Test Report Number PR050321.CAR

Fungus Testing of:
Quiet-Tech acoustic Insulation Batts

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REVISION PAGE

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SIGNATURES

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1.0 PURPOSE

This report describes the methods used for Fungus Resistance testing of the Quiet-Tech Acoustic Insulation Batts submitted by CarpetCycle LLC. This test program was conducted to determine the ability of the above samples to successfully satisfy the requirements specified in the references listed in section 2.0 of this report.

1.1 Test Program Sequence

1.1.1. Receipt Inspection

Upon receipt at NTS, the Samples were visually inspected to ensure there had been no damage due to shipping/handling, and to confirm that the test model number and serial number coincide with those on the packing list.
No discrepancies or damage was observed.

1.1.2. Functional Test

Not Applicable

1.1.3. Testing

Tests and Test Methods

Test	Standard/Test Method
Fungus	ASTM Designation: C 1338-00

2.0 APPLICABLE DOCUMENTS

2.1 CarpetCycle LLC Purchase Order Number: MSRQT6282016

2.2 NTS Quotation Number: OP0198938

2.3 ASTM Designation: C 1338-00

Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings, 2000

2.4 ISO 17025:2005

General requirements for the competence of testing and calibration laboratories

2.5 NTS Corporate Quality Policy Manual

Revision 8, Dated April 22, 2016

3.0 TEST ITEMS

3.1 Description

Qty.	Item	P/N	S/N
5	Quiet-Tech acoustic Insulation Batts	N/A	N/A

3.2 Security Classification of Items

None

4.0 TEST DATE(S) AND EQUIPMENT

4.1 Test Date(s)

Test	Date(s)
Fungus	6/29/16 - 7/27/16

4.2 Test Equipment

The instrumentation used in the performance of these tests is periodically calibrated and standardized within the manufacturers rated accuracies and are traceable to the National Institute of Standards and Technology. The calibration procedures and practices are in accordance with ANSI/NCSL Z540-1 and ISO 17025:2005. Certification of calibration is on file subject to inspection by authorized personnel.

5.0 GENERAL TEST REQUIREMENTS

5.1 Test Facility

The Samples were tested for Fungus Resistance at NTS test facilities located in Tinton Falls, NJ.

5.2 Test Sample Configuration

The test item configurations are documented in the photographs contained in this test report.

5.3 Pass/Fail Criteria

Samples on which the growth is less than that on the comparative item shall be considered to have passed. Test samples with growth greater than that on the comparative item shall be considered to have failed.

6.0 TEST PROCEDURE

6.1 Fungus: ASTM Designation: C 1338-00

6.1.1. Requirement

The Purpose of the fungus resistance test is to assess the extent to which the samples will support fungal growth. The samples were tested for fungus resistance using ASTM Designation C 1338-00. A test duration of 28 days was used.

6.1.2. Test Procedure

Preparation for incubation.
Step 1. Viability Specimens were prepared by placing a 1" x 1" piece of sterilized filter paper on each of two solidified Czapek Dox agar petri dishes. A third petri dish was prepared with Sabouraud Dextrose agar. The comparative material was a 0.75" x 6" white birch tongue depressor.
Step 2. The test specimens, viability controls and comparative material were inoculated with the mixed fungal spore suspension by spraying the suspension on the items in the form of a fine mist from an atomizer.
Step 3. The test specimens controls and comparative material were placed in the test chamber. Incubation started immediately following the inoculation.

Incubation of the test item(s).
Step 1. The test items were incubated in the chamber at 95 ±4% relative humidity and 30 ±2°C (86 ±4°F) for the test duration. (28 days).
Step 2. After 7 days, fungal growth on the controls was inspected to verify the environmental conditions in the chamber were suitable for growth as well as the viability of the inoculum. At this time at least 90 percent of the control surface area was covered by fungus. The controls were left in the chamber for the duration of the test.

Inspection.
At the end of the incubation period, the test items were inspected immediately under 60X magnification. See test data in Appendix B for more information.

6.1.3. Conclusions

The insulation samples passed the ASTM C 1338 fungus test by having less growth than the comparative material. Growth was consistent over the control material while the samples showed more scattered growth with many areas of light to no growth on the tested samples. Please reference Appendix B for Test Data and Appendix C for photographs.

