

GCP Applied Technologies

MONOKOTE Z-156 Test Reports

| | |
|-----------------------------------|---------|
| ASTM E736 Cohesive Adhesive ASTM | Page 2 |
| E761 Compressive Strength | Page 5 |
| ASTM E859 High Speed Air Erosion | Page 8 |
| ASTM G21 Mold Resist | Page 12 |
| UL E84 Flame Spread Smoke Develop | Page 24 |



COHESION/ADHESION – ASTM E736-11

MONOKOTE® Z-156

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

GCP APPLIED TECHNOLOGIES INC. (FORMERLY W.R. GRACE & CO.)

CAMBRIDGE, MASSACHUSETTS

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

Copyright 2014 GCP Applied Technologies Inc. (formerly W.R. Grace & Co.)



COHESION/ADHESION ABSTRACT

Significance: This test measures the adhesive force required to separate the material from the base, or the cohesive force within the material and is an indication of the ability of sprayed fire-resistive material to remain in place and resist separation during anticipated service conditions.

The test was conducted using a modified ASTM E-736 “Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members” test procedure¹.

Results: The average cohesive strength of three individual Monokote® Z-156 test panels on hot rolled steel was 20,680 pounds per square foot (psf).

REPORT DETAILS

Date of Test: April 30, 2014 (sample preparation); June 12, 2014 (testing)

Identification of Specimen: Bags of Monokote® Z-156 were selected at random as produced by Grace Construction Products, GCP Applied Technologies Inc. (formerly W.R. Grace & Co.). Each bag contained the label of Underwriters' Laboratories, Inc. Each bag of the Monokote® Z-156 was mixed with water in a mechanical mixer in accordance with the noted instructions to produce a uniform slurry having a mixer density of 54.4 pounds per cubic foot (pcf) and a nozzle density of 67.0 pcf. The procedures represented typical field construction practices and complied with the instructions printed on the Monokote® Z-156 bags. Subsequent measurements completed on a test panel sprayed during sample preparation activities provided a laboratory dry density of 49.6 pcf.

Description of Test:

I. Apparatus:¹

- A. Wood cap 1.25 inches in diameter with a hook attached at the center.
- B. Two component epoxy resin system.
- C. A standard hydraulic tensile machine.
- D. Load cell – 12,000 pound capacity.

1. Modified to allow for high density, high strength materials in accordance with AWCI Appendix B Bond Test.

II. Test Specimen:

- A. Substrate – 12” x 12” x 0.25”, hot rolled steel sheet (3 tests).
- B. Monokote® Z-156 was spray-applied and allowed to dry to constant weight at laboratory conditions (68 °F ± 18 °F) [20 °C ± 10 °C].



III. **Procedure:**

Prior to testing, a 1 3/8 inch hole was drilled ¼ inch deep into the surface of the Monokote® Z-156 using an appropriately sized Forstner bit. A 1¼ inch diameter round wood ring was then glued into the hole 24 hours prior to testing. Care was taken to avoid epoxy running out from the test area onto the surrounding specimen surface. A metal eye hook, having sufficient strength to support the expected test force, was secured to the plug to provide a means of securing the cross head to the specimen.

The specimens were tested using a standard Tinius Olsen materials testing apparatus. Care was taken during the test to maintain the test surface parallel to the crosshead of the Tinius Olsen. A crosshead speed of 0.05 inches/minute was used to pull the adhered plugs from the Monokote® Z-156. The test was continued to failure.

