BIOTECH TESTING SERVICES

TEST REPORT

LAB NO.: 2301912/ 6	DATE: 28/09/2023

NAME OF CUSTOMER : JSW PAINTS PRIVATE LIMITED

ADDRESS : Vasind, Shahapur,
Thane - 421604

REFERENCE : Your letter Ref. JSWP/ BTS/07/2023-24 dated August 23, 2023
Kind Attention: Anirudh Neswankar

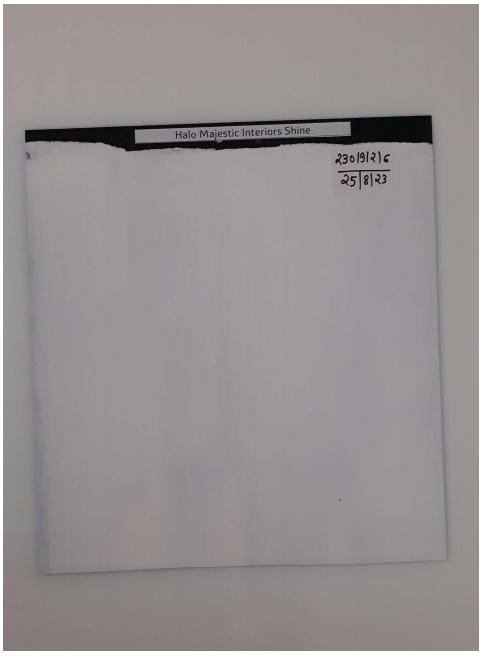
DATE OF RECEIPT : 25/08/2023

DATE OF INITIATION : 25/08/2023

DATE OF COMPLETION : 28/09/2023

SAMPLE DESCRIPTION : Sample labeled as-

Sr. No.	Description
6.	Halo Majestic Interiors Shine
	Uncoated Leneta panels
Untreated lab control	



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Name of Test:

JIS Z 2801: 2010; Amendment 1: 2012

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
3. Pseudomonas aeruginosa ATCC 9027
4. Klebsiella pneumoniae ATCC 4352
5. Enterococcus faecalis MTCC 3159
6. Enterococcus hirae ATCC 10541
7. Serratia marcescens ATCC 14756
8. Pseudomonas stutzeri MTCC 101
9. Vibrio cholerae 01 MTCC 3904
10. Bacillus subtilis ATCC 6633
11. Nocardia rugosa MTCC 10604
12. Shigella flexneri ATCC 29508
13. Staphylococcus epidermidis ATCC 7919
14. Alcaligenes faecalis ATCC 8750
15. Acinetobacter baumannii ATCC 19606
16. Pseudomonas putida ATCC 12633
17. Salmonella typhimurium ATCC 23564
18. Enterobacter aerogenes ATCC13048
19. Proteus mirabilis ATCC 25933
20. Bacillus cereus ATCC 14579
21. Streptococcus faecalis ATCC 29212
22. Meticillin Resistant Staphylococcus aureus ATCC 43300
23. Listeria monocytogenes ATCC 19112
24. Klebsiella pneumoniae ATCC 2146 - MBL strain
25. Enterobacter sakazakii ATCC 51329
26. Escherichia coli ATCC 25922
27. Corynebacterium minutissumum ATCC 23348
28. Streptococcus mutans MTCC 497
29. Vancomycin Resistant Enterococci ATCC 51299
30. Vancomycin Resistant Enterococci ATCC 2006
31. Citrobacter freundii ATCC 43864
32. Corynebacterium xerosis ATCC 7711
33. Proteus vulgaris ATCC 13315
34. Micrococcus luteus ATCC 11880
35. Klebsiella pneumoniae ATCC 700603 ESBL strain
36. Salmonella enterica MTCC 733
37. Sarcina luteus NCIM 2210
38. Escherichia coli K12 MTCC 1302
39. Burkholderia cepacia MTCC 12970
40. Clostridium perfringens ATCC 13124

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Experimental Conditions:

Sample Size : 5cm x 5cm

Pre-treatment of sample : ETO Sterilisation

Inoculum Carrier : 1: 500 Nutrient broth

Cover Film : LDPE Film

Lab Control : LDPE Film

Contact Time : 24 hours at 35^0 C

Media and Reagent : For Bacteria - Soyabean-casein digest agar

For Clostridium – Clostridial Agar

Incubation Temperature : Bacteria - 37^0 C for 48 hours; Clostridium - 37^0 C for 48 hours (Anaerobic condition)

