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March 14, 2021

Attn: Mr. Keith Euerle
Director, Specialty Textile Testing and Analysis
Phifer Wire Products, Inc.
Post Office Box 1700
Tuscaloosa, Alabama 35403-1700

RE: Fungal and Bacterial Resistance of Eleven 12 x 12 inches Wall Tiles Employing ASTM G21/G22 (PO# 279501) The Samples Were identified by the Following Codes.

- | | |
|-----------------------------------|------------------------------------|
| 1. SheerWeave 7000, U69 Cocoa | 7. SheerWeave 7500R, R47 Limestone |
| 2. SheerWeave 7200R, RB2 Oyster | 8. SheerWeave 7600, U95 Thunder |
| 3. SheerWeave 7250R, RL6 Chiffon | 9. SheerWeave 7650, U95 Thunder |
| 4. SheerWeave 7400, U82 Sesame | 10. SheerWeave 7700R, TB3 Concrete |
| 5. SheerWeave 7450, U81 Parchment | 11. SheerWeave 7750R, TL3 Concrete |
| 6. SheerWeave 7500, R41 Limestone | |

DISCUSSION AND RESULTS

Because the submitted fabric tiles may not be as uniform as previous SheerWeave samples studied, two 2 X 2 inch samples were cut from both the top and bottom of the tiles and analyzed, (Four samples per tile).

Sub-samples from the fabrics were exposed the various micro-organisms. The concentration of the test organisms employed was a minimum of 750,000 spores/mL. of agar for each of the fungi and 90,000 viable cells/mL. of agar for the bacterial testing. After inoculation, the fabric test samples they were incubated for 10 days at 25 degrees Celsius. The volume of the spore suspensions used was 1 mL. The medium employed was a neutral salt agar

(KH₂PO₄-0.7 g, K₂HPO₄-0.7 g, MgSO₄.7H₂O-0.7 g, NH₄NO₃-1.0 g, NaCl-0.005 g,
FeSO₄.7H₂O-0.002 g, ZnSO₄.7H₂O-0.002 g, MnSO₄.H₂O-0.001 g, Agar-15.0 g, Water-1000 mL.)

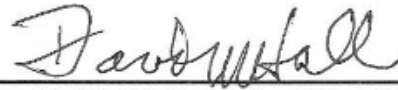
Growth for the various fungi and bacteria on the control samples (i.e.: those not exposed to *bacteria or fungi*) after 10 days of incubation were measured. After incubation the fabric test samples were thoroughly washed to remove all traces of the *fungal* and *bacterial* organisms followed by examination in detail for any damage employing a Stereomicroscope at 80 X magnification. The test results are attached.

CONCLUSION

After incubation and washing, the tested specimens showed no traces of either *fungal or bacterial* growth on the surfaces of the test specimens, with exception of some minor staining which could be removed, and the original fabric color being restored by using a weak oxygen bleach ((Oxyclean). Further there was no evidence of any fiber damage when viewed at 80 X employing the stereo-microscopical methods.

The result of the analyses indicate that all of the tiles were uniform in all respects.
It is my opinion that the various samples of SheerWeave tiles analyzed can be classified as being totally resistant to *fungus and bacterial* attack as outlined in ASTM/(G21/G22).

Sincerely,



David M. Hall, PhD., PE, FTI, FSDC
Forensic Consultant



RESULTS

Growth Rating: 0=no growth, 1=less than 10% growth, 2=10-30% growth, 3=30-60% growth, 4=>60% growth

Damage: Nil= no fiber surface damage at 80X, **Slight**=some erosion of the fiber surface, **V.slight**=very slight, some roughened fiber surface, **Stain**= Staining or discoloration of the fibers, **Bleached**=removal of fabric color

