



BIOTECH TESTING SERVICES

TEST REPORT

LAB NO. : 2103366/ 1

DATE: 28/10/2021

NAME OF CUSTOMER : M/S. APCO (Australian Paint Company Pty Ltd)
(Berger Paints Singapore Pte Ltd)

ADDRESS : 22 Benoi Sector,
Singapore 629854

REFERENCE : Your Letter Ref. Nil dated October 23, 2021

DATE OF RECEIPT : 23/10/2021

DATE OF INITIATION : 23/10/2021

DATE OF COMPLETION : 28/10/2021

SAMPLE DESCRIPTION : leneta sample labeled as -

Sr. No.	Sample Code
1.	PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT
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



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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	: Sample (50 mm x 50 mm); Pre-sterilized by UV light
Control Carrier	: 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	: 24 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) (PFU/ ml)	Neutralizer Toxicity Control (B) (PFU/ ml)	Dilution-neutralization Control (C) (PFU/ ml)
MS2 Bacteriophage	44	46	48

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 24 hours

Quantitative Assessment of Antiviral Activity – ISO 21702: 2019				
Untreated: Average no. of Plaques recovered at 0 hours (U_0): 9.80×10^4 PFU/sq cm.				Log = 4.99
Untreated: Average no. of Plaques recovered at 24 hours (U_t): 1.10×10^5 PFU/sq cm.				Log = 5.04
Sample Identification	Average No. of Plaques recovered from Treated (A_t)	Log of Plaques recovered from Treated (A_t)	Antiviral Activity (R) (Log $U_t - A_t$)	Virus Reduction Percentage
PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT	700	2.84	2.20	99.36

Where:

R = Antiviral activity

U_0 = Log of PFU recovered from Untreated specimen immediately after inoculation, in PFU/ cm²

U_t = Log of PFU recovered from Untreated specimen after 24 hrs. after inoculation, in PFU/ cm²

A_t = Log of PFU recovered from Treated specimen after 24 hrs. after inoculation, in PFU/ cm²

COMMENT:

When tested as specified, Sample labeled as **PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT** has shown **99.36%** reduction of virus MS2 Bacteriophage as surrogate virus in 24 hours when tested by ISO 21702: 2019 standard.

Disclaimer:

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



Dr Shilpa U. Nair
Quality Manager
(Authorized Signatory)

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BIOTECH TESTING SERVICES

TEST REPORT

LAB NO.: 2103366/ 1

DATE:28/10/2021

NAME OF CUSTOMER : M/S. APCO (Australian Paint Company Pty Ltd)
(Berger Paints Singapore Pte Ltd)

ADDRESS : 22 Benoi Sector,
Singapore 629854

REFERENCE : Your Letter Ref. Nil dated October 23, 2021

DATE OF RECEIPT : 23/10/2021

DATE OF INITIATION : 23/10/2021

DATE OF COMPLETION : 28/10/2021

SAMPLE DESCRIPTION : Leneta sample labeled as -

Sr. No.	Sample Description
1.	PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT
	Untreated lab control

Name of Test:

JIS Z 2801: 2010

Antibacterial products - Test for antibacterial activity and efficacy

Test Organisms used for evaluating Antimicrobial activity:

1. Staphylococcus aureus ATCC 6538
2. Escherichia coli ATCC 8739

Test Conditions:

Neutraliser used : Buffered Saline with Tween 80 - 0.01 %
Inoculum Carrier : 1/20 Nutrient Broth with Tween 80
Contact Time : 24 hours at 37° C
Incubation Temperature : 37° C
Media and Reagent : Soyabean-casein digest agar

Results:

ANTIBACTERIAL ACTIVITY

1. Test Bacteria: Staphylococcus aureus ATCC 6538

Quantitative Assessment of Activity - JIS Z 2801: 2010				
Untreated lab control: Conc. of Inoculum on untreated sample at 0 hours (A): 1.76×10^4				Log = 4.24
Untreated lab control: Conc. of Inoculum on untreated sample after 24 hours (B): 6.20×10^5				Log = 5.79
Sample Identification	No. Bacteria on treated sample (C)	Log of Bacteria on treated sample	Antimicrobial Activity (R) (Log B-C)	Microbial Kill (% Reduction)
PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT	<10	<1	>4.79	>99.99

2. Test Bacteria: Escherichia coli ATCC 8739

Quantitative Assessment of Activity - JIS Z 2801: 2010				
Untreated lab control: Conc. of Inoculum on untreated sample at 0 hours (A): 1.88×10^4				Log = 4.27
Untreated lab control: Conc. of Inoculum on untreated sample after 24 hours (B): 1.20×10^6				Log = 6.07
Sample Identification	No. Bacteria on treated sample (C)	Log of Bacteria on treated sample	Antimicrobial Activity (R) (Log B-C)	Microbial Kill (% Reduction)
PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT	20	1.30	4.77	99.99

The Standard Antimicrobial value of Evaluation $R \geq 2.0$

COMMENT:

When tested as specified, Sample labeled **PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT**; **PASSES** the Quantitative Assessment of activity for Staphylococcus aureus and Escherichia by **JIS Z 2801: 2010 Test Method**.