Neutralizer used : SCDLP Broth

Compliance for Conditions of Valid test:

Test Bacteria	Logarithmic value of number of viable bacteria untreated sample at 0 hours (Lmax- Lmin)/ Lmean	Average number of viable bacteria recovered immediately after inoculation from the Untreated specimen	The number of viable bacteria recovered from each Untreated specimen after incubation after 24 hrs
Staphylococcus aureus ATCC 6538	0.007	Confirms	Confirms
Escherichia coli ATCC 8739	0.002	Confirms	Confirms
Pseudomonas aeruginosa ATCC 9027	0.011	Confirms	Confirms
Klebsiella pneumoniae ATCC 4352	0.002	Confirms	Confirms
Enterococcus faecalis MTCC 3159	0.005	Confirms	Confirms
Enterococcus hirae ATCC 10541	0.002	Confirms	Confirms
Serratia marcescens ATCC 14756	0.003	Confirms	Confirms
Pseudomonas stutzeri MTCC 101	0.002	Confirms	Confirms
Vibrio cholerae 01 MTCC 3904	0.005	Confirms	Confirms
Bacillus subtilis ATCC 6633	0.008	Confirms	Confirms
Nocardia rugosa MTCC 10604	0.014	Confirms	Confirms
Shigella flexneri ATCC 29508	0.006	Confirms	Confirms
Staphylococcus epidermidis ATCC 7919	0.005	Confirms	Confirms
Alcaligenes faecalis ATCC 8750	0.004	Confirms	Confirms
Acinetobacter baumannii ATCC 19606	0.005	Confirms	Confirms
Pseudomonas putida ATCC 12633	0.007	Confirms	Confirms
Salmonella typhimurium ATCC 23564	0.004	Confirms	Confirms
Enterobacter aerogenes ATCC13048	0.006	Confirms	Confirms

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Test Bacteria	Logarithmic value of number of viable bacteria untreated sample at 0 hours (Lmax- Lmin)/ Lmean	Average number of viable bacteria recovered immediately after inoculation from the Untreated specimen	The number of viable bacteria recovered from each Untreated specimen after incubation after 24 hrs
Proteus mirabilis ATCC 25933	0.002	Confirms	Confirms
Bacillus cereus ATCC 14579	0.007	Confirms	Confirms
Streptococcus faecalis ATCC 29212	0.002	Confirms	Confirms
Meticillin Resistant Staphylococcus aureus ATCC 43300	0.004	Confirms	Confirms
Listeria monocytogenes ATCC 19112	0.007	Confirms	Confirms
Klebsiella pneumoniae ATCC 2146 - MBL strain	0.002	Confirms	Confirms
Enterobacter sakazakii ATCC 51329	0.004	Confirms	Confirms
Escherichia coli ATCC 25922	0.002	Confirms	Confirms
Corynebacterium minutissumum ATCC 23348	0.014	Confirms	Confirms
Streptococcus mutans MTCC 497	0.005	Confirms	Confirms
Vancomycin Resistant Enterococci ATCC 51299	0.002	Confirms	Confirms
Vancomycin Resistant Enterococci ATCC 2006	0.009	Confirms	Confirms
Citrobacter freundii ATCC 43864	0.009	Confirms	Confirms
Corynebacterium xerosis ATCC 7711	0.002	Confirms	Confirms
Proteus vulgaris ATCC 13315	0.003	Confirms	Confirms
Micrococcus luteus ATCC 11880	0.003	Confirms	Confirms
Klebsiella pneumoniae ATCC 700603 ESBL strain	0.007	Confirms	Confirms
Salmonella enterica MTCC 733	0.004	Confirms	Confirms
Sarcina luteus NCIM 2210	0.004	Confirms	Confirms
Escherichia coli K12 MTCC 1302	0.004	Confirms	Confirms
Burkholderia cepacia MTCC 12970	0.011	Confirms	Confirms
Clostridium perfringens ATCC 13124	0.010	Confirms	Confirms
Acceptance	≤ 0.2	6.2×10^3 - 2.5×10^4 cells/cm^2	Shall not be less than 6.2×10^2 cells/cm^2

