Technical Service Report

Prepared for:

Nationwide Protective Coatings

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Dry Film Mildew And Algae Resistance Evaluation Of Eight Coded Elastomeric Coating Samples

Troy Technical Center Region:	Troy USA
Project Initiator:	Carlos Cruz, Troy Corporation
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SUMMARY:
Objective: To evaluate the comparative dry film mildew and algae resistance of eight coded elastomeric roof coating samples.

Laboratory testing established that:

- Films of sample “A” were not resistant to either dry film mildew or algae attack.
- Films of the remaining samples were resistant to dry film mildew and algae attack.

With the exception of sample “A”, all of the samples were resistant to dry film mildew and algae attack when challenged.

As these samples were coded, no further comments can be made regarding their performance.

It is suggested that Nationwide Protective Coatings consult with Rick Greene to further discuss the results of this study and plan the next steps moving forward.

BACKGROUND:
Nationwide Protective Coatings prepared and submitted eight coded elastomeric roof coating samples and requested that Troy evaluate the comparative dry film mildew and algae resistance of these samples. The series represented a comparison of Polyphase® 663 and Polyphase® S99.

SAMPLE IDENTIFICATION:

SPNO	SPECIMEN
01	A
02	B
03	C
04	D

EXPERIMENTAL METHODS:
The test samples were analyzed according to the Troy Mildew Resistance Test (SOP MI-09) and the Troy Algae Resistance Test (Troy Standard Test 1.3.Alg.1). Microbiology details are presented below.

RESULTS:
Films of sample "A" failed to exhibit either dry film mildew or algae resistance when tested after 24 and 48 hours leaching.

Films of the remaining samples exhibited dry film mildew and algae resistance when tested after 24 and 48 hours leaching.

CONCLUSIONS & RECOMMENDATIONS:
All of the samples except sample "A" were protected against dry film mildew and algae attack. Sample "A" was not protected against either dry film mildew or algae attack. Without a decode of the biocides and their use levels represented by each sample, further comments regarding these test results cannot be made.

EXPERIMENTAL METHODS:

MILDEW

Mildew Resistance Test: (SOP MI-09) The samples were tested in accordance with a modified version of ASTM D 5590-00. One coat of each sample was applied to both sides of Whatman #2 filter paper in duplicate and air dried for 24 hours. One part of the coating specimen from each sample was exposed for 24 hours in room temperature tap water and air dried for 24 hours. The other part of the coating specimen from each sample was exposed for 48 hours in room temperature tap water with one water exchange after 24 hours and air dried for 24 hours. The coating specimens were then cut into 1-inch squares two of which were placed in petri dishes containing solidified Malt Agar and seeded with a combination of *Aspergillus niger* and *Penicillium funiculosum* fungal organisms and two of which were placed in petri dishes containing solidified Malt Agar and seeded with *Aureobasidium pullulans*. All of the squares were then top inoculated with 0.1 ml of the test fungi. The petri dishes were incubated for a period of 3 weeks at 28 °C.

Test Organisms:
Aspergillus niger (ATCC #6275)
Aureobasidium pullulans (ATCC #9348)
Penicillium funiculosum (ATCC #11797)

ALGAE

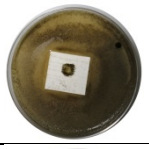
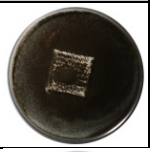
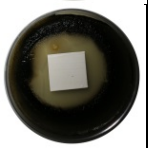
Algae Resistance Test: (Troy Standard Test 1.3.Alg.1) One coat of each sample was applied to both sides of Whatman #2 filter paper in duplicate and air dried for 24 hours. One part of the coating specimen from each sample was exposed for 24 hours in room temperature tap water and air dried for 24 hours. The other part of the coating specimen from each sample was exposed for 48 hours in room temperature tap water with one water exchange after 24 hours and air dried for 24 hours. A 0.35 ml suspension of algae was spread over the plate with a "Drigalski" spatula. Two 1-inch squares were cut from each specimen and placed on Proteose agar plates. Twenty (20) µl of algae suspension was placed on top of each filter paper square. The petri dishes were then incubated for two weeks at 15 degrees C, 52% RH and 4000-lux light.

Test Organisms*:*
Chlorella vulgaris var viridis (ATCC #16487)
Chlorella sp. (Troy Isolate)
Stichococcus bacillaris (BIUC #K-150)

Chlorella and *Stichococcus* represent the significant algae that dominate the unsightly growth on siding, decks, and EIFS, roofs, and stucco coatings. They are most often isolated from these surfaces and adapt well with special attention to laboratory growth environments. Algae disfigure the coatings surface and do not deteriorate the coating, as do the fungi. The algae used in these test are representative for the temperature range in your region and in sub-tropical environments.

TABLE I

COMPARATIVE EVALUATION OF EIGHT CODED ELASTOMERIC COATING SAMPLES AGAINST DRY FILM MILDEW ATTACK

SAMPLE IDENTIFICATION		MILDEW RATING							
		Aureobasidium pullulans				*A. niger + P. funiculosum*			
		24h Leach		48h Leach		24h Leach		48h Leach	
A	Control 1607201 (No Mildewcide)	**3**		**3**		**4**		**4**	
B	ULTRA SEAL 1606092	**Z(10)**		**Z(8)**		**0**		**0**	
C	PERMAKOTE 1607191	**Z(10)**		**Z(10)**		**0**		**0**	
D	PERMAKOTE PLUS 1605163	**Z(6)**		**Z(4)**		**0**		**0**	

LEGEND

0 = No Growth, Zone of Inhibition May be Present, Z(n) - Zone of Inhibition in mm

1 = Trace Growth (<10% coverage)

2 = Light Growth (10-30% coverage)

3 = Moderate Growth (30-60% coverage)

4 = Heavy Growth (60% to complete coverage)

TEST ORGANISMS:

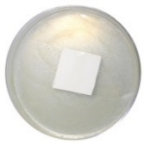
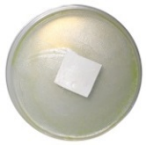
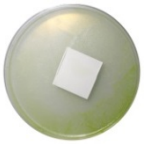
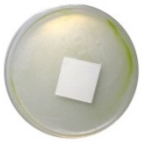
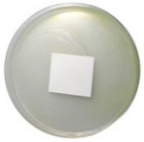
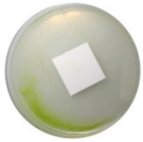
Aspergillus niger

Aureobasidium pullulans

Penicillium funiculosum

TABLE II

COMPARATIVE EVALUATION OF EIGHT CODED ELASTOMERIC COATING SAMPLES AGAINST ALGAE ATTACK

SAMPLE		ALGAE RATING			
		24h Leach		48h Leach	
A	Control 1607201 (No Mildewcide)	**1**		**3**	
B	ULTRA SEAL 1606092	**0**		**0**	
C	PERMAKOTE 1607191	**0**		**0**	
D	PERMAKOTE PLUS 1605163	**0**		**0**	

LEGEND

0	= No Growth, Zone of Inhibition May be Present
1	= Trace Growth
2	= Light Growth
3	= Moderate Growth
4	= Heavy Growth
5	= Very Heavy Growth

TEST ORGANISMS:

Chlorella sp.

C. vulgaris

S. bacillaris

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