IV. **Calculations:** The cohesive/adhesive force is calculated as:

$$CA = F/A$$

Where:

CA = Cohesive/Adhesive force, (lbs/ft²);

F = Recorded force, (lb.);

A = Area of the wood plug, (ft²) = 0.008522108 ft²

V. **Test Data:**

| SPECIMEN | MAXIMUM APPLIED LOAD (lbs) | MAXIMUM C/A FORCE (psf) | FAILURE TYPE |
|----------------|----------------------------|-------------------------|-----------------|
| 1 | 184.4 | 21638 | Cohesive |
| 2 | 162.6 | 19080 | Cohesive |
| 3 | 181.7 | 21321 | Cohesive |
| AVERAGE | 176.2 | 20680 | Cohesive |

Thickness Tested – 0.75"

Monokote® Z-156 Density – 49.6 pcf

Official Observers:

Steve Ackerman, PE - Froehling & Robertson, Inc.

Doug Macy - GCP Applied Technologies Inc. (formerly W.R. Grace & Co.)

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

Ryne Turner, PE

CMT Manager

I certified this as an exact copy of the report generated by F&R in 2014



COMPRESSIVE STRENGTH – ASTM E761-11

MONOKOTE® Z-156

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

GCP APPLIED TECHNOLOGIES INC. (FORMERLY W.R. GRACE & CO.)

CAMBRIDGE, MASSACHUSETTS

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

Copyright 2014 GCP Applied Technologies Inc. (formerly W.R. Grace & Co.)



COMPRESSIVE STRENGTH ABSTRACT

Significance: This test measures the compressive strength of sprayed fire - resistive materials and is a measure of the resistance to deformation under a compressive load.

The test was conducted in general accordance with ASTM E761-11 "Compressive Strength of Sprayed Fire - Resistive Materials Applied to Structural Members."

Results: The samples of Monokote® Z-156 required an average uniform compressive load of 874.7 pounds per square inch (psi) to compress them to 10 percent deformation.

REPORT DETAILS

Date of Test: April 30, 2014 (sample preparation); June 12, 2014 (testing)

Identification of Specimen: Bags of Monokote® Z-156 were selected at random as produced by Grace Construction Products, GCP Applied Technologies Inc. (formerly W.R. Grace & Co.). Each bag contained the label of Underwriters' Laboratories, Inc. Each bag of the Monokote® Z-156 was mixed with water in a mechanical mixer in accordance with the noted instructions to produce a uniform slurry having an average mixer density of 54.4 pounds per cubic foot (pcf) and a nozzle density of 67.0 pcf. The procedures represented typical field construction practices and complied with the instructions printed on the Monokote® Z-156 bags. Subsequent measurements completed on a test panel sprayed during sample preparation activities provided a laboratory dry density of 49.6 pcf.

Description of Test:

I. Apparatus

- A. Tinius-Olsen universal testing machine with loading and crosshead travel distance recorder.
- B. Spherical bearing block assembly having a plane bearing surface 6" x 6" square. A steel plate measuring 3" x 3" was used to center loading on the fireproofing material.

II. Test Specimen: Specimens consisted of nominal 7" x 24" x 1.25" Monokote® Z-156 applied to a galvanized steel sheet approximately 0.25" in thickness. This resulted in an actual Z-156 thickness of approximately 1.00". Two individual specimens of the prepared panels were tested.

III. Procedure:

- A. After initial room temperature curing for 72 hours, the specimens were force dried in a drying oven maintaining a temperature of 110 ± 10 °F and a relative humidity less than 60% in order to reach constant weight.



- B. The compressive load was applied perpendicular to the face of the test specimen, with the bearing block on top of the specimen. The initial thickness for the deformation calculation was measured between the bearing surface and the steel substrate after the initial load of 0.1 psi had been applied.
- C. The crosshead speed of the testing machine was set at 0.05 inches per minute during compression to 10 percent deformation.

IV. Calculations: The compressive strength is calculated as:

$$CS = L/A$$

Where:

CS = Compressive strength at 10% deformation, (lbs./in²)

L = Recorded compressive load at 10% deformation (lb.)

