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October 11, 2010

Stewart Averett
EcoActive Surfaces
551-D NE 27th Street
Pompano Beach, FL 33064

RE: MIL STD 810G Method 508.6 - Fungus

- Project # 2010-226
- Date Samples Received: 9/3/10
- Date Testing Started: 9/9/10
- Date Testing Ended: 10/7/10
- Date Report Issued: 10/11/10

Dear Mr. Averett,

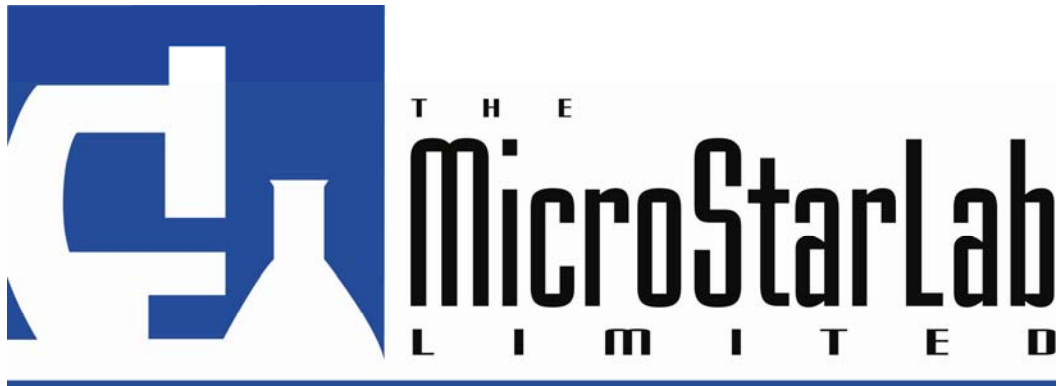
The final report for the MIL STD 810G Method 508.6 Fungus testing you requested is attached.

If you have any questions, please do not hesitate to call.

Best regards,

Judy LaZonby

President – The MicroStar Lab, Ltd



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Crystal Lake, IL 60014
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Final Report for:
EcoActive Surfaces, Inc
551-D NE 27th Street
Pompano Beach, FL 33064

Test Method:
MIL STD 810G Method 508.6 - Fungus

MSL Project # 2010-226
Sample Received: 9/3/10
Testing Initiated: 9/9/10
Testing Completed: 10/7/10
Report Issued: 10/11/10

Judy LaZonby
President – The MicroStar Lab, Ltd





Objective:

The purpose of this test is to assess the extent to which materiel will support fungal growth. If the materiel is found to support fungal growth, the following will also be determined:

- The species of the fungi that is present
- How rapidly the fungus will grow on the materiel and a description of the growth
- Any affects the fungus may cause to the materiel, for example, any detrimental effects, physical interferences on performance, or health and aesthetic factors.
- If the materiel can be stored effectively in a field environment.
- Any reversal processes, for example, wiping off the fungal growth, if this is of interest to the customer.

Pre-test Documentation:

One test sample (4 replicates) was submitted for testing. The sample was identified as:

1. Webbing ASI 002

The test sequence, environmental test history, or pre-test operations were not specified prior to testing. Testing followed MIL STD 810G Method 508.6 protocol.

The test chamber was a glass aquarium approximately 20" x 10" x 13" in size fitted with a glass top. The bottom of the tank contained approximately 1 inch of distilled water to maintain humidity. Above the water a grate was placed to protect test pieces or controls from inadvertently falling into the water at any point during testing. Test pieces and controls were suspended using clips and cable ties attached to rods. Prior to testing the chamber was decontaminated using hot water and a quaternary amine microbial decontaminant cleaner. A small fan was also added to the chamber to maintain a flow of air that envelopes the test pieces as determined by the test method.

Per customer request, fluorescent lighting was placed above the test chamber and left on for the duration of the test.



Test pieces in chamber at Day 28.





The inoculum was prepared from pure fungal stock cultures incubated at $30 \pm 1^\circ\text{C}$ for 10 to 21 days. The following U.S. group test fungi were used:

1. *Aspergillus flavus* ATCC 9643
2. *Aspergillus versicolor* ATCC 11 730
3. *Penicillium funiculosum* ATCC 11 797
4. *Chaetomium globosum* ATCC 6205
5. *Aspergillus niger* ATCC 9642

Spore suspensions containing $1,000,000 \pm 20\%$ spores per milliliter as determined with a counting chamber were prepared for each organism. The viability of the spore suspensions were verified by inoculating the entire surface of Potato Dextrose Agar plates and checking for growth after 7 to 10 days incubation at $30 \pm 1^\circ\text{C}$. See results below in Table #1. Equal volumes of the individual fungal cultures were blended to obtain the mixed spore suspension to be used for inoculation of test items.

