BIOTECH TESTING SERVICES

TEST REPORT

LAB NO. : 2002135/ 1 - 2	DATE: 31/07/2020

NAME OF CUSTOMER : GREENLAM INDUSTRIES LIMITED

ADDRESS : Plot no. E - 176/179, Phase-II,
RIICO Industrial Area, P.O Behror,
Dist. Alwar

REFERENCE : Letter Ref. Nil dated July 13, 2020
K. Attention: GSRA Sharma

DATE OF RECEIPT : 13/07/2020

DATE OF INITIATION : 13/07/2020

DATE OF COMPLETION : 31/07/2020

SAMPLE DESCRIPTION : LAMINATE SAMPLE LABELED AS:-

Sr. No.	Description
1.	Décor No. 269-SF-1.00mm, Greenlam Anti-Virus High Pressure Decorative Laminate Sample
2.	Décor No. 275-SF-1.00mm, Greenlam Untreated High Pressure Decorative Laminate Sample
Untreated – Lab Control	

Name of Test:

Measurement of Antiviral activity on plastics and other non-porous surfaces and coating materials

Name of Test Protocol:

ISO 21702: 2019*

Scope of Method:

This test specifies method for measuring antiviral activity on plastic and other non-porous surface of antiviral-treated products against specified virus. Due to individual sensitivities, the results of one test virus might not be applicable for other viruses.

*Modified method with use of MS2 virus

• Samples are not drawn by the laboratory • Result relate only to the samples tested
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104/105, Malwa, Patanwala Ind. Estate, L.B.S. Marg, Ghatkopar (W), Mumbai - 400086, INDIA • Tel. : +91-22-2500 2811, 2500 2812
Email : info@biotechts.in / report@biotechts.in / biotechtestingservices@gmail.com / shilpanair@biotechts.in

Test Microorganism Information:

MS2 Bacteriophage (MS2) is an RNA virus of the family Leviviridae. Escherichia coli 15597 are the hosts for bacteriophages. Due to its environmental resistance, MS2 bacteriophages are used as a surrogate virus (particularly in place of Picornaviruses such as Poliovirus and human Norovirus) in water quality and Antimicrobial studies.

Virus: MS2 Bacteriophage

Permissive Host Cell: Escherichia coli ATCC 15597

Experimental Details:

Test Carrier	: Laminate Paper (50 mm x 50 mm); Pre-sterilized by UV light
Control Carrier	: Laminate paper non coated and sterilized by autoclaving (50 mm x 50 mm)
LDPE cover	: LDPE film pre sterilized 40 mm x 40 mm
Virus	: MS2 Bacteriophage; Inoculum volume 0.4 ml
Permissive Host Cell	: Escherichia coli ATCC 15597
Contact Period	: 2 hours & 24 hours
Neutralizer	: DE broth
Medium	: Trypticase soya agar
Incubation for survivors	: 37^{0}C for 3 days

Validation and Records:

Neutralizer Validation and Records:

Validation Test			
Test Organism	**Exptl. Condition Control (A)** (CFU/ ml)	**Neutralizer Toxicity Control (B)** (CFU/ ml)	**Dilution–neutralization Control ©** (CFU/ ml)
MS2 Bacteriophage	45	48	50

Where –

A=No. of PFU/ml of Test organism in Experimental condition validation

B=No. of PFU/ml of Test organism in Neutralizer Toxicity validation

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Test Procedure:

Pre-sterilized samples were loaded with diluted viral suspension to 10^6 PFU/ ml. Virus suspension 0.4 ml was added to 50 mm x 50 mm of Test substrate. It was covered with 40 mm x 40 mm LDPE film. Following exposure time, Virus was eluted and neutralized by serial tenfold dilution and assayed to determined surviving Viruses in comparison with Control without test product in sq. cms. Virus assay was quantitative as Plaque forming unit (PFU) visible as area of Clearance.

Results:

A. **Contact duration of 2 hours**

Quantitative Assessment of Antiviral Activity – ISO 21702: 2019				
Untreated: Average no. of Plaques recovered at 0 hours (U_0): 6.00 x 10^4 PFU/sq cm.				Log = 4.77
Untreated: Average no. of Plaques recovered at 2 hours (U_t): 7.50 x 10^4 PFU/sq cm.				Log = 4.87
Sample Identification	**Average No. of Plaques recovered from Treated (At)**	**Log of Plaques recovered from Treated (At)**	**Antiviral Activity (R) (Log U_t - A_t)**	**Virus Reduction Percentage**
Décor No. 269-SF-1.00mm, Greenlam Anti-Virus High Pressure Decorative Laminate Sample	4600	3.66	**1.21**	**93.86**
Décor No. 275-SF-1.00mm, Greenlam Untreated High Pressure Decorative Laminate Sample	6800	3.83	**1.04**	**90.93**

B. **Contact duration of 24 hours**

Quantitative Assessment of Antiviral Activity – ISO 21702: 2019				
Untreated: Average no. of Plaques recovered at 0 hours (U_0): 6.00 x 10^4 PFU/sq cm.				Log = 4.77
Untreated: Average no. of Plaques recovered at 24 hours (U_t): 9.20 x 10^4 PFU/sq cm.				Log = 4.96
Sample Identification	**Average No. of Plaques recovered from Treated (At)**	**Log of Plaques recovered from Treated (At)**	**Antiviral Activity (R) (Log U_t - A_t)**	**Virus Reduction Percentage**
Décor No. 269-SF-1.00mm, Greenlam Anti-Virus High Pressure Decorative Laminate Sample	<10	<1	**>3.96**	**>99.98**
Décor No. 275-SF-1.00mm, Greenlam Untreated High Pressure Decorative Laminate Sample	<10	<1	**>3.96**	**>99.98**

Where:
R = Antiviral activity
U_0 = Log of PFU recovered from Untreated specimen immediately after inoculation, in PFU/ cm^2
U_t = Log of PFU recovered from Untreated specimen after 2 / 24 hrs. after inoculation, in PFU/ cm^2
A_t = Log of PFU recovered from Treated specimen after 2 / 24 hrs. after inoculation, in PFU/ cm^2

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COMMENT:

When tested as specified, Sample labeled as **Décor No. 269-SF-1.00mm, Greenlam Anti-Virus High Pressure Decorative Laminate Sample** has shown **93.86%** and **>99.98%** Reduction of virus; **Décor No. 275-SF-1.00mm, Greenlam Untreated High Pressure Decorative Laminate Sample** has shown **90.93%** and **>99.98%** Reduction of virus in 2 hours and 24 hours when tested by ISO 21702: 2019 standard.

For BIOTECH TESTING SERVICES

Dr Shilpa U. Nair
Quality Manager
(Authorized Signatory)

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