



## BIOTECH TESTING SERVICES

### TEST REPORT

LAB NO. : 2004179/1

DATE: 30/11/2020

**NAME OF CUSTOMER** : M/S. AKZO NOBEL INIDA LIMITED  
**ADDRESS** : TTC, Industrial Area, Kopar Khairane,  
Thane Belapur Road, Navi Mumbai  
**REFERENCE** : Your letter Ref. No. Nil dated November 05, 2020  
**DATE OF RECEIPT** : 05/11/2020  
**DATE OF INITIATION** : 26/11/2020  
**DATE OF COMPLETION** : 30/11/2020  
**SAMPLE DESCRIPTION** : Test sample labeled as -

| Sr. No. | Description           |
|---------|-----------------------|
| 1.      | Dulux SuperClean      |
|         | 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



## BIOTECH TESTING SERVICES

### 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             | : Lenata Sample (50 mm x 50 mm); Pre-sterilized by UV light              |
| Control Carrier          | : Lenata Sample 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           | : 30 minutes and 2 hours   |
| Neutralizer              | : DE broth   |
| Medium                   | : Trypticase soya agar   |
| Incubation for survivors | : 37°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 | 44                                     | 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 30 minutes**

| Quantitative Assessment of Antiviral Activity – ISO 21702: 2019                                 |   |   |  |                            |
|---|---|---|--|----------------------------|
| Untreated: Average no. of Plaques recovered at 0 hours ( $U_0$ ): $9.00 \times 10^4$ PFU/sq cm. |   |   |  | Log = 4.95                 |
| Untreated: Average no. of Plaques recovered at 2 hours ( $U_t$ ): $1.18 \times 10^5$ PFU/sq cm. |   |   |  | Log = 5.07                 |
| Sample Identification   | Average No. of Plaques recovered from Treated ( $A_t$ ) | Log of Plaques recovered from Treated ( $A_t$ ) | Antiviral Activity (R) ( $\text{Log } U_t - A_t$ ) | Virus Reduction Percentage |
| Dulux SuperClean  | 4100  | 3.61  | 1.34   | 95.49                      |

**B. Contact duration of 2 hours**

| Quantitative Assessment of Antiviral Activity – ISO 21702: 2019                                 |   |   |  |                            |
|---|---|---|--|----------------------------|
| Untreated: Average no. of Plaques recovered at 0 hours ( $U_0$ ): $9.00 \times 10^4$ PFU/sq cm. |   |   |  | Log = 4.95                 |
| Untreated: Average no. of Plaques recovered at 2 hours ( $U_t$ ): $1.18 \times 10^5$ PFU/sq cm. |   |   |  | Log = 5.07                 |
| Sample Identification   | Average No. of Plaques recovered from Treated ( $A_t$ ) | Log of Plaques recovered from Treated ( $A_t$ ) | Antiviral Activity (R) ( $\text{Log } U_t - A_t$ ) | Virus Reduction Percentage |
| Dulux SuperClean  | 2700  | 3.43  | 1.64   | 97.71                      |

Where:

R = Antiviral activity

$U_0$  = Log of PFU recovered from Untreated specimen immediately after inoculation, in PFU/  $\text{cm}^2$

$U_t$  = Log of PFU recovered from Untreated specimen after 30 mins & 2hrs. after inoculation, in PFU/  $\text{cm}^2$

$A_t$  = Log of PFU recovered from Treated specimen after 30 mins & 2hrs. after inoculation, in PFU/  $\text{cm}^2$

**COMMENT:**

When tested as specified, Sample labeled as Dulux SuperClean has shown 95.49% and 97.71% Reduction of virus in 30 minutes and 2 hours when tested by ISO 21702: 2019 standard.

