

14 November 2018

Technical Service Report No. 18039

Certificate for Cargotrack Group

Use in products: Slide Therm - thermal blanket - thermal separator - thermal covers.



Test Laboratory:

Technical Centre – Biocide Laboratory
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1. Objectives

To examine a PU coated fabric (containing INTERCIDE DBF 9 DINCH) for protection against bacterial pink stain and fungal contamination before and after artificial weathering.

2. Summary and Conclusions

Bacterial pink stain test

A coated fabric without biocide was readily susceptible to pink staining; the growth of *Streptomyces sp.* was not suppressed by this sample.

A partial bacteriostatic effect was displayed by the PU coated fabric before artificial weathering; it was largely protected against pink staining. However, the effect was reduced after weathering and the fabric was lightly pink stained.

Fungal growth test

A coated fabric without biocide was susceptible to heavy fungal growth.

Before weathering the PU coated fabric permitted light fungal growth, but after weathering it was susceptible to heavy fungal growth.

3. Samples Examined

1 PU coated polyester fabric sample was received for testing on 03 September 2018 labelled:

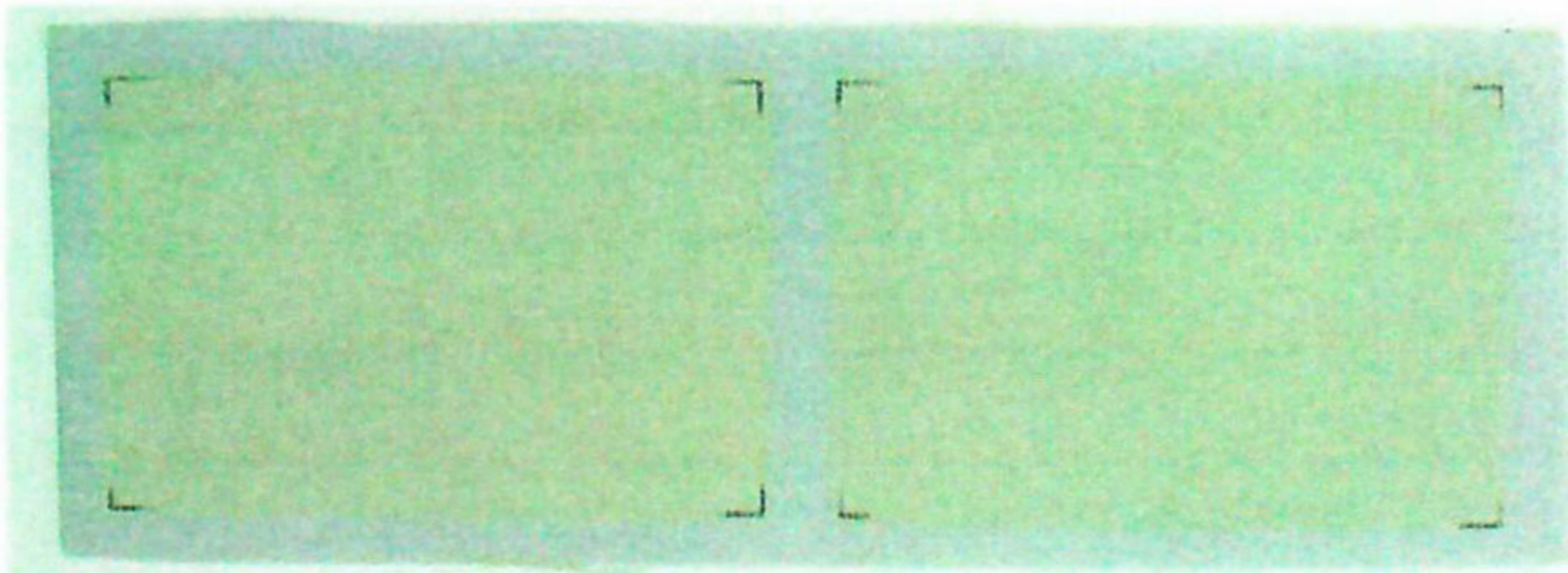
10 parts INTERCIDE DBF 9 DINCH per 100 parts PU
polyester fabric with hydrophobic coating and resinated with silver PU colour

A coated fabric without biocide was included in tests as a control

4. Pre-conditioning of Samples

Tests were carried out on the fabric with and without artificial weathering for 120 hours in a QLab weathering tester: Alternate cycles of 8 hours UVA-340nm at 50°C, 15 minutes water spray and 3 hours and 45 minutes condensation at 50°C in accordance with EN 4892-3 Method A, cycle 2 weathering of plastics.