Control strips of unbleached, plain weave cotton cloth cut into 3 cm X 4 inch strips were dipped into the solution described within the method and allowed to dry. These strips were hung within the chamber close to and bracketing test items to ensure the test strips and test items experience the same test environment. The test chamber containing the test pieces and control strips was held in the test facility for 4 hours prior to inoculation to equilibrate to $30 \pm 1^\circ\text{C}$ and a relative humidity of greater than 90% and less than 100%.

Each test item and control strip was inoculated with the mixed spore suspension by spraying the items with a fine mist from a sterile atomizer. The items were covered completely with the spore suspension on both sides, spraying until drops began to form on the surface. Immediately after spraying, the test items and control strips were suspended from rods in the test chamber. The test chamber contained water to maintain the desired relative humidity required by the test method of greater than 90% and less than 100%. The chamber was placed within a walk-in incubator to begin incubation. The temperature within the test chamber was maintained at $30 \pm 1^\circ\text{C}$ for the duration of testing as required by the test method.

Humidity and temperature probes and sensors are checked using the following equipment:

- Veriteq Data Logger , NIST traceable certificate # 0147202, Serial #09102066

See Table #2 for the record of critical components for this test.

After 7 days, the growth on the control strips was inspected. The control strips were checked again at the end of testing for an increase in fungal growth. See results below.


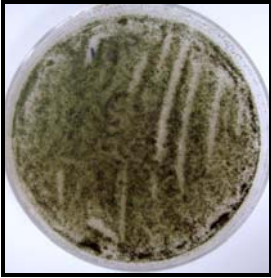


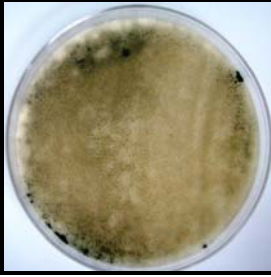
Provided the control strips and viability of spore suspensions were acceptable, the test was continued for 28 days incubation. At the end of the incubation, the samples were examined for fungal growth. Results are described in the Post Test Documentation section below. The assigned ratings were determined using the rating scheme in Table #3 that is listed in the method.





During Test Documentation:

Table #1 Viability of Individual Spore Suspensions

Organism	Percent Coverage	Viability Plate at 7 Days Incubation
<i>Aspergillus niger</i> ATCC # 9642	100%	
<i>Aspergillus flavus</i> ATCC # 9643	100%	
<i>Aspergillus versicolor</i> ATCC # 11730	100%	
<i>Penicillium funiculosum</i> ATCC # 11797	100%	
<i>Chaetomium globosum</i> ATCC # 6205	100%	





Temperature and Humidity were maintained throughout the entire test period. See Table 2 and attached chart and the end of this report.

Table #2 – Record of Critical Components

Critical Component	Pre-Condition	Week 1	Week 2	Week 3	Week 4
Temperature ($30 \pm 1^\circ\text{C}$)	29.6	30.2	30.9	29.8	29.9
Humidity (>90% and <100%)	94.8	95.4	95.6	95.8	95.8

MIL STD 810 G Method 508.6 Critical Component Requirements:

- Temperature cannot exceed 40°C
- Temperature cannot exceed 32°C for 4 hours or more
- Temperature cannot go below 28°C and have a drop in humidity to less than 90%.
- If temperature does fall below the test parameters (29°C) but humidity has been maintained at 90% or greater, reestablish test conditions and continue test at the point the test fell below the prescribed tolerances.
- Relative humidity cannot drop below 50%
- Relative humidity cannot drop below 70% for 4 or more hours
- If there is evidence of deterioration of fungal growth on the control strips that may be due to test interruptions which affected the temperature and humidity, the test must be restarted.



The picture above shows two chamber control strips at Day 28.

The control strip on the top shows the typical fungal growth found on the side of the control strip which was directly exposed to fluorescent lighting. The light appears to have somewhat inhibited fungal growth as compared to the control strip on the bottom which shows fungal growth found on the side that was away from the direct lighting. At Day 7, all control strips had acceptable fungal growth to confirm the viability of the spore suspension and that the environment was suitable for fungal growth. At Day 28, all chamber controls had an increase in fungal growth as compared to Day 7 as required by the test method. All chamber controls performed as expected confirming the validity of the test.





