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

ISO 22196:2011

Job reference – J002825

Lab Ref/Report No.	**J002825**
Testing Laboratory **Site** **Company owner**	**Microbiological Solutions Limited** **Gollinrod, Bury, BL9 5NB** **Angela Davies, Managing director**
Report Date	**12/04/2021**
Period of Analysis	**08/04/2021**

Customer	LLC Flex Craft
Contact Name	
Address	Pr-t Ispytateley, D. 4, Room 11 G. Krasnoarmeysk Moskovskaya Oblast 141292 Russia
Email	
PO Number	Q004414/2

Name of product	PVC self-adhesive film
Batch number and appearance of product	Clear Film
Manufacturer / Supplier	LLC Flex Craft
Storage Conditions	Ambient
Method	ISO 22196:2011
Neutraliser	N1
Dimensions of test specimens	50mmx50mm squares
Dimensions of cover film	40mmx40mm square thickness 0.065mm
Cover film material	Polythene
Test Temperature	35 ± 1 °C
Temperature of Incubation	Bacteria - 37°C ±1°C for 24hr to 48hrs
Identification of the reference strains	*Escherichia coli* ATCC 10536 *Staphylococcus aureus* ATCC 6538

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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.
A negative control of Polythene is run parallel to the test and control material provided to ensure recovery of test organisms.

Deviations from standard method

N/A

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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 & Summary

The product has shown the following log reductions:

E.coli – 5.31 log

S.aureus – 3.04 log

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

E.coli

0 Hour control					
	Viable bacteria per plate				
Dilution	1	2	Average	N	Log recovery per cm/2
2	150	116	13300	8312.5	3.92
2	118	140	12900	8062.5	3.91
2	129	127	12800	8000	3.90
Average (U0)			13000	8125	3.91

Control 24 hour					
	Viable bacteria per plate				
Dilution	1	2	Average	N	Log recovery per cm/2
3	330	330	330000	206250	5.31
3	330	330	330000	206250	5.31
3	330	330	330000	206250	5.31
Average (Ut)			330000	206250	5.31

Test 24 hour					
	Viable bacteria per plate				
Dilution	1	2	Average	N	Log recovery per cm/2
0	0	0	0	0	0.00
0	0	0	0	0	0.00
0	0		0	0	0.00
Average (At)			0	0	0.00

Log reduction (R)
(Ut – U0) – (At – U0) = Ut – At
5.31

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Test results

0 Hour control					
	Viable bacteria per plate				
Dilution	1	2	Average	N	Log recovery per cm/2
1	19	20	195	121.875	2.09
2	152	180	16600	10375	4.02
2	156	161	15850	9906.25	4.00
Average (U0)			10882	6801	3.37

Control 24 hour					
	Viable bacteria per plate				
Dilution	1	2	Average	N	Log recovery per cm/2
2	136	116	12600	7875	3.90
2	100	100	10000	6250	3.80
1	41	45	430	269	2.43
Average (Ut)			7677	4798	3.37

Test 24 hour					
	Viable bacteria per plate				
Dilution	1	2	Average	N	Log recovery per cm/2
0	0	0	0	0	0.00
0	0	0	0	0	0.00
0	15	18	16.5	10.3125	1.01
Average (At)			6	3	0.34

Log reduction (R)
(Ut – U0) – (At – U0) = Ut – At
3.04

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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
10^^{x} – Dilution factor
U_t – Log10 cfu/cm^2 recovered from control at time point 24h
R – Log reduction (U_t – A_t)