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Results:

ANTIBACTERIAL ACTIVITY

1. Test Bacteria: Staphylococcus aureus ATCC 6538

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				20600	4.31
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				312500	5.49
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>4.70**	**>99.998**	

2. Test Bacteria: Escherichia coli ATCC 8739

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				19700	4.29
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				312500	5.49
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>4.70**	**>99.998**	

3. Test Bacteria: Pseudomonas aeruginosa ATCC 9027

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				22500	4.35
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				50600	4.70
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	112	2.04	**2.66**	**99.778**	

4. Test Bacteria: Klebsiella pneumoniae ATCC 4352

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				14800	4.17
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				51800	4.71
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.92**	**99.988**	

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5. Test Bacteria: Enterococcus faecalis MTCC 3159

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				10250	4.01
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				23100	4.36
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	12	1.06	**3.31**	**99.946**	

6. Test Bacteria: Enterococcus hirae ATCC 10541

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				15750	4.20
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				12310	4.09
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.29**	**>99.949**	

7. Test Bacteria: Serratia marcescens ATCC 14756

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				5930	3.77
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				11700	4.07
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.27**	**>99.946**	

8. Test Bacteria: Pseudomonas stutzeri MTCC 101

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				13200	4.12
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				9430	3.97
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.18**	**>99.934**	

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9. Test Bacteria: Vibrio cholerae 01 MTCC 3904

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				12250	4.09
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				218750	5.34
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	1108	3.04	**2.30**	**99.493**	

10. Test Bacteria: Bacillus subtilis ATCC 6633

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				58750	4.77
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				56250	4.75
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.95**	**>99.989**	

11. Test Bacteria: Nocardia rugosa MTCC 10604

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				18750	4.27
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				23750	4.38
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.58**	**>99.974**	

12. Test Bacteria: Shigella flexneri ATCC 29508

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				2750	3.44
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				10375	4.02
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.22**	**>99.940**	

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13. Test Bacteria: Staphylococcus epidermidis ATCC 7919

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				5280	3.72
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				90625	4.96
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	200	2.30	**2.66**	**99.779**	

14. Test Bacteria: Alcaligenes faecalis ATCC 8750

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				37800	4.58
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				89375	4.95
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>4.16**	**>99.993**	

15. Test Bacteria: Acinetobacter baumannii ATCC 19606

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				4750	3.68
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				26250	4.42
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.62**	**>99.976**	

16. Test Bacteria: Pseudomonas putida ATCC 12633

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels: **Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				41250	4.62
Uncoated Leneta panels: **Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				287500	5.46
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	490	2.69	**2.77**	**99.830**	

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17. Test Bacteria: Salmonella typhimurium ATCC 23564

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				50000	4.70
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				41250	4.62
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	44	1.64	**2.98**	**99.894**	

18. Test Bacteria: Enterobacter aerogenes ATCC13048

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				45000	4.65
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				51250	4.71
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	300	2.48	**2.23**	**99.415**	

19. Test Bacteria: Proteus mirabilis ATCC 25933

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				30625	4.49
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				25000	4.40
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.60**	**>99.975**	

20. Test Bacteria: Bacillus cereus ATCC 14579

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				19375	4.29
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				16250	4.21
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	18	1.26	**2.95**	**99.885**	

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21. Test Bacteria: Streptococcus faecalis ATCC 29212

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				58750	4.77
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				24375	4.39
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.59**	**>99.974**	

22. Test Bacteria: Meticillin Resistant Staphylococcus aureus ATCC 43300

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				29375	4.47
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				41250	4.62
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	25	1.39	**3.23**	**99.939**	

23. Test Bacteria: Listeria monocytogenes ATCC 19112

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				39375	4.59
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				60000	4.78
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.98**	**>99.990**	

24. Test Bacteria: Klebsiella pneumoniae ATCC 2146 - MBL strain

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				10250	4.01
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				36250	4.56
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	312	2.49	**2.06**	**99.138**	

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25. Test Bacteria: Enterobacter sakazakii ATCC 51329

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				56250	4.75
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				55000	4.74
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.94**	**>99.989**	

26. Test Bacteria: Escherichia coli ATCC 25922

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				48125	4.68
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				113750	5.06
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>4.26**	**>99.995**	