A = Area of load bearing surface, (in.²)

V. Test Data:

| SPECIMEN | MAXIMUM APPLIED LOAD (lbs) | MAXIMUM STRENGTH (psi) |
|----------------|----------------------------|------------------------|
| 1 | 7842 | 871.3 |
| 2 | 7903 | 878.1 |
| AVERAGE | 7872 | 874.7 |

Thickness Tested – 1.25" (incl. galvanized sheet)

Z-156 Density – 49.6 pcf

Official Observers:

Steve Ackerman, PE - Froehling & Robertson, Inc.

Doug Macy - GCP Applied Technologies Inc. (formerly W.R. Grace & Co.)

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

Ryne Turner, PE

CMT Manager

I certified this as an exact copy of the report generated by F&R in 2014



VERY HIGH SPEED

AIR EROSION TEST [100 MPH]

MONOKOTE TYPE Z-156

FIRE RESISTIVE MATERIAL

MADE FOR

GRACE CONSTRUCTION PRODUCTS

GCP APPLIED TECHNOLOGIES INC. (FORMERLY W.R. GRACE & CO.)

TRAVELERS REST, SOUTH CAROLINA

MADE BY

FROEHLING & ROBERTSON, INC.

GREENVILLE, SOUTH CAROLINA

Copyright 1998 GCP Applied Technologies Inc. (formerly W.R. Grace & Co.)



AIR EROSION TEST

ABSTRACT

Significance: This test measures the effect of a high speed air stream upon fire-resistive materials, and evaluates the resistance to dusting, flaking, spalling and delamination of the fire-resistive material.

The test was conducted in accordance with a modified version of ASTM E-859 "Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members." Modifications were made to the duct system and therefore the sample size [see "Description of Test"] to achieve a higher velocity than described in the test method.

Results: Monokote Type Z-156 when subjected to tangential air stream of a velocity of 9,000 ft./min. or 102.2 m.p.h. [2,743 m/min. or 164.4 Km/hr.] resulted in a weight loss of 0.000 grams at one hour, 0.000 grams during the next 5 hours, and 0.000 grams during the next 18 hours (24 hours test time). The total weight loss was 0.000 grams per ft.² [0.000 grams per meter²] in 24 hours. The test density was 36.70 lbs./ft.³ [588 Kg/m³].

REPORT DETAILS

Date of Test: June 15, 1998

Identification of Specimen: Randomly selected of bags of Monokote Type Z-156 as produced by Grace Construction Products, GCP Applied Technologies Inc. (formerly W.R. Grace & Co.) were used. Each bag of Monokote Type Z-156 contained the label of Underwriters' Laboratories, Inc. Each bag of Monokote Type Z-156 was mixed with water in a mechanical mixer in accordance with the instructions on each bag of material to produce a cohesive uniform slurry having an average mixer density of 50.0 lbs./ft³ [801 Kg/m³] and a nozzle density of 55.4 lbs./ft³ [887 Kg/m³]. The procedures truly represented typical field construction practices and complied with the instructions printed on the Monokote Type Z-156 bags.

Description of Test:

- I. Apparatus
 - A. Application Base - 12 gauge galvanized steel sheet 7.875" by 65.5" [200 mm by 1664 mm].
 - B. Duct System - A duct made of 12 gauge galvanized steel 69 inches long [1.75 meters], with a rectangular cross section of 3" by 6" [76 mm by 152 mm]. The duct had a 6" by 63.5" [152 mm by 1613 mm] opening at the top to accept the test sample. (2.65 ft.² or 0.246 m² exposed area).
 - C. Blower - capable of moving air through the entire cross section of the duct at a velocity of 9,000 ft./min. or 102.2 m.p.h. [2,743 m/min. or 164.4 Km/hr.].
 - D. Pitot Tube - used in conjunction with a manometer to measure air velocity in the duct.



- E. Filter - A collecting filter was attached at the exhaust end of the duct. Filter fabric was 30 denier nylon constructed with 94 ends per inch [25.4 mm] and 82 picks per inch [25.4 mm].
- F. Scale - balance having a capacity of 100 grams with sensitivity of ± 0.001 gram.