Materials	Test organism	Surface	Rep	Before wash		After wash
				Rating	Damage	Damage
1 SheerWeave 7000 (U69 Cocoa)	Alternaria spp	Top	1	1 Nil	Nil	Nil
		Top	2	1 Nil	Nil	Nil
		Bottom	1	0 Nil	Nil	Nil
		Bottom	2	1 Stain	Nil	Nil
	Aspergillus flavus	Top	1	0 Nil	Nil	Nil
		Top	2	0 Nil	Nil	Nil
		Bottom	1	0 Nil	Nil	Nil
		Bottom	2	0 Nil	Nil	Nil
	Aspergillus niger	Top	1	0 Nil	Nil	Nil
		Top	2	1 Nil	Nil	Nil
		Bottom	1	1 Bleach	Bleach	Bleach
		Bottom	2	1 Bleach	Bleach	Bleach
	Penicillium spp	Top	1	0 Nil	Nil	Nil
		Top	2	0 Nil	Nil	Nil
		Bottom	1	0 Nil	Nil	Nil
		Bottom	2	0 Nil	Nil	Nil
Trichoderma	Top	1	0 Nil	Nil	Nil	
	Top	2	0 Nil	Nil	Nil	
	Bottom	1	0 Nil	Nil	Nil	
	Bottom	2	0 Nil	Nil	Nil	
2 SheerWeave 7200R (RB2 Oyster)	Alternaria spp	Top	1	0 Nil	Nil	Nil
		Top	2	0 Nil	Nil	Nil
		Bottom	1	0 Nil	Nil	Nil
		Bottom	2	0 Nil	Nil	Nil
	Aspergillus flavus	Top	1	2 Nil	Nil	Nil
		Top	2	2 Nil	Nil	Nil
		Bottom	1	3 Stain	Nil	Nil
		Bottom	2	3 Stain	Nil	Nil
	Aspergillus niger	Top	1	3 Stain	Nil	Nil
		Top	2	3 Stain	Nil	Nil
		Bottom	1	3 Stain	Stain	Stain
		Bottom	2	3 Stain	Stain	Stain
	Penicillium spp	Top	1	0 Nil	Nil	Nil
		Top	2	0 Nil	Nil	Nil
		Bottom	1	2 Stain	Nil	Nil
		Bottom	2	2 Stain	Nil	Nil
Trichoderma	Top	1	2 Stain	Nil	Nil	
	Top	2	3 Stain	Nil	Nil	
	Bottom	1	4 Stain	Nil	Nil	
	Bottom	2	4 Stain	Nil	Nil	

3 SheerWeave 7250R (RL4 Chiffon)	Alternaria spp	Top	1	1 Nil	Nil	
		Top	2	0 Nil	Nil	
	Aspergillus flavus	Top	1	0 Nil	Nil	
		Top	2	1 Nil	Nil	
	Aspergillus niger	Top	1	1 Nil	Nil	
		Top	2	1 Nil	Nil	
	Penicillium spp	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Trichoderma	Top	1	1 Stain	Nil	
		Top	2	1 Stain	Nil	
4 SheerWeave 7400 (U82 Sesame)	Alternaria spp	Top	1	1 Nil	Nil	
		Top	2	1 Nil	Nil	
	Aspergillus flavus	Bottom	1	0 Nil	Nil	
		Bottom	2	1 Nil	Nil	
		Top	1	1 Stain	Nil	
		Top	2	1 Stain	Nil	
	Aspergillus niger	Bottom	1	1 Stain	Nil	
		Bottom	2	1 Stain	Nil	
		Top	1	3 Stain	Nil	
		Top	2	3 Stain	Nil	
	Penicillium spp	Bottom	1	4 Stain	Stain	
		Bottom	2	4 Stain	Stain	
		Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Trichoderma	Bottom	1	3 Stain	Nil	
		Bottom	2	3 Stain	Nil	
		Top	1	4 Stain	Nil	
		Top	2	4 Stain	Nil	
	5 SheerWeave 7450) (U81 Parchment	Alternaria spp	Bottom	1	4 Stain	Nil
			Bottom	2	4 Stain	Nil
Aspergillus flavus		Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
6 SheerWeave 7500 (R41 Limestone)	Aspergillus niger	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Penicillium spp	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Trichoderma	Top	1	1 Stain	Nil	
		Top	2	1 Stain	Nil	
	Alternaria spp	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Aspergillus flavus	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
Aspergillus niger	Top	1	2 Nil	Nil		
	Top	2	2 Nil	Nil		
Penicillium spp	Top	1	0 Nil	Nil		
	Top	2	0 Nil	Nil		