Bacteriophages are viruses of Bacteria. They are suitable only as a Preliminary screen in the development of germicidal product. Due to variation in virus antigen, for specific virucidal claims, test should be conducted specifically with that virus

For BIOTECH TESTING SERVICES



*Shilpa*  
Dr Shilpa U. Nair  
Quality Manager  
(Authorized Signatory)

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## BIOTECH TESTING SERVICES

### TEST REPORT

LAB NO. : 2004198/ 1

DATE: 11/11/2020

**NAME OF CUSTOMER** : M/S. AKZO NOBEL INIDA LIMITED  
**ADDRESS** : TTC, Industrial Area, Kopar Khairane,  
Thane Belapur Road, Navi Mumbai  
**REFERENCE** : Your letter Ref. No. Nil dated November 02, 2020  
**DATE OF RECEIPT** : 05/11/2020  
**DATE OF INITIATION** : 05/11/2020  
**DATE OF COMPLETION** : 11/11/2020  
**SAMPLE DESCRIPTION** : Test sample labeled as -

| Sr. No.               | Description             |
|-----------------------|-------------------------|
| 1.                    | Dulux SuperClean 3 in 1 |
| 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





## BIOTECH TESTING SERVICES

### 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             | : Lenata Sample (50 mm x 50 mm); Pre-sterilized by UV light              |
| Control Carrier          | : Lenata Sample 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           | : 30 minutes and 2 hours   |
| Neutralizer              | : DE broth   |
| Medium                   | : Trypticase soya agar   |
| Incubation for survivors | : 37 <sup>0</sup> C for 3 days   |

### Validation and Records:

#### Neutralizer Validation and Records:

| Validation Test   |   |   |  |
|-------------------|---|---|--|
| Test Organism     | Exptl. Condition Control (A)<br>(CFU/ ml) | Neutralizer Toxicity Control (B)<br>(CFU/ ml) | Dilution-neutralization Control (C)<br>(CFU/ ml) |
| MS2 Bacteriophage | 42  | 44  | 46   |

#### 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

**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 30 minutes**

| Quantitative Assessment of Antiviral Activity – ISO 21702: 2019                                     |   |   |  |                            |
|---|---|---|--|----------------------------|
| Untreated: Average no. of Plaques recovered at 0 hours ( $U_0$ ): $6.50 \times 10^4$ PFU/sq. cm.    |   |   |  | Log = 4.81                 |
| Untreated: Average no. of Plaques recovered at 30 minutes ( $U_t$ ): $9.10 \times 10^4$ PFU/sq. cm. |   |   |  | Log = 4.95                 |
| Sample Identification   | Average No. of Plaques recovered from Treated ( $A_t$ ) | Log of Plaques recovered from Treated ( $A_t$ ) | Antiviral Activity (R) ( $\text{Log } U_t - A_t$ ) | Virus Reduction Percentage |
| Dulux SuperClean 3 in 1   | 2590  | 3.41  | 1.54   | 97.15                      |

**B. Contact duration of 2 hours**

| Quantitative Assessment of Antiviral Activity – ISO 21702: 2019                                  |   |   |  |                            |
|--|---|---|--|----------------------------|
| Untreated: Average no. of Plaques recovered at 0 hours ( $U_0$ ): $9.00 \times 10^4$ PFU/sq. cm. |   |   |  | Log = 4.95                 |
| Untreated: Average no. of Plaques recovered at 2 hours ( $U_t$ ): $1.18 \times 10^5$ PFU/sq. cm. |   |   |  | Log = 5.07                 |
| Sample Identification  | Average No. of Plaques recovered from Treated ( $A_t$ ) | Log of Plaques recovered from Treated ( $A_t$ ) | Antiviral Activity (R) ( $\text{Log } U_t - A_t$ ) | Virus Reduction Percentage |
| Dulux SuperClean 3 in 1  | 2400  | 3.38  | 1.69   | 97.96                      |

Where:

R = Antiviral activity

$U_0$  = Log of PFU recovered from Untreated specimen immediately after inoculation, in PFU/  $\text{cm}^2$

$U_t$  = Log of PFU recovered from Untreated specimen after 5 mins. and 2 hours after inoculation, in PFU/  $\text{cm}^2$

$A_t$  = Log of PFU recovered from Treated specimen after 5 mins. and 2 hours after inoculation, in PFU/  $\text{cm}^2$

**COMMENT:**

When tested as specified, Sample labeled **Dulux SuperClean 3 in 1** has shown **97.15% and 97.96%** Reduction of virus in 30 minutes and 2 hours when tested by ISO 21702: 2019 standard.

Bacteriophages are viruses of Bacteria. They are suitable only as a Preliminary screen in the development of germicidal product. Due to variation in virus antigen, for specific virucidal claims, test should be conducted specifically with that virus

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