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REPORT

Intertek Testing Services NA, Inc

1717 Arlingate Lane COLUMBUS, OHIO 43228

PROJECT NO.: 3184718 DATE: July 6, 2009

REPORT NO. 3184718COL-001

RENDERED TO:
Glasteel
285 Industrial Drive
Moscow, TN 38057

STANDARD REFERENCED AND TEST METHOD:

ASTM D6329-98 (Reapproved 2008): Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.

AUTHORIZATION:

The test was authorized by Javier Vasquez; A representative from Glasteel.

GENERAL DESCRIPTION:

The test performed was on ASTM D6329-98 (Reapproved 2008): Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers conducted at the Intertek microbiology lab in Columbus. The sample was received on March 5, 2009. The samples are currently in production. The Glasliner FRP was tested for its ability to resist contaminants when exposed to *Aspergillus niger* (ATCC # 9642), *and Penicillium citrinum* (ATCC # 36382). Three samples of the material were tested for each of the fungi.

TEST DESCRIPTION

Samples:

1. For visual evaluation three specimens were sterilized by a surface disinfectant then inoculated, unless otherwise specified by client.

2. Samples were brought to equilibrium which is done by determining the bulk moisture content of the material.

3. Sufficient amount of potato dextrose agar was poured into sterile containers based on size of specimens. Once agar was solidified, specimens were placed on agar

REPORT NO.: 3184718COL-001 DATE: July 6, 2009

4. The surface of the agar/specimen was inoculated with the spore suspension by spraying suspension over the specimens so that the entire surface is moistened with spore suspension

5. The test specimens were covered and incubated at 20 to 30°C with a relative humidity of 85%, for 28 days.

6. Specimens were periodically checked for growth during the incubation period; tests may be terminated early for any specimen showing a visual rating of 2 or greater prior to the 28 days

7. After 28 days a growth rating scale of 0-4 based on ASTM G-21-96 is taken. See table below.

8. If any growth is detected, pictures are taken of the growth and placed into a comprehensive report

9. After visual examination is complete, dilutions are performed to calculate the amount of growth per sample

10. The visual acceptance criteria is no growth rating higher than trace growth or a rating of 1

Please see the following rating table

REPORT NO.: 3184718COL-001 DATE: July 6, 2009

Observed Growth on Specimens (Sporulating or Non-sporulating or Both)	Rating	Comments
None	0	Devoid of microbial growth. Surface exhibiting no chemical, physical or structural change. Note 1
Traces of Growth (less than 10%)	1	Scattered, sparse or very restricted microbial growth. Appearance on surface minor or inhibited. Surface exhibiting no chemical, physical or structural change. Note 1
Light Growth (10 to 30%)	2	Intermittent infestation. Loosely spread microbial colonies on surface/moderate growth. Includes continuous filamentous (cobwebby) growth extending over the entire surface. Surface exhibiting no chemical, physical or structural change
Medium Growth (30 to 60%)	3	Substantial amount of microbial growth. Surface exhibiting chemical, physical and structural change
Heavy Growth (60% to complete coverage)	4	Massive microbial growth. Surface decomposed or rapidly deteriorating
Notes	1	A rating of 0 or 1 needs to be confirmed using a microscope since non-sporulating growth may not be seen without the aid of a microscope. The report should indicate the magnification power of the microscope

All samples receiving a growth rating of 2 or higher are automatic failures.

REPORT NO.: 3184718COL-001 DATE: July 6, 2009

CALIBRATED EQUIPMENT:

Calibrated Equipment	Manufacturer	Sample Id No.	Calibration Date	Calibration Due Date
Micropipette	Fisherbrand	CE 1141	03/06/09	03/06/10
Environmental Chamber	Thermotron	CE 1142	For Reference Only	
Microscope	Zeiss	CE 1154	For Reference Only	
Balance	Ohaus	CE 1143	02/12/09	02/12/10
Digital Hygrometer	Fisher	CE 1150	02/19/09	02/19/10

RESULTS:
The negative control showed no signs of growth.

The positive control showed complete growth over the agar surface. The original number of fungus aerosolized onto the surface was 1.0×10^5 cfu/ml *Aspergillus niger* and 1.0×10^5 cfu/ml *Penicillium citrinum*.

Bulk Moisture Content

Material	Starting Weight (g)	Drying Weight (g)	Bulk Moisture Content (%)
Glasliner FRP 1	32.063	32.008	0.002
Glasliner FRP 2	30.165	30.113	0.173
Glasliner FRP 3	30.779	30.728	0.166

Please see following table for rating the material achieved for each microorganism.

Material	*A. niger*	*P. citrinum*
Glasliner FRP	1	1

*Samples showed complete growth over the adhesive name label but not over actual test sample

REPORT NO.: 3184718COL-001 DATE: July 6, 2009

Calculated microbial growth

Material	*A. niger* (avg CFU/plate)	*P. citrinum* (avg CFU/plate)
Glasliner FRP	61	54

CONCLUSION:

This report documents the performance of the Glasliner FRP's ability to resist fungal and mold contaminants. The microbiological test sample evaluations were conducted at the Intertek laboratory located in Columbus, OH between March 20, 2009 and April 22, 2009 utilizing the test method and acceptance criteria of ASTM D6329-98 (Reapproved 2008): Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers. The Glasliner FRP does meet the acceptance criteria and does demonstrate the resistance of fungal contamination.

Test Performed by:

Shannon Meier
Microbiologist
Columbus Office

Report Approved by:

Ramzi Amawi
Operations Manager
Columbus Office