II. **Test Specimen:**

A. Substrate - 12 gauge galvanized steel sheet 7.875" by 65.5" [200 mm by 1664 mm] onto which the Monokote Type Z-156 was spray applied at 0.798 inch [20.3 mm] thickness. The specimen as sprayed was allowed to cure and dry at laboratory conditions. The test was conducted 221 days after application of the Monokote Type Z-156.

- III. A. The collecting filter was dried for one hour at 120° F [49° C], weighed and placed in the apparatus.
- B. The specimen was placed into the duct opening so the face of the specimen and the inside face of the duct opening were flush and in the same plane and sealed in place using silicone rubber adhesive. The edges overlapped the duct opening by 1 inch [25.4 mm].
- C. The pitot tube was positioned in the center of the tube cross section at the upstream end of the test specimen.
- D. With the filter in place, the blower was maintained at an average velocity of 9,000 ft./min. or 102.2 m.p.h. [2,743 m/min. or 164.4 Km/hr.].
- E. The blower was stopped at intervals of 1, 6, and 24 hours, the collecting filter removed, dried, and re-weighed.

IV. **Test Data:**

- A. Density = 36.7 lbs./ft³ [588 Kg/m³]
- B. Thickness tested = 0.798 inches [20.3 mm]
- C. Exposed area = 2.65 ft.² [0.246 m²]

| Filter Weight (grams) at: | 1 hour | 6 hours | 24 hours |
|---|--------|---------|----------|
| Ending | 3.823 | 3.832 | 3.800 |
| Starting | 3.823 | 3.832 | 3.800 |
| Weight loss by sample | 0.000 | 0.000 | 0.000 |
| Total weight loss (24 hours) = 0.000 grams | | | |
| Total weight loss per ft. ² = 0.000 grams [per m ² = 0.000 grams] | | | |



Official Observers:

Ken Huffman, Allen Ridenour - Froehling & Robertson, Inc.

Walter R. Payment - for GCP Applied Technologies Inc. (formerly W.R. Grace & Co.)

The data included in this report constitutes all the tests that were witnessed.

Respectfully submitted,
FROEHLING & ROBERTSON, INC.

A handwritten signature in black ink, appearing to read 'R. Turner', is written over a horizontal line.

Ryne Turner, PE
CMT Manager

I certified this as an exact copy of the report generated by F&R in 1998

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

TITLE PAGE

Study Title

ASTM Designation: G21-96 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi"

Products Identity

Monocyte Z-156

Test Microorganisms

Penicillium funiculosum ATCC 11797

Aspergillus brasiliensis ATCC 9642

Chaetomium globosum ATCC 6205

Trichoderma virens ATCC 9645

Aurobasidium pullulans ATCC 15233

Author

Laura Higgins, B.S.

Kalpa Mehta, Ph.D.

Participating Study Personnel

Laura Higgins, B.S.

Kalpa Mehta, Ph.D.

Reviewed By:

D. Ugarte

Study Completion Date

26 NOV 2012

Study Report amended: 29 SEP 2016

Testing Facility

Antimicrobial Test Laboratories

1304 W. Industrial Blvd.

Round Rock, Texas 78681

Antimicrobial Test Laboratories Study ID

NG3645

CONCLUSION

A liquid suspension of the pooled fungal species was applied to the test substance Monokote Z-156. After a 60 day incubation period at 30 ± 2 °C, the test substance demonstrated no signs of supporting fungal growth, therefore it is determined that Monokote Z-156 does not provide a carbon source for fungal growth.

STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS

No claim of confidentiality is made for any information contained in this study (sign if applicable)

Company: _____

Agent: _____

Title: _____

Date: _____

Signature: _____

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

LABORATORY QUALITY ASSURANCE STATEMENT

This study was performed in accordance with Antimicrobial Test Laboratories Standard Operating Procedures (SOPs) related to Experimental Quality and Control.