For BIOTECH TESTING SERVICES



Dr Shilpa U. Nair
Quality Manager
(Authorized Signatory)



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TEST REPORT

LAB NO.: 2103366/ 1

DATE:10/11/2021

NAME OF CUSTOMER : M/S. APCO (Australian Paint Company Pty Ltd)
(Berger Paints Singapore Pte Ltd)

ADDRESS : 22 Benoi Sector,
Singapore 629854

REFERENCE : Your Letter Ref. Nil dated October 23, 2021

DATE OF RECEIPT : 23/10/2021

DATE OF INITIATION : 23/10/2021

DATE OF COMPLETION : 10/11/2021

SAMPLE DESCRIPTION : Leneta sample labeled as -

Sr. No.	Sample Description
1.	PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT
	Untreated lab control

Test Method:

ISO 21702: 2019; Measurement of Antiviral activity on plastics and other non-porous surfaces and coating materials

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.



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Determination of Infectious titre:

TCID50 method

Virus strains and host cells:

Test Virus: Influenza A virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

Host Cell: MDCK cell ATCC CCL-34; Passage No.: Cells from PN 19

Experimental Conditions:

Test Sample	: Sample surface (50 mm x 50 mm); Pre-sterilized by ETO
Control Sample	: LDPE film (40 mm x 40 mm); Pre-sterilized by ETO
Test procedure	: Triplicates
Virus inoculum volume	: 0.4 ml
Viral titre	: 1.60×10^8 PFU/ ml
Contact Period	: 24 hours
Wash out Medium	: SCDLP
TCID50 method	: 96 Well plate
Medium of Cell culture	: Eagle's minimal essential medium (EMEM), supplemented with inactivated FBS & antibiotics
Incubation	: 37° C in CO ₂ incubator/ 7 days

Verification of cytotoxicity by cell sensitivity to virus and the inactivation of antiviral activity:

1. Sterile Control and Test samples were added with 10 ml wash out solution, SCDLP medium. To ensure that the neutralizer completely washes the specimens, SCDLP broth was pipetted at least four times.
2. The washing out solution was inoculated with virus suspension and incubated at 25° C for 30 minutes.
3. Infective titre of this solution was determined by TCID50 Method.
4. Log of TCID50/ ml of Control fabric - Log of TCID50/ ml of Test Fabric ≤ 0.5 .

Test Procedure:

1. 0.4 ml of the test inoculum was added onto the test surface. It was covered with LDPE film to ensure that the test inoculum makes contact with test surface and spreads to the edges.
2. After the specimen was inoculated and the cover film applied, It was closed with the lid of the Petri dish and incubated at $35 \pm 1^{\circ}$ C and a relative humidity of not less than 90 % for 24 hours.
3. Immediately after inoculation, the three Control sample were terminated using SCDLP medium to retrieve the virus.
4. After the contact time of 24 hours, remaining Control and Test samples were terminated using SCDLP medium to retrieve the virus.
5. Infectivity titer of virus recovered from the sample was determined by TCID₅₀ method.

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Results:

Test Virus: Influenza A Virus (H3N2): A/Hong Kong/8/68: ATCC VR-1679

Test Sample: PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT

Virus	Contact Duration	Group	Logarithm of Infectivity titre of virus (lgTCID ₅₀ / cm ²)	Average titre Infectivity of virus (lgTCID ₅₀ / cm ²)
Influenza virus suspension: (1.80 × 10 ⁶ PFU/ ml)	0 hours	Control (U ₀)	5.90	5.89
			5.92	
			5.85	
	24 hours	Control (U _t)	5.86	5.86
			5.90	
			5.82	
24 hours	PRO-COAT HYGIENE + ANTIVIRAL & ANTIMICROBIAL INTERIOR PAINT (A _t)	2.00	1.97	
		1.96		
		1.95		
Antiviral activity R= U _t - A _t (24 hours contact)			-	3.89 (99.98%)

Where

R is the Antiviral activity

U₀ is the average of common logarithm from three control/ untreated specimen immediately after inoculation

U_t is the average of common logarithm from three control/ untreated specimen after 24 hours

A_t is the average of common logarithm from three Treated specimen after 24 hours

For BIOTECH TESTING SERVICES




Dr Shilpa U. Nair
Quality Manager
(Authorized Signatory)



BIOTECH TESTING SERVICES

TEST REPORT

LAB NO. : 2103565/ 1

DATE: 07/12/2021

NAME OF CUSTOMER : M/S. APCO (Australian Paint Company Pty Ltd)
(Berger Paints Singapore Pte Ltd)

ADDRESS : 22 Benoi Sector,
Singapore 629854

REFERENCE : Your Letter Ref. Nil dated October 23, 2021

DATE OF RECEIPT : 23/10/2021

DATE OF INITIATION : 23/10/2021

DATE OF COMPLETION : 28/10/2021

SAMPLE DESCRIPTION : Sample Specimen labeled as -

Sr. No.	Sample Code
1.	Pro – Coat Hygiene + Antiviral & Antimicrobial Interior Paint
	Untreated lab control

Test Method:

ISO 21702: 2019; Measurement of Antiviral activity on plastics and other non-porous surfaces and coating materials

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.



