STUDY REPORT
MEASUREMENT OF ANTIBACTERIAL ACTIVITY ON PLASTICS AND OTHER NON-POROUS SURFACES

ISO 22196:2011

Job reference – J002048-1

Lab Ref/Report No.	**J002048-1**
Testing Laboratory **Site** **Company owner**	**Microbiological Solutions Limited** **Gollinrod, Bury, BL9 5NB** **Angela Davies, Managing director**
Report Date	**04/08/2020**
Period of Analysis	**23/07/2020-25/07/2020**

Customer	Hale Environments Ltd
Contact Name	Giles Tickle
Address	James House, Mere Park, Dedmere Road, Marlow, SL7 1FJ
Email	info@hale-environments.co.uk
PO Number	Q003134

Name of product	Hale Defence +
Batch number	0050407
Storage Conditions	Ambient
Appearance of the Product	White paint
Method	ISO 22196:2011
Neutraliser	N1
Volume of test inoculum used	0.4ml
Dimensions of test specimens	76mmx26mm
Dimensions of cover film	66mmx16mm square thickness 0.065mm
Cover film material	Polythene
Test Temperature	20^0C
Temperature of Incubation	Bacteria - 37°C ±1°C for 24hr to 48hrs
Identification of the reference strains	*Escherichia coli* NCTC 10418 (ATCC 10536) *MRSA* NCTC 12493

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Introduction

ISO 22196:2011 specifies a method of evaluating the antibacterial activity of antibacterial-treated plastics, and other non-porous, surfaces of products (including intermediate products).

It is not intended to be used to evaluate the effects and propagation of bacteria on non-porous surfaces without antibacterial treatments. ISO 846 describes tests to evaluate the effects and propagation of bacteria on non-porous surfaces, which are different from those covered by ISO 22196.

Secondary effects of antibacterial treatments, such as the prevention of bio deterioration and odour, are not covered by the standard, which is not intended to be used or referenced as a method to document or claim biodegradability of, for instance, plastics materials.

Building materials are excluded, except where they are used in the same manner as treated articles.

Antibacterial-treated textile products are excluded, even if the surfaces are coated or laminated (such products are covered by ISO 20743).

Photocatalytic materials and products are excluded (such materials and products are covered by ISO 27447).

Test Method – Standard conditions

The test specimen is placed in an empty agar dish and 0.4ml of the test inoculum pipetted onto the test surface. The inoculum is then covered with a 40mm X 40mm square piece of film and gently pressed down ensuring the liquid does not leak beyond the edge of the film. The surface is maintained at 35°C ± 1°C for 24 hours ± 1 hr. Testing is performed in triplicate with organisms recovered from control samples at 0 hours and 24 hours and from test samples at 24 hours only. Organisms are recovered by washing test specimens in 10ml of validated neutralizer and enumerating the wash liquid by pour plate.

Deviations from standard method

The product was tested against E.coli and non-standard organism MRSA.

The product was applied to glass slides prior to testing. The size of the glass slides was factored into final calculations.

Plain glass slides were used as controls.

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Acceptance Criteria

The value of the antibacterial activity can be used to characterize the effectiveness of an antibacterial agent. The antibacterial-activity values used to define the effectiveness shall be agreed upon by all interested parties.

Conclusion

The test product has shown a 3.36 (99.956%)log reduction against E.coli and a 3.45(99.965%) log reduction against MRSA, when tested according to the conditions stipulated in this report.

Test results were calculated against a plain glass control material without paint.

See raw data tables below for test results.

The sample will be retained for 1 month unless otherwise requested.

Laboratory Manager
Megan Barrett

Technical Project Manager
Peter Thistlethwaite

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Test results – MRSA

24 hour					
		Dilution	cfu/ml	Average cfu/ml	A*t* (Log10 bacteria/cm2)
MRSA	Test	0	5	11	1.02
		0	12		
		0	16		

0 hour					
		Dilution	cfu/ml	Average cfu/ml	U*0* (Log10 bacteria/cm2)
MRSA	Control	3	32	48	4.65
		3	21		
		2	90		

24 hour						
		Dilution	cfu/ml	Average cfu/ml	U*t* (Log10 bacteria/cm2)	Antibacterial activity (*R*)
MRSA	Control	3	33	31	4.46	3.45
		3	42			
		3	17			

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Test results – E.coli

24 hour					
		Dilution	cfu/ml	Average cfu/ml	*At* (Log10 bacteria/cm2)
Escherichia coli	Test	0	13	14	1.11
		0	16		
		0	12		

0 hour					
		Dilution	cfu/ml	Average cfu/ml	*U0* (Log10 bacteria/cm2)
Escherichia coli	Control	2	92	81	3.89
		2	79		
		2	73		

24 hour						
		Dilution	cfu/ml	Average cfu/ml	*Ut* (Log10 bacteria/cm2)	Antibacterial activity (*R*)
Escherichia coli	Control	3	32	31	4.47	3.36
		3	42			
		3	19			

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Key

I: - Test inoculum concentration cfu/ml
U_o – Log10 cfu/cm^2 recovered from control at time point 0h
A_t – Log10 cfu/cm^2 recovered from test sample at time point 24h
U_t – Log10 cfu/cm^2 recovered from control at time point 24h
R = (Ut − U0) − (At − U0) = Ut – At