Photo 1: showing a change in colour of the fabric after artificial weathering



5. Results

Table 1: Assessment of Bacteriostatic Effect and Pink Stain - test based on ASTM E1428

Fabric samples in contact with inoculated agar	without weathering			weathered 5 days		
	replicate I	replicate II	replicate III	replicate I	replicate II	replicate III
Zone of inhibition (mm) measured from edge of sample to start of growth						
No biocide control	0	0	not tested	not tested	not tested	not tested
PU coated with DBF 9	4mm*	6mm*	7mm*	0mm	1mm*	2mm*
% Surface Pink Staining - assessed after removal from agar						
No biocide control	4	4	not tested	not tested	not tested	not tested
PU coated with DBF 9	1	1	1	2	2	2

Rating	Observed % Staining of Surface of Test Material (not intensity of colour)
0	No stain
1	Trace of Stain (less than 10% coverage)
2	Slight Stain (10-30% coverage)
3	Moderate Stain (30-50% coverage)
4	Heavy Stain (50% to complete coverage)
	* partial zones present

Photo 2a: Zone of Inhibition one of each triplicate set of test plates



Photo 2b: Assessment of Pink Stain after removal from agar

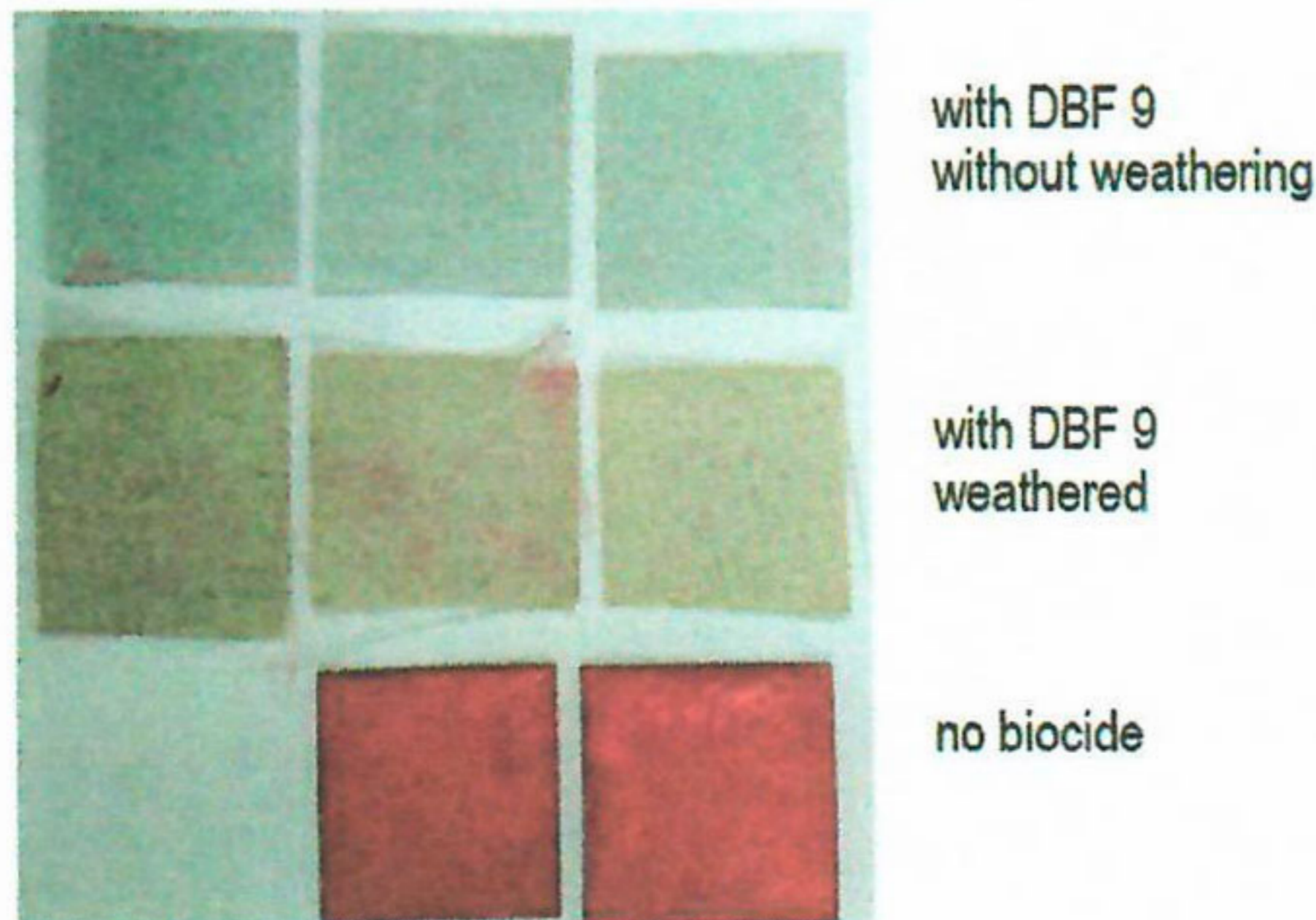
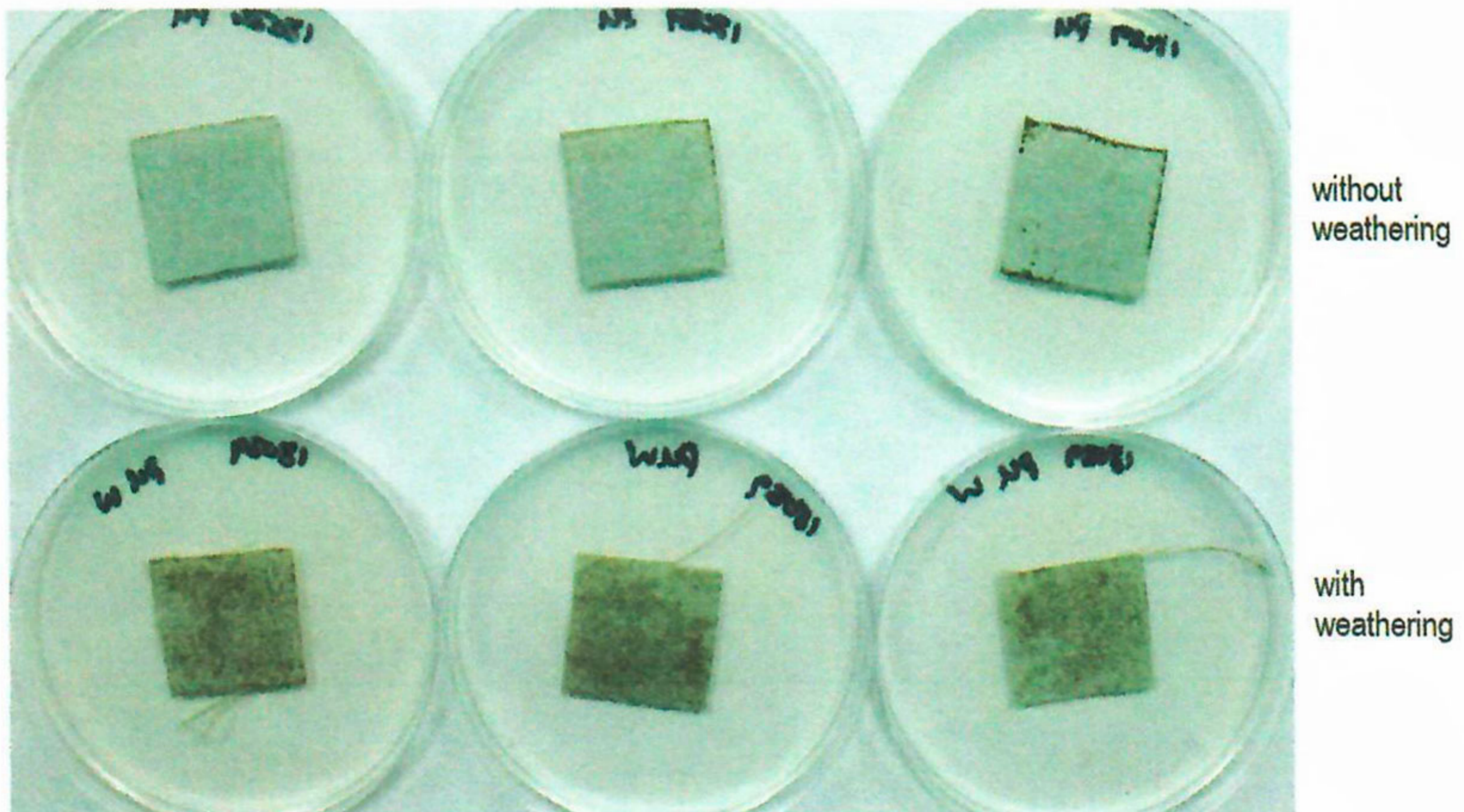