Post Test Documentation:

Four replicates of one test sample and four control samples were tested for 28 days. The testing was performed without interruption. Performance data was not required.

Upon removal of the chamber at Day 28, the test pieces were evaluated following the rating scheme listed below in Table #3. Test pieces were first examined with an unaided eye and then more closely inspected with a stereoscope. Any possible fungal growth was examined by tape preparation and microscopic evaluation. Fungal growth was determined to be test organisms or non-test organisms. Since samples are not sterile prior to testing, it is not uncommon non-test organisms that are native to the test samples will appear.

Table #3 – Evaluation Scheme for Visible Effects and Test Sample Ratings

Amount of Growth	Rating	Comments
None	0	Substrate devoid of microbial growth
Trace	1	Scattered, sparse or very restricted microbial growth
Light	2	Intermittent infestations or loosely spread microbial colonies on substrate surface. Includes continuous filamentous growth extending over the entire surface, but underlying surfaces are still visible
Medium	3	Substantial amount of microbial growth. Substrate may exhibit visible structural change
Heavy	4	Massive microbial growth





Results:

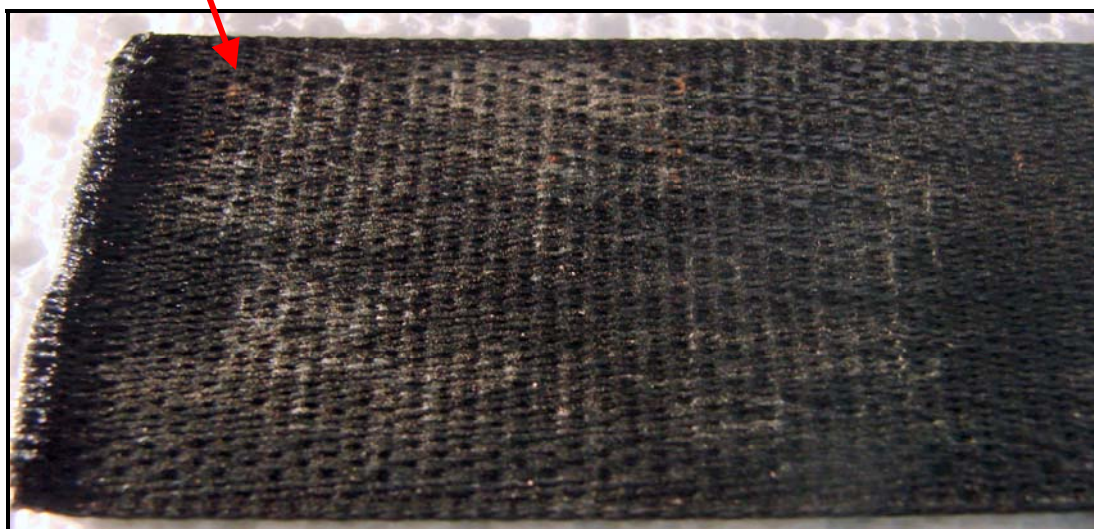
Sample # 1	Rating	Description of Growth
Webbing ASI 002	1	Scattered, sparse microbial growth was found across entire sample surface.



Webbing ASI 002 before testing

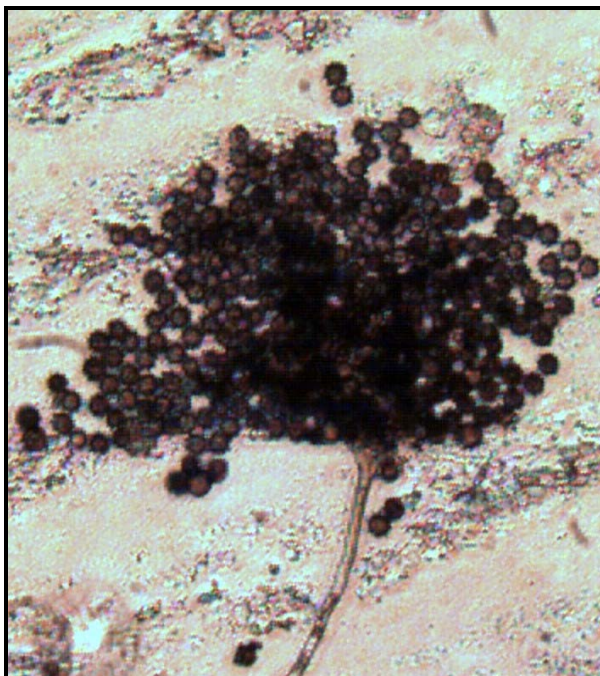


Webbing ASI 002 after testing



The image above is a magnification of the fungal growth that is representative of all replicates from sample Webbing ASI 002. The growth was scattered across entire sample surface and was visible only under oblique light.