7 SheerWeave 7500R (R47 Limestone)	Trichoderma	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Alternaria spp	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
		Bottom	1	0 Nil	Nil	
		Bottom	2	0 Nil	Nil	
	Aspergillus flavus	Top	1	1 Stain	Nil	
		Top	2	1 Stain	Nil	
		Bottom	1	1 Stain	Nil	
		Bottom	2	1 Stain	Nil	
	Aspergillus niger	Top	1	2 Stain	Nil	
		Top	2	2 Stain	Nil	
		Bottom	1	2 Stain	Nil	
		Bottom	2	1 Stain	Nil	
	Penicillium spp	Top	1	1 Stain	Nil	
		Top	2	1 Stain	Nil	
Bottom		1	1 Stain	Nil		
Bottom		2	1 Stain	Nil		
Trichoderma	Top	1	1 Stain	Nil		
	Top	2	1 Stain	Nil		
	Bottom	1	1 Stain	Nil		
	Bottom	2	1 Stain	Nil		
8 SheerWeave 7600 (U95 Thunder)	Alternaria spp	Top	1	3 Nil	Nil	
		Top	2	2 Nil	Nil	
		Bottom	1	1 Nil	Nil	
		Bottom	2	1 Nil	Nil	
	Aspergillus flavus	Top	1	2 Nil	Nil	
		Top	2	2 Nil	Nil	
		Bottom	1	3 Stain	Nil	
		Bottom	2	3 Stain	Nil	
	Aspergillus niger	Top	1	2 Nil	Nil	
		Top	2	2 Nil	Nil	
			Bottom	1	4 Stain	Stain
			Bottom	2	4 Stain	Stain
Penicillium spp		Top	1	1 Nil	Nil	
		Top	2	2 Nil	Nil	
		Bottom	1	3 Stain	Nil	
		Bottom	2	3 Stain	Nil	
Trichoderma		Top	1	4 Stain	Nil	
		Top	2	4 Stain	Nil	
		Bottom	1	4 Stain	Nil	
		Bottom	2	4 Stain	Nil	
9 SheerWeave 7650 (U95 Thunder)	Alternaria spp	Top	1	1 Nil	Nil	
		Top	2	0 Nil	Nil	
	Aspergillus flavus	Top	1	0 Nil	Nil	
		Top	2	0 Nil	Nil	
	Aspergillus niger	Top	1	1 Nil	Nil	
		Top	2	0 Nil	Nil	

10 SheerWeave 7700R (TB3 Concrete)	Penicillium spp	Top	1	0 Nil	Nil
		Top	2	0 Nil	Nil
	Trichoderma	Top	1	3 Nil	Nil
		Top	2	3 Nil	Nil
	Alternaria spp	Top	1	1 Nil	Nil
		Top	2	0 Nil	Nil
		Bottom	1	0 Nil	Nil
		Bottom	2	0 Nil	Nil
	Aspergillus flavus	Top	1	0 Nil	Nil
		Top	2	0 Nil	Nil
		Bottom	1	3 Stain	Nil
		Bottom	2	4 Stain	Nil
	Aspergillus niger	Top	1	1 Nil	Nil
		Top	2	0 Nil	Nil
		Bottom	1	3 Stain	Nil
		Bottom	2	3 Stain	Nil
	Penicillium spp	Top	1	0 Nil	Nil
		Top	2	0 Nil	Nil
		Bottom	1	2 Stain	Nil
		Bottom	2	2 Stain	Nil
Trichoderma	Top	1	2 Stain	Nil	
	Top	2	2 Stain	Nil	
	Bottom	1	4 Stain	Nil	
	Bottom	2	4 Stain	Nil	
11 SheerWeave 7750R (TL3 Concrete)	Alternaria spp	Top	1	0 Nil	Nil
	Top	2	1 Nil	Nil	
Aspergillus flavus	Top	1	0 Nil	Nil	
	Top	2	0 Nil	Nil	
Aspergillus niger	Top	1	1 Nil	Nil	
	Top	2	1 Nil	Nil	
Penicillium spp	Top	1	0 Nil	Nil	
	Top	2	0 Nil	Nil	
Trichoderma	Top	1	1 Stain	Nil	
	Top	2	1 Stain	Nil	

Total 170 plates