Table 2: Assessment of Fungal Growth – ISO 846 A test

Fabric samples	Fungal Growth					
	without weathering			weathered 5 days		
	replicate I	replicate II	replicate III	replicate I	replicate II	replicate III
No biocide control	5	5	5	not tested	not tested	not tested
PU coated with DBF 9	2	2	3	4	5	5

Evaluation ISO 846 A - Intensity of Growth on test sample	
0	No growth apparent under the microscope
1	Growth not visible to the naked eye, but clearly visible under microscope
2	Growth visible to the naked eye, covering up to 25% of surface
3	Growth visible to the naked eye, covering up to 50% of surface
4	Considerable growth, covering more than 50% of surface
5	Heavy growth covering the entire surface

Photo 3: Fungal Growth 3 replicates of test fabric (PU coated with INTERCIDE DBF 9)



6. Test Method Summary

Test based on ASTM E1428 - 2015 Evaluation of Antimicrobials in or on Polymeric Solids against Pink Staining by *Streptomyces* species.

Replicate pre-sterilised samples were placed on Yeast Malt Extract agar plates. A thin layer of agar inoculated with the actinomycete bacteria *Streptomyces* ATCC 25607 (formerly known as *Streptoverticillium reticulum*) was poured over the test surfaces to ensure close contact / interaction. Petri dishes were incubated at 28°C for 2-4 weeks. A zone of inhibition may be observed indicating diffusion or migration of an antimicrobial from the test sample into the agar.

$$Z = \frac{D - d}{2}$$

Z = zone (mm) from test surface to start of growth in agar
 D = total diameter of growth-free zone (including width of sample)
 d = width of sample

Test samples were removed from the agar and the area/coverage of staining visually assessed according to the rating scheme detailed.

Rating	ASTM E1428 % staining of test surface (not intensity of colour)
0	No stain
1	Trace of Stain (less than 10% coverage)
2	Slight Stain (10-30% coverage)
3	Moderate Stain (30-50% coverage)
4	Heavy Stain (50% to complete coverage)

ISO 846: Plastics - Evaluation of the action of microorganisms, Method A: Fungal Growth


Replicate samples were placed on mineral salts agar plates without a carbon source in Petri dishes. Sample surfaces were inoculated with a mixed fungal spore suspension containing *Aspergillus niger*, *Chaetomium globosum*, *Paecilomyces variotii*, *Penicillium pinophilum* and *Trichoderma virens*.

Plates were incubated at 25°C for 4 weeks or until heavy fungal growth was recorded on a sample without biocide. Surface fungal growth was assessed with the naked eye and with the aid of a microscope

Growth	Interpretation of ISO 846 A results
0	The material is not a nutritive medium for microorganisms (it is inert or fungistatic)
1	The material contains nutritive substances or is contaminated to such a small degree that it permits only slight growth
2 to 5	The material is not resistant to fungal attack and contains nutritive substances suitable for the development of microorganisms

7. Report Review

The work detailed in this report has been carried out according to internationally recognised test methods or Valtris standard test methods. All results have been checked by the responsible person and reviewed by the Biocide Product Manager.


Signed _____ Date 14 November 2018
Kristina Nichols, BSc (Hons)
Biocides Lab Manager, Europe & Asia Pacific


Reviewed _____ Date 14 November 2018
Phil Clegg, BSc (Hons)
Biocides Product Manager, Europe & Asia Pacific

Use biocides safely. Always read the label and product information before use.

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