Pictured to the left is test organism *Aspergillus niger*; pictured on the right is test organism *Aspergillus versicolor*; both organisms were found across the entire surface of the test piece. The photographs below show the other two test organisms: *Aspergillus flavus* (left), and *Penicillium funiculosum* (right) which were also recovered from - Webbing ASI 002 sample.

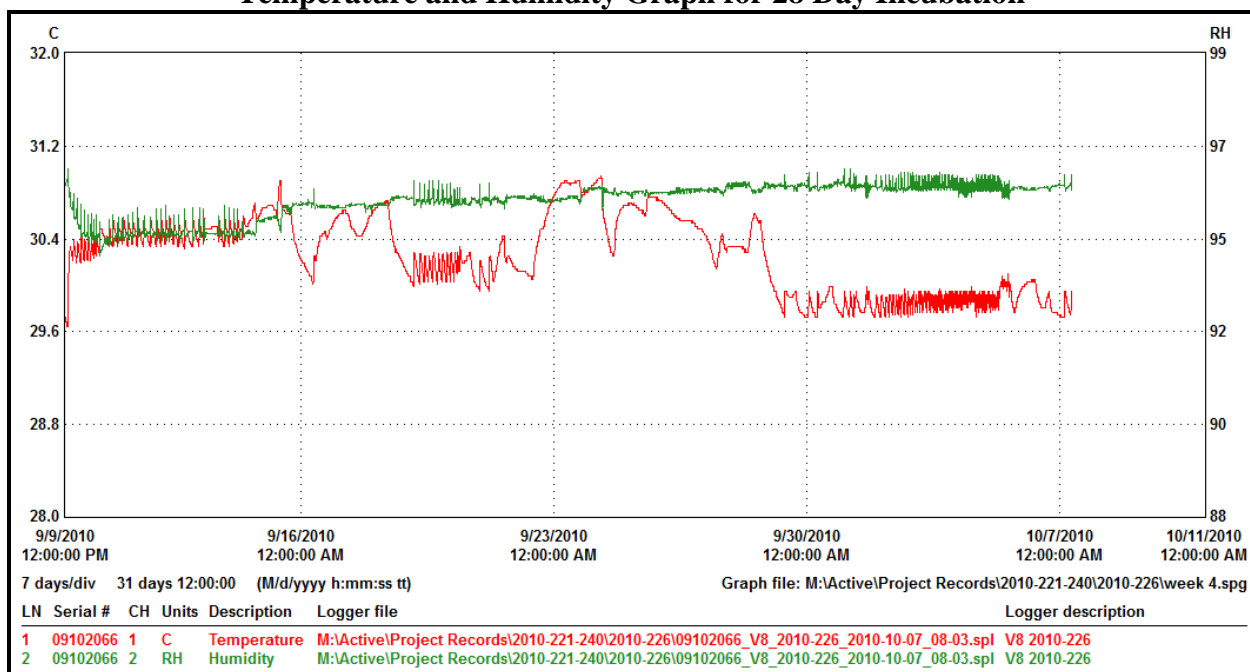




Conclusions

- After 28 days of incubation test sample: Webbing ASI 002 supported scattered, sparse microbial growth identified as test organisms: *Aspergillus niger*, *Aspergillus versicolor*, *Aspergillus flavus*, and *Penicillium funiculosum*. The fungal growth found on the tested sample was visible only under the oblique light. These results are recorded in the Post-Test Documentation Section.
- When the control strips were checked for growth after 7 days, the test pieces were only inspected within the chamber with the unaided eye and had no visible fungal growth.
- The fungal growth did not appear to affect the integrity of the surface of the samples. No staining or deterioration of the surfaces was noted. Physical interference and detrimental effects on performance were not evaluated at this time. Any item with fungal growth may pose a health risk for persons with allergies to mold.
- The fungal growth appeared such that wiping of the surface could partially remove the growth from site but not completely eliminate the fungus from the test pieces.
- Areas of the test pieces that received less light exposure exhibited more fungal growth than those portions with direct exposure to the light. The heavier growth areas were still rated "1".

Temperature and Humidity Graph for 28 Day Incubation



The test period began on September 9, 2010 after the samples and control strips were equilibrated in the test chamber followed by inoculation. All other fluctuations seen on the graph were within test parameters.

