



No: 050522/VCCM

May 20, 2022

Test Report

Client: Branch of Panasonic Appliances Vietnam Co., Ltd. in Hung Yen**Address:** Plot G2, Thang Long Industrial Park II, Lieu Xa Commune, Yen My District, Hung Yen Province, Vietnam**Test sample:**

1. Panasonic washing machine model NA-V10FR1, made in Vietnam washing load of 3kg for Blue Ag+ function.

Test cloth: cotton knit (10cm x 10cm) and cotton knit 3kg/ machine (provided by the client)

2. Panasonic washing machine model NA-V10FR1, made in Vietnam washing load of 3kg for Blue Ag+ function (18h after wash).

Test cloth: cotton knit (3cm x 3cm) for Antibacterial efficiency test.

Test items:Test antibacterial efficiency and bacterial elimination efficiency for Blue Ag+ function of Front load washing machine NA-V10FR1 series (Made in Vietnam) with 2 types of bacteria *Escherichia coli* and *Staphylococcus aureus*.**Test method:**

- Antibacterial efficiency test: JIS L 1902: 2015. Fabric sample washed in Operating condition: Cotton Program with Cold wash added Blue Ag+ option.
- Bacterial elimination efficiency test: protocol of Panasonic Appliances Vietnam Co., Ltd. Fabric sample washed in Operating condition: Cotton Program with Cold wash added Blue Ag+ option.

Sample retention time: No**