27. Test Bacteria: Corynebacterium minutissumum ATCC 23348

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				18750	4.27
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				50625	4.70
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.91**	**>99.988**	

28. Test Bacteria: Streptococcus mutans MTCC 497

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				26875	4.43
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				13750	4.14
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.34**	**>99.955**	

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29. Test Bacteria: Vancomycin Resistant Enterococci ATCC 51299

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				36875	4.57
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				20000	4.30
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.50**	**>99.969**	

30. Test Bacteria: Vancomycin Resistant Enterococci ATCC 2006

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				26250	4.42
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				115000	5.06
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	31	1.49	**3.57**	**99.973**	

31. Test Bacteria: Citrobacter freundii ATCC 43864

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				26250	4.42
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				50625	4.70
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.91**	**>99.988**	

32. Test Bacteria: Corynebacterium xerosis ATCC 7711

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				12750	4.11
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				14375	4.16
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	44	1.64	**2.52**	**99.696**	

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33. Test Bacteria: Proteus vulgaris ATCC 13315

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				6600	3.82
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				10500	4.02
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.23**	**>99.940**	

34. Test Bacteria: Micrococcus luteus ATCC 11880

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				5810	3.76
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				30000	4.48
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.68**	**>99.979**	

35. Test Bacteria: Klebsiella pneumoniae ATCC 700603 ESBL strain

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				23125	4.36
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				9625	3.98
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.19**	**>99.935**	

36. Test Bacteria: Salmonella enterica MTCC 733

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				45625	4.66
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				50000	4.70
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.90**	**>99.988**	

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37. Test Bacteria: Sarcina luteus NCIM 2210

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				35625	4.55
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				38750	4.59
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>3.79**	**>99.984**	

38. Test Bacteria: Escherichia coli K12 MTCC 1302

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				32500	4.51
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				83750	4.92
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	230	2.36	**2.56**	**99.724**	

39. Test Bacteria: Burkholderia cepacia MTCC 12970

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				34375	4.54
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				28125	4.45
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	156	2.19	**2.26**	**99.444**	

40. Test Bacteria: Clostridium perfringens ATCC 13124

Quantitative Assessment of Activity: JIS Z 2801: 2010; Amen. 1: 2012				**count**	**Log**
Uncoated Leneta panels**: Inoculum on untreated sample at 0 hours (U0) CFU/cm2**				14375	4.16
Uncoated Leneta panels**: Inoculum on untreated sample after 24 hours (Ut) CFU/cm2**				114375	5.06
Sample identification	**No. Bacteria on treated sample CFU/cm2 (At)**	**Log of Bacteria on treated sample**	**Antimicrobial Activity (R) (Log Ut- At)**	**Microbial Kill (% Reduction)**	
Halo Majestic Interiors Shine	<6.25	<0.80	**>4.26**	**>99.995**	

The Standard Antimicrobial value of Evaluation R ≥2.0

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COMMENT:

When tested as specified, sample labeled as **Halo Majestic Interiors Shine; PASSES** the Quantitative Assessment of activity for Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Enterococcus faecalis, Enterococcus hirae, Serratia marcescens, Pseudomonas stutzeri, Vibrio cholerae, Bacillus subtilis, Nocardia rugosa, Shigella flexneri, Staphylococcus epidermidis, Alcaligenes faecalis, Acinetobacter baumannii, Pseudomonas putida, Salmonella typhimurium, Enterobacter aerogenes, Proteus mirabilis, Bacillus cereus, Streptococcus faecalis, Meticillin Resistant Staphylococcus aureus, Listeria monocytogenes, Klebsiella pneumoniae, Enterobacter sakazakii, Escherichia coli, Corynebacterium minutissumum, Streptococcus mutans, Vancomycin Resistant Enterococci, Vancomycin Resistant Enterococci, Citrobacter freundii, Corynebacterium xerosis, Proteus vulgaris, Micrococcus luteus, Klebsiella pneumoniae, Salmonella enterica, Sarcina luteus, Escherichia coli, Burkholderia cepacia and Clostridium perfringens by **JIS Z 2801: 2010; Amendment 1: 2012 Test Method.**

For BIOTECH TESTING SERVICES

BIOTECH TESTING SERVICES BTS MUMBAI

Dr Shilpa U. Nair
Quality Manager
(Authorized Signatory)

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BIOTECH TESTING SERVICES

TEST REPORT

LAB NO. : 2102148/ 3	DATE: 19/08/2021

NAME OF CUSTOMER : JSW PAINTS PRIVATE LIMITED

ADDRESS : Vasind, Shahapur,
Thane - 421604

REFERENCE : Your letter Ref. JSWP/ BTS/01/2021 -22 dated June 29, 2021
Kind Attention: Anirudh Neswankar

DATE OF RECEIPT : 06/07/2021

DATE OF INITIATION : 06/07/2021

DATE OF COMPLETION : 19/08/2021

SAMPLE DESCRIPTION : Whatman Paper Panel sample labeled as:

Sr. No.	Description
3.	Halo Majestic Interiors Shine

Name of Test:

Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated four week Agar Plate Assay

Test Method:

ASTM D 5590: 2017

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Procedure:

The samples are cut into 38 mm discs/ squares. These are placed on the center of pre-poured agar plates. A thin coat of fungal suspension is applied to each specimen using a sterile atomizer making sure the surface is covered, but not to over saturate.

A set of positive and negative growth control is included. A set of Whatman #2 (or equivalent) filter papers or the drawdown papers without coating may be suitable growth control/ viability control. Incubate all plates at 28°C under 85 to 90 % relative humidity for 4 weeks.

Experimental conditions:

Size of sample : 38 mm disc

Test fungus : Mixed spore suspension of Aspergillus niger ATCC 9642, Penicillium funicolosum ATCC 11797 and Aurobasidium pullulans ATCC 15233

Incubation : 28°C ± 90 % humidity

Results:

Visual/ Microscopic Assessment Report

Sample Description	Zone of Inhibition	Rating in Terms of Growth
Halo Majestic Interiors Shine	10 mm	**0**
Whatman Filter paper - Viability control	-	**4**

Observation for Visible Effects:

Growth on specimen	Rating
None	0
Trace of Growth (< 10 %)	1
Light Growth (10 to 30 %)	2
Medium Growth (30 to 60 %)	3
Heavy Growth (60% to complete coverage)	4

INTERPRETATION:

Sample labeled as **Halo Majestic Interiors Shine** are **Resistant to fungal attack** at the end of 28 days of incubation when tested as per **ASTM: 5590: 2017** test methods.

For BIOTECH TESTING SERVICES

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BIOTECH TESTING SERVICES

TEST REPORT

LAB NO. : 2102148/ 1 **DATE: 16/07/2021**

NAME OF CUSTOMER : JSW PAINTS PRIVATE LIMITED

ADDRESS : Vasind, Shahapur,
Thane - 421604

REFERENCE : Your letter Ref. JSWP/ BTS/01/2021 -22 dated June 29, 2021
Kind Attention: Anirudh Neswankar

DATE OF RECEIPT : 06/07/2021

DATE OF INITIATION : 07/07/2021

DATE OF COMPLETION : 16/07/2021

SAMPLE DESCRIPTION : leneta panel sample labeled as:

Sr. No.	Description
1.	Halo Majestic Interiors Shine
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 applied on Lenata Paper (50 mm x 50 mm); Pre-sterilized by UV light
Control Carrier	: LDPE Film 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 and 24 hours
Neutralizer	: DE broth
Medium	: Trypticase soya agar
Incubation for survivors	: 37^0C 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	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): 7.60 x 10^4 PFU/sq cm.				Log = 4.88
Untreated: Average no. of Plaques recovered at 2 hours (U_t): 8.60 x 10^4 PFU/sq cm.				Log = 4.93
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**
Halo Majestic Interiors Shine	610	2.78	**2.15**	**99.29**

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): 7.60 x 10^4 PFU/sq cm.				Log = 4.88
Untreated: Average no. of Plaques recovered at 24 hours (U_t): 9.10 x 10^4 PFU/sq cm.				Log = 4.95
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**
Halo Majestic Interiors Shine	230	2.36	**2.59**	**99.74**

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 & 24hrs. 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, Leneta sample labeled as **Halo Majestic Interiors Shine** has shown **99.29%** and **99.74%** reduction of MS2 Bacteriophage as surrogate virus in 2 hours and 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

BIOTECH TESTING SERVICES BTS MUMBAI

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