In general, this suite of SOPs specifies the following:

- Laboratory equipment and devices are verified to function properly and calibrated internally or externally as appropriate to ensure experimental quality.
- Each experiment is evaluated relative to rigorous in-process experimental controls.
 - o Media sterility controls (negative controls)
 - o Vehicle (carrier) sterility controls
 - o Media growth controls (positive controls)
 - o Verification of positive cultures as target organism
- Review by Antimicrobial Test Laboratories' Scientific Director, Benjamin Tanner, Ph.D. for scientific clarity, accuracy, and completeness.

This study is exempt from 40 CFR Part 160 (non-GLP). Per sponsor communication, data not intended to support a United States antimicrobial pesticide registration.

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

TABLE OF CONTENTS

| | |
|--|----|
| TITLE PAGE..... | 1 |
| STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS..... | 3 |
| LABORATORY QUALITY ASSURANCE STATEMENT..... | 4 |
| TABLE OF CONTENTS..... | 5 |
| FINAL STUDY REPORT..... | 6 |
| SUMMARY OF THE TEST METHOD..... | 7 |
| TEST INFORMATION..... | 9 |
| RESULT TABLES AND CHARTS..... | 10 |
| PHOTOS FROM STUDY..... | 11 |
| STUDY ACCEPTANCE CRITERIA..... | 12 |
| STUDY RECORD AND SPECIMEN RETENTION..... | 12 |
| STUDY CONCLUSION..... | 12 |
| REFERENCES..... | 13 |

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

FINAL STUDY REPORT

Study Title

ASTM Designation: G21-09 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi"

Study Number

NG3645

Study Sponsor

Bret Simpson
GCP Applied Technologies

Test Facility

Antimicrobial Test Laboratories
1304 W. Industrial Blvd.
Round Rock, Texas 78681

Study Director

Laura Higgins, B.S.
Kalpa Mehta, Ph.D.

Study Completion Date

26 NOV 2012

Study Objective

To assess the potential for mold growth on products and to evaluate the products as a potential food source for mold growth.

SUMMARY OF THE TEST METHOD

Materials

- Pure culture of each test system (microorganism).
- Sufficient quantity of test substance(s).
- Sufficient quantity of clean, sterile plastic Petri dishes containing solidified Nutrient Salts Agar.
- Sufficient volume of sterile Nutrient Salts Solution.
- Bunsen burner, microbiological incinerator, or micro-torch as appropriate to ensure rapid and complete flame-sterilization of forceps and/or loops.
- Sufficient quantity of micropipettes and appropriately sized sterile micropipette tips.
- Automatic pipettor (PipetAid or similar) and various sizes of sterile serological pipettes.
- Sufficient quantity of sterile 50ml centrifuge tubes.
- Preval sprayer and jar or other equivalent atomizer.
- Sterile 10-20ml syringe.
- Sterile glass wool.
- Incubators capable of sustaining temperatures of 30 ± 2 °C.
- Sufficient amount of sterile Fisher P2 Filter paper
- Centrifuge
- Sufficient amount of sterile RO Water
- Sufficient amount of Triton X-100

PROCEDURE

Preparation of Test Cultures

- Test cultures are initiated from the monthly working stock plates. Each culture is incubated at 30 ± 2 °C.
- Plates are washed with a 10ml volume of sterile distilled, de-ionized or reverse osmosis water (or other equivalent sterile solution such as phosphate buffered saline) supplemented with 0.1% Triton X-100.
- Suspended fungal growth is decanted into separate sterile 50ml conical centrifuge tubes.
- Each spore suspension is passed through a syringe (without plunger) with a thin layer of sterile glass wool inside the bottom of the syringe. The volume passed through the glass wool syringe is collected in a separate 50ml conical tube. Each tube is washed with sterile water or phosphate buffered saline and the volume is collected in the same collection vessel.
- Each spore suspension is centrifuged at 1,000 rpm for 10 minutes and suspended in sterile water or phosphate buffered saline. Spores are centrifuged for a total of two times and the final spore suspension suspended in 10ml Nutrient Salts Solution.
- A 5-10ml aliquot of each spore suspension is added to a sterile Preval sprayer jar.
- Sterile Nutrient Salts Solution is added to bring the final volume to 100ml.

