Lonza

March 7, 2016

Technical Service Report

For

佛山市禅城区裕丰塑料五金厂

WR-12018 (TS-0003)

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We trust that the information in this report is of help. The following people will be pleased to help you if you have further questions about the work that has been carried out:

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This study was carried out by Peng Ting, Microbiologist, Technical Service Laboratory, LONZA Suzhou.

1. Introduction

Lonza Microbial Technical Service Laboratories received 1 sample which treated with ZPT powder for antimicrobial testing. The customer would like to confirm whether the sample treated with antimicrobial had fungal resistance properties according to ASTM G21 test method and antibacterial test according to JISZ method.

2. Objective

To evaluate anti-bacterial and anti-fungal performance resistance of the materials submitted.

3. Summary

ASTM G21 Fungal Resistance Test Summary:

- Samples are under blind conditions.
- Sample performance is consistent between triplicate.
- Filter paper used as the negative control and was used to check the activity of fungal spore used in this test.
- The PVC sample had no fungal growth on the sample surface and passed the antifungal test.

The results of the anti-fungal evaluations are summarized in Tables 1.

JISZ2801 Antibacterial Test Summary:

- The value of antimicrobial activity obtained by the testing method of JISZ2801 shall not be less than 2.0 for the antimicrobial efficacy of antimicrobial products.

- The sample achieved more than 4 log reduction against S.aureus and E.coli after 24h contact time, ZPT treated sample showed good antibacterial performance.

-The results of the anti-bacterial evaluations are summarized in Table 2.

4. Experimental Results

ASTM G21 Fungal Resistance Test:

An agar plate method, ASTM G21-96 “Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi”, was used to evaluate fungal resistance of the plastic

samples. Triplicate, two-inch diameter discs were punched out of each of the 5-by-5-inch sheets provided. The discs were then placed on individual nutrient salts agar plates (25 mm x 100 mm Petri dishes) and spray-inoculated with a mixed fungal spore suspension of organisms specified in the test method (Aspergillus niger, Penicillium pinophilum, Chaetomium globosum, Gliocladium virens, and Aureobasidium pullulans). The plates were incubated at 280 C for twenty-eight days, and then rated for fungal growth using a light microscope at 10 to 20X magnification. Growth is reported on a 0 to 4 scale, with "0" describing no growth on the specimen and "4" being heavy growth (60% to complete coverage).
Growth Rating Scale:

0 = No growth
1 = Trace growth (<10% coverage)
2 = Light growth (10 to 30% coverage)
3 = Medium growth (30 to 60% coverage)
4 = Heavy growth (60 to 100% coverage)

TABLE 1 – Dry Film Fungal Resistance

No	Sample	Rating	Results
1	PVC 防滑垫	0,0,0	No fungal growth on panel surface

JIS Z2801 Bacterial Challenge:

The JIS Z2801 test is designed to determine the population reduction of bacteria over a 24 hour period. The samples were subjected to this test using *Staphylococcus aureus* (G+) and *Escherichia coli* (G-). Results are reported in percent reduction over a 24 hour period.
Results of JIS Z2801 Bacterial Challenge – Table 2

Table 2 – Gram + Bacteria: *Staphylococcus aureus* and Gram – Bacteria: *Escherichia coli*

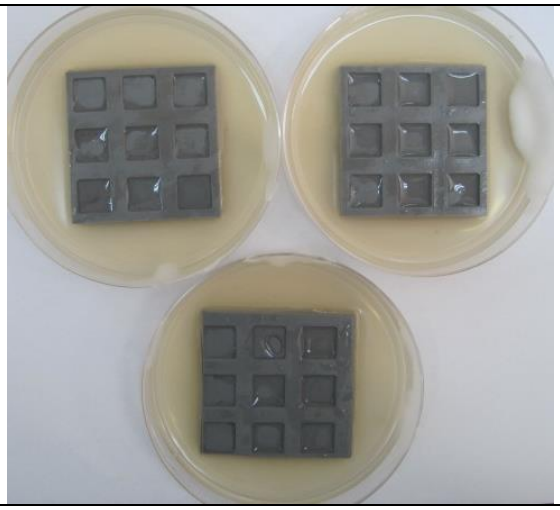
Table 2: JIS Z2801

PU							
Staphylococcus aureus ATCC6538							
Sample Name	Bacterial viability after:						
	0hours	24hours					
	Rep 1	Rep 1	Rep 2	Rep 3	average	Log Reduction	% Reduction
PE	$8.0*10^5$	$2.7*10^7$	$3.7*10^7$	$3.5*10^7$	$3.3*10^7$	NR	NR
PVC 防滑垫		<10	<10	<10	<10	7.5	>99.99999

PU							
E.coli ATCC11229							
Sample Name	Bacterial viability after:						
	0hours	24hours					
	Rep 1	Rep 1	Rep 2	Rep 3	average	Log Reduction	% Reduction
PE	$2.1*10^5$	$5.2*10^7$	$9.5*10^7$	$8.6*10^7$	$7.8*10^7$	NR	NR
PVC 防滑垫		$1.5*10^3$	$2.2*10^3$	$1.9*10^3$	$1.9*10^3$	4.6	>99.99

NR = No Reduction in bacterial population

Appendix. Photographs of ASTM G21 plates at the conclusion of the Test:

	
PVC 防滑垫	阳性

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