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Determination of Infectious titre:

TCID50 method

Virus strains and host cells:

Test Virus: Human Coronavirus HCoV-229E (Surrogate of SARS-CoV-2)

Host Cell: MRC-5 cell line (ATCC CCL-171); Passage No.: Cells from PN 18

Experimental Conditions:

Test Sample	: Sample surface (50 mm x 50 mm); Pre-sterilized by ETO
Control Sample	: LDPE film (40 mm x 40 mm); Pre-sterilized by ETO
Test procedure	: Triplicates
Virus inoculum volume	: 0.4 ml
Viral titre	: 1.60×10^8 PFU/ ml
Contact Period	: 24 hours
Wash out Medium	: SCDLP
TCID50 method	: 96 Well plate
Medium of Cell culture	: Eagle's minimal essential medium (EMEM), supplemented with inactivated FBS & antibiotics
Incubation	: 37°C in CO_2 incubator/ 7 days

Verification of cytotoxicity on Host cells:

1. Sterile Control and Test samples were added with 10 ml wash out solution, SCDLP medium. To ensure that the neutralizer completely washes the specimens, SCDLP broth was pipetted at least four times.
2. 0.1 ml of the washing out solution was inoculated into 6 well plate having monolayer of host cells in duplicates.
3. It was incubated at 34°C for 2-3 days.
4. After incubation, plates were examined visually for cytotoxic effect if any.

Observations:

Sample Description	Observations
Pro – Coat Hygiene + Antiviral & Antimicrobial Interior Paint	Non cytotoxic

Verification of cytotoxicity by cell sensitivity to virus and the inactivation of antiviral activity:

1. Sterile Control and Test samples were added with 10 ml wash out solution, SCDLP medium. To ensure that the neutralizer completely washes the specimens, SCDLP broth was pipetted at least four times.
2. The washing out solution was inoculated with virus suspension and incubated at 25°C for 30 minutes.
3. Infective titre of this solution was determined by TCID50 Method.
4. Log of TCID50/ ml of Control fabric - Log of TCID50/ ml of Test Fabric ≤ 0.5 .

Observations:

Log of TCID50/ ml of Control fabric	Log of TCID50/ ml of Test Fabric	Log of TCID50/ ml of Control fabric - Log of TCID50/ ml of Test Fabric	Acceptable Criteria
3.80	3.42	0.38	≤ 0.5

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Test Procedure:

1. 0.4 ml of the test inoculum was added onto the test surface. It was covered with LDPE film to ensure that the test inoculum makes contact with test surface and spreads to the edges.
2. After the specimen was inoculated and the cover film applied, It was closed with the lid of the Petri dish and incubated at 35 ± 1°C and a relative humidity of not less than 90 % for 24 h.
3. Immediately after inoculation, the three Control sample were terminated using SCDLP medium to retrieve the virus.
4. After the contact time of 24 hours, remaining Control and Test samples were terminated using SCDLP medium to retrieve the virus.
5. Infectivity titer of virus recovered from the sample was determined by TCID₅₀ method.

Results:

Test Virus: Human Coronavirus HCoV-229E (Surrogate of SARS-CoV-2)

1. Test Sample: Pro – Coat Hygiene + Antiviral & Antimicrobial Interior Paint

Virus	Contact Duration	Group	Logarithm of Infectivity titre of virus (lgTCID ₅₀ / cm ²)	Average titre Infectivity of virus (lgTCID ₅₀ / cm ²)
Coronavirus suspension: (1.50 × 10 ⁸ PFU/ ml)	0 hours	Control (U ₀)	5.80	5.90
			5.92	
			5.98	
	24 hours	Control (U _t)	5.75	5.87
			5.90	
			5.95	
	24 hours	Pro – Coat Hygiene + Antiviral & Antimicrobial Interior Paint (A _t)	2.70	2.65
			2.65	
			2.60	
Antiviral activity R= U _t - A _t (24 hours contact)			-	3.22 (99.93%)

Antiviral activity R= U_t - A_t

Where

R is the Antiviral activity

U₀ is the average of common logarithm from three control/ untreated specimen immediately after inoculation

U_t is the average of common logarithm from three control/ untreated specimen after 24 hours

A_t is the average of common logarithm from three Treated specimen after 24 hours



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