Preparation of Test Substance and Controls

- The test substance is cut to approximately 2" x 2" and placed on the surface of the Nutrient Salts Agar.
- A sterile 1" x 1" filter paper is cut and placed on the surface of the Nutrient Salts Agar, and serves as the positive control for the test.
- A blank Nutrient Salts Agar plate is used as the negative control.
- All samples (including positive and negative controls) are inoculated by spraying the surface with the pooled spore suspension for approximately 1 second, or until surface is visibly moistened.
- Once all the plates have been inoculated, the plates are covered, sealed and placed into the incubator at 30 ± 2 °C with no less than 85% relative humidity.
- The samples are incubated over 28 days or other as requested by the Study Sponsor. During the incubation period, observations are made at intervals of 7 days. The test may be terminated at the discretion of the Study Sponsor, before the 28 day mark if samples show a rating of 2 (light growth) or higher. Observations of 0 (no growth) will be confirmed by microscopic observation and the magnification used should be noted.
- Once the contact time is met the samples are removed from the incubator, observations are made and plates are properly disposed of.

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

TEST INFORMATION

Client Information

Company Name: GCP Applied Technologies
Study Sponsor: Bret Simpson
Sponsor's Email: Bret.T.Simpson@grace.com

General Test Information

Test Performed: ASTM G21
ATL Study ID: NG3645
Performed By: L. Higgins
Date Initiated: 27 SEP 2012
Date Completed: 26 NOV 2012

Test Substance Information

Name: Monokote Z-156
Date Received: 25 SEP 2012

Test Parameters

Microorganisms: *Penicillium funiculosum* ATCC 11797
Aspergillus brasiliensis ATCC 9642
Chaetomium globosum ATCC 6205
Trichoderma virens ATCC 9645
Aurobasidium pullulans ATCC 15233

Contact Temperature: 30 ± 2 °C
Contact Humidity: $\geq 85\%$
Inoculum Volume: 1 second spray
Suspension Medium: Nutrient Salts Solution
Agar Medium: Nutrient Salts Agar
Contact Time: 60 days
Replicates: Triplicate

Controls

Negative Control: Passed; all plates showed <10% growth
Positive Control: Passed; all plates showed copious growth

The data reported herein represents the results of the product(s) submitted to Antimicrobial Test Laboratories when tested under the conditions and method reported, and not necessarily that of all product(s) bearing the same product name and/or manufacturer.

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

RESULT TABLES AND CHARTS

Observations are qualitatively made on a scale from 0-4 as follows:

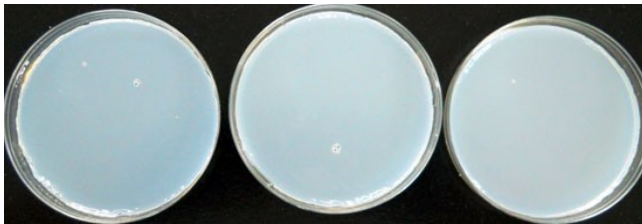
| Score | Description |
|-------|--|
| 0 | No growth detected on sample |
| 1 | Traces of growth detected on sample (<10%) |
| 2 | Light growth detected on sample (10%-30%) |
| 3 | Medium growth detected on sample (30%-60%) |
| 4 | Heavy growth detected on sample (60%-Complete) |

RESULTS:

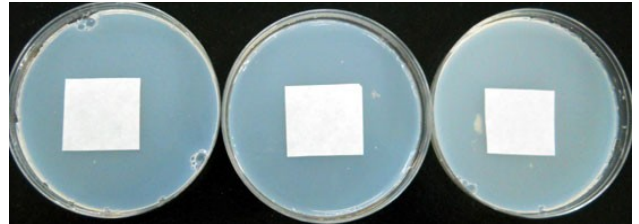
| Incubation Time and Score | | | | |
|---------------------------|----------------------|-------------|-------------|-------------|
| Date | Sample | Replicate 1 | Replicate 2 | Replicate 3 |
| Day 60 (26NOV2012) | ATL Negative Control | 1 | 1 | 1 |
| | ATL Positive Control | 4 | 4 | 4 |
| | Monokote Z-156 | 0 | 0 | 0 |

PHOTOS FROM STUDY

Day 0



ATL Negative Control

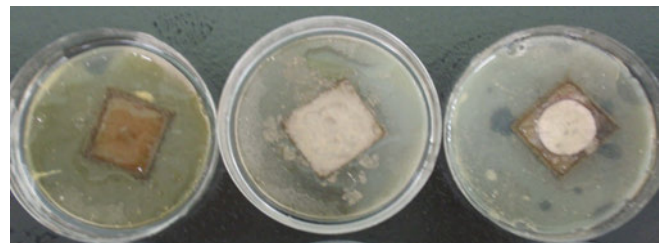


ATL Positive Control

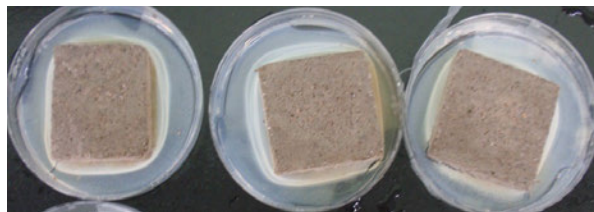
Day 60



ATL Negative Control



ATL Positive Control



Monokote Z-156

STUDY ACCEPTANCE CRITERIA

Success Criteria

- The experimental success (controls) criteria follow:
 1. After 14 days of incubation, copious amounts of growth are observed on all three of the positive control specimens.
 2. After 14 days, less than 10% of growth is observed on all three negative control plates.

STUDY RECORD AND SPECIMEN RETENTION

Study Record Retention

This study report and corresponding data sheets will be held by Antimicrobial Test Laboratories at the following address for at least 2 years after the date of this report:

Antimicrobial Test Laboratories
1304 W. Industrial Blvd.
Round Rock, Texas 78681

Specimen Retention

The test substances used in Non-GLP studies are disposed of after 30 days unless otherwise requested by the study sponsor.

STUDY CONCLUSION

A liquid suspension of the pooled fungal species was applied to the test substance Monokote Z-156. After a 60 day incubation period at 30 ± 2 °C, the test substance demonstrated no signs of supporting fungal growth, therefore it is determined that Monokote Z-156 does not provide a carbon source for fungal growth.

ANTIMICROBIAL TEST LABORATORIES

Study ID: NG3645

Client: GCP Applied Technologies

Protocol: ASTM G21

REFERENCES

1. ASTM G21-09. Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi. West Conshohocken, PA: American Society for Testing and Materials.



BLPR.R4339 Cementitious Cement and Plaster Mixtures

[Page Bottom](#)

Cementitious Cement and Plaster Mixtures

[See General Information for Cementitious Cement and Plaster Mixtures](#)

GCP APPLIED TECHNOLOGIES INC

R4339

FIRE OPERATING UNIT
62 WHITTEMORE AVE
CAMBRIDGE, MA 02140 USA

Cementitious mixtures applied to inorganic reinforced cement board and/or foamed plastic.