Appendix A, Test Equipment List

Test Equipment

NTS #	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WC005393	VWR	Incubator	RF2425	RF10107605	5/26/16	5/26/17
WC005541	Reichert	Brightline Hemacytometer	1492	072201-001	06/27/07	N/A Note 1
WC005557	LabGlass	250ml Reagent Atomizer	24/40	N/A	NCR	NCR
WC024124	Keyence	Digital Microscope System	VHX-700FE	Z0331120020	NCR	NCR
WC005517	Wild Heerbrugg	60-500X Microscope	M8	N/A	NCR	NCR
WC005711	ESCO	Labculture Reliant Class II Type A2 Biohazard Safety Cabinet	LR2-3S2-E	2013-82966	1/6/16	1/6/17
WC005709	Navitar	Microscope Light Source	20500120	114860	NCR	NCR
WC005833	Beckman	Centrifuge	J-21B	2838	NCR	NCR
WC005748	Tuttnauer Brinkman	Autoclave	3545EP	2503027	10/20/15	10/20/16
WC005782	Intelligent Weighing Technology	Balance	IL-120	1091797	5/18/16	5/18/17
WC005751	Intelligent Weighing Technology	Balance	PB-720	IT0901958	10/23/15	10/23/16
WC005753	Dragon Lab	Hot Plate Stirrer	MS-H-Pro	0M1SD100003	NCR	NCR
WC024110	Hanna Instruments	pH/ORP/ISE, EC/TDS/NaCl/Resistivity, Temperature Bench Meter	HI 3512	08699357	5/23/16	5/23/17
WC005750	Van Guard	Microscope	1431BRi	12756	NCR	NCR
WC005752	—	Butane Micro Burner	3017-1	N/A	NCR	NCR

Note 1 – After initial calibration, no periodic calibration is required.

Appendix B, Fungus Data

Fungus Test

ASTM Designation: C 1338-00

The mixed fungus spore suspension in a mineral salts solution (pH 6.26) was prepared using the following fungi with the concentrations show:

Counts were performed with a Brightline Hemacytometer S/N 072201-001 (NJ1381).

Species	Final Concentration	Amount To Use
Aspergillus niger	1.043 X 10^6 cells/ml	10 ml
Penicillium funiculosum	1.047 X 10^6 cells/ml	10 ml
Aspergillus flavus	1.047 X 10^6 cells/ml	10 ml
Aspergillus versicolor	1.043 X 10^6 cells/ml	10 ml
Chaetomium globosum	0.048 X 10^6 cells/ml	10 ml

TEST RESULTS

Presence of evidence of fungal growth on controls:

The inoculated filter paper on the plates – Covered with growth
Sabouraud Dextrose agar plate – Covered with growth
The comparative material – Fungal growth and spores covering material

Fungal growth on the samples:

No.	Part Description	Appearance	Species
1	Insulation samples (white string side, we'll call the bottom, down)	Loosely spread microbial colonies and filamentous growth, but growth is non-continuous with intermittent areas of little to no growth. *A. versicolor* is the most consistently seen species, with some scattered colonies of *P. funiculosum*. Some samples had higher density of	*Aspergillus versicolor* *Penicillium funiculosum* *Aspergillus niger (only associated with salt deposits)*

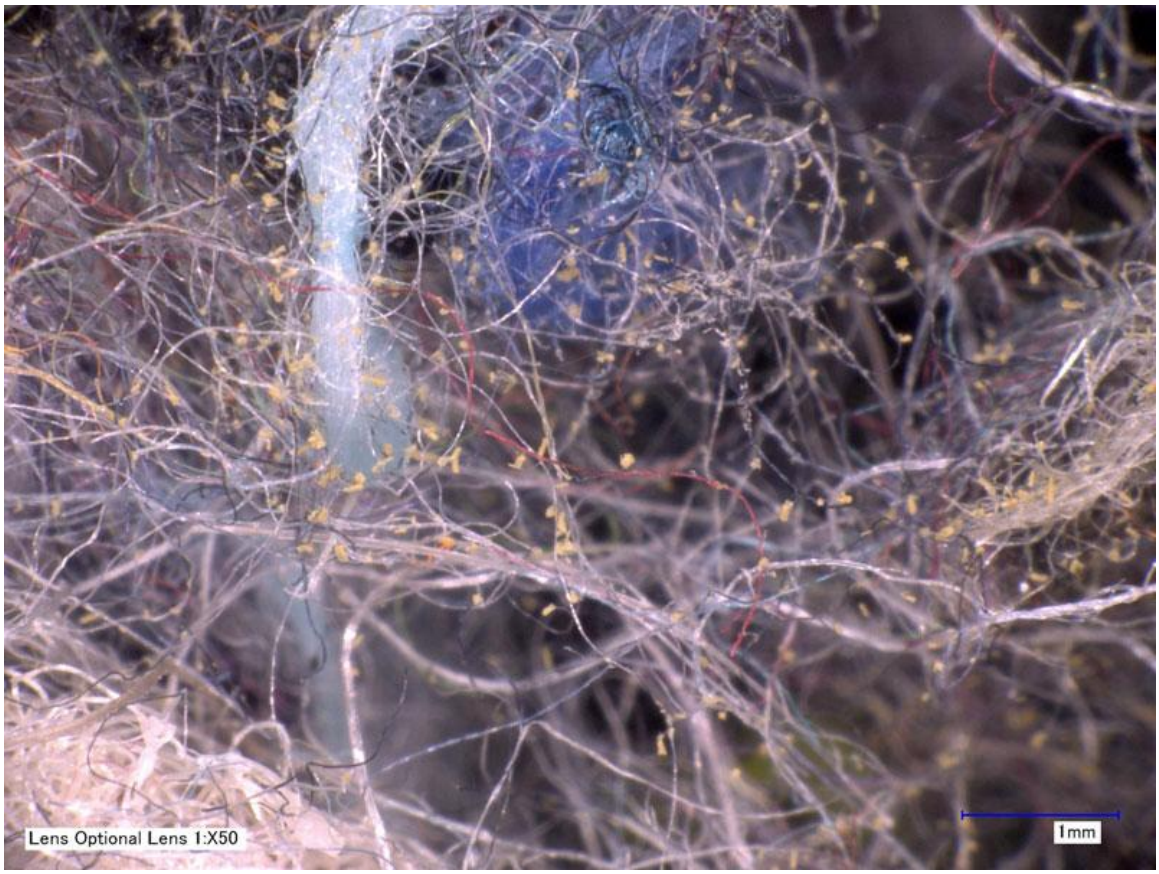
		overall growth than others, but generally, there was a lot of variability, and some areas light growth, unlike the control which had a consistent coating of homogeneous growth. *A. niger* fruiting bodies are infrequent, and are only seen associated with salt deposits (from the inoculation solution).	
2	White Thread along base of samples (two samples were inoculated and placed in chamber with the thread side up)	No growth is seen to be specifically attached to matrix of white thread.	NA
	Comparative material – Puritan brand standard tongue depressor (white birch)	Loosely spread microbial colonies and filamentous growth covering substrate surface; *A. versicolor* and *A. niger* are evenly and commonly distributed all over the surface with no gaps and notably tall healthy growth of *A. niger*; *P. funiculosum* colonies are common, but not continuous over surface. *A. flavus* is rare with only a few fruiting bodies seen.	*Aspergillus versicolor* *Aspergillus niger* *Penicillium funiculosum* *Aspergillus flavus(rare)*

Appendix C, Photographs

Test Setup showing test specimens, controls, and comparative item.

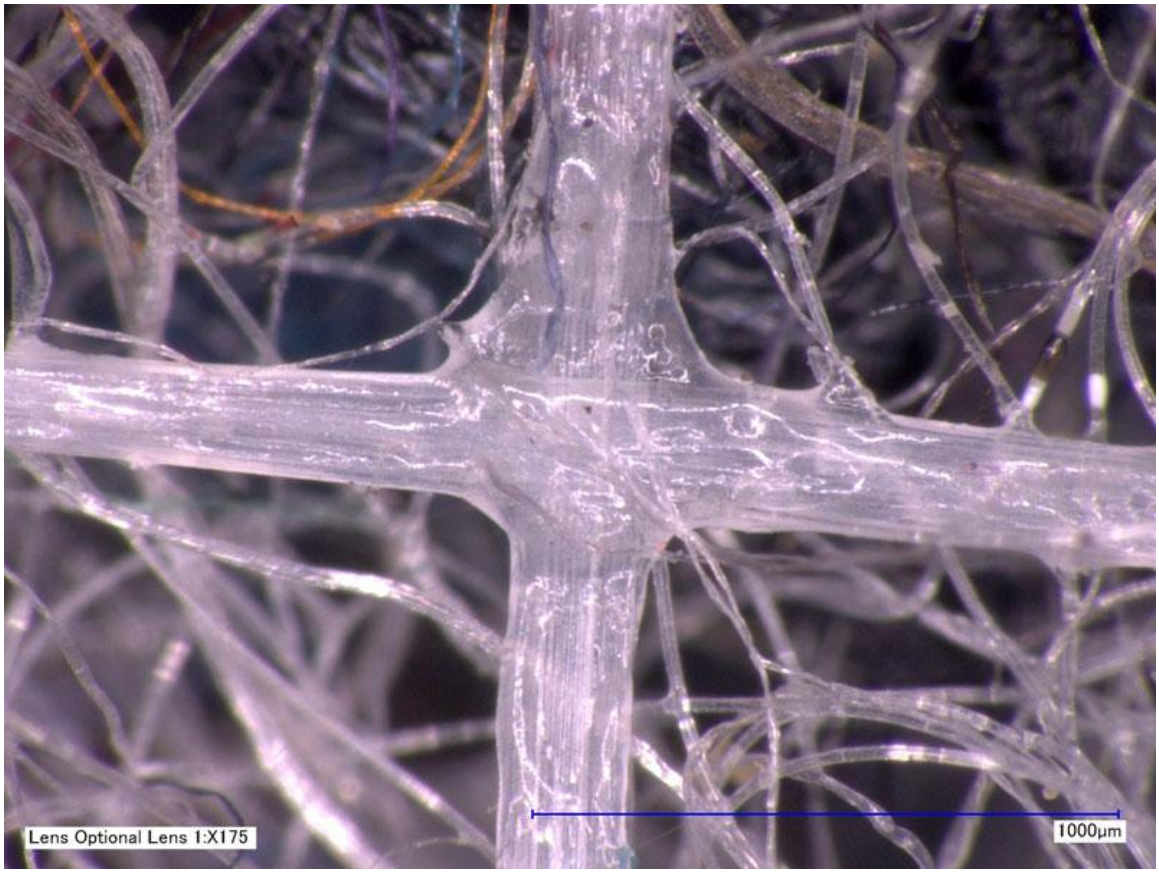
Samples After 28 Days of Incubation

Microscopic example of growth on sample



Magnification x50

Microscopic view of mesh side after 28 Days of Incubation



Magnification x175

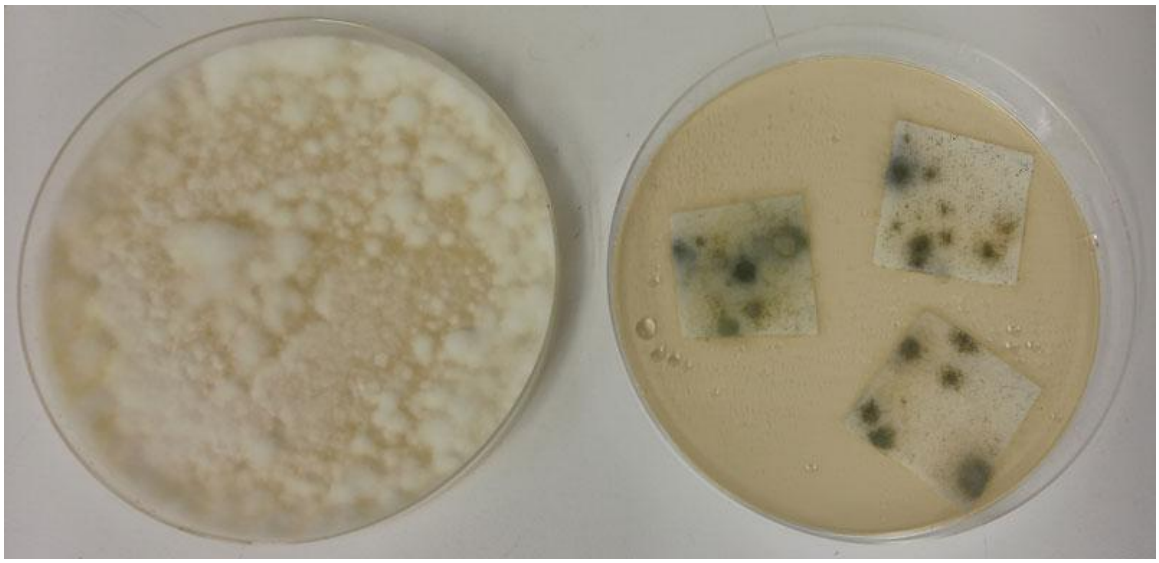
Comparative Material Before Inoculation

Comparative Material After 28 Days of Incubation

Microscopic view of fungal growth on Comparative Material

Magnification x100

Controls After 28 Days of Incubation



End of Report