Applied To Inorganic Reinforced Cement Board

| | MK-4 | MK-5 | RG | Type 105 | KM-106 |
|-----------------|------|------|----|----------|--------|
| Flame Spread | 10 | 10 | 0 | 0 | 0 |
| Smoke Developed | 0 | 0 | 0 | 0 | 0 |

| | Z-3306G | MK-6/HY or MK-6/HB or MK-10/HB or MK-10/HB ES or MK-6/HY ES | Z-106/HY | MK-6 GF or MK-6 GF Extended Set | MK-6s or Z-106G or MK-1000/HB or MK-1000/HB Extended Set | AK-1 |
|-----------------|---------|---|----------|---------------------------------------|---|------|
| Flame Spread | 0 | 0 | 5 | 0 | 0 | 0 |
| Smoke Developed | 0 | 0 | 0 | 0 | 0 | 0 |

| | Type 105 | Type Z-106 | Type KM-601 | Type Z-146, Z-146 NPP, Z-146PC, Z-146T, Z-156, Z-156PC, Z-156T | Monokote Acoustic 1 | Monokote Acoustic 5 | Monokote Acoustic 35 |
|-----------------|-------------|---------------|----------------|--|------------------------|------------------------|-------------------------|
| Flame spread | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smoke developed | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | Applied to Inorganic Reinforced Cement Board in a Max Thk of 1 In. Type Z-3300TB+, ++ |
|-----------------|--|
| Flame Spread | 5 |
| Smoke Developed | 0 |

| | Applied to Inorganic Reinforced Cement Board In a Max Thk of 1/2 in. Type Z-Acoustical Plaster |
|-----------------|---|
| Flame Spread | 0 |
| Smoke Developed | 0 |

+ FOR SURFACE BURNING CHARACTERISTICS APPLIED OVER FOAMED PLASTIC, SEE CLASSIFICATION MARKING OF UNDERWRITERS LABORATORIES INC. ON PRODUCT OR CARTON.

++ Systems utilizing cementitious mixture covering over 2 in. thickness of foamed plastic, fire tested in accordance with the International Conference of Building Officials Research Committee Acceptance Criteria for Foam Plastics under Section 1717 (b) of the 1976 Uniform Building Code.

| | Applied Over 2 In. Thk Foamed Plastic |
|-----------------|--|
| Flame Spread | 0 |
| Smoke Developed | 0 |

| | In. a Min Thkns of 1/2 In. Type Z-3300TB†† |
|-----------------|---|
| Flame spread | 10 |
| Smoke developed | 0 |

* A Foamed plastic formed by the simultaneous spraying of two liquid components (CPR-485, Component "A" and CPR-485, Component "B") as manufactured by The Upjohn Company, CPR Division. This foamed plastic has values of Over 200 for flame spread, 15 for fuel contributed and Over 500 for smoke developed.

* A1 Systems utilizing 3/4 in. thick cementitious mixture covering over 2 in. thickness of foamed plastic, fire tested in accordance with the Uniform Building Code Standard 26-3.

| | Applied Over 2 In. Thk Foamed Plastic * In. a Min Thkns of 1/2 in. Type Z3300TB* |
|-----------------|---|
| Flame spread | 5 |
| Smoke developed | 0 |

* Foamed plastic in the form of boards identified as Type B and manufactured by GCP Applied Technologies Inc. and bearing the Fire Hazard Classification Marking of Underwriters Laboratories Inc. The 2 in. thickness of foamed plastic exhibited values of 5 for flame spread, not determinable for fuel contributed, and 40 for smoke developed, while material remained in original test position; ignition of molten residue on the furnace floor resulted in flame travel equivalent to calculated Flame Spread Classification of 100 and Smoke Developed Classification of Over 500.

** A system utilizing 1/2 in. thickness of cementitious mixture covering 2 in. thickness of foamed plastic,thickness of foamed plastic.

**FOR SURFACE BURNING CHARACTERISTICS SEE CLASSIFICATION MARK
OF UL ON PRODUCT OR CARTON**

Last Updated on 2016-09-23

[Questions?](#)

[Print this page](#)

[Terms of Use](#)

[Page Top](#)

© 2016 UL LLC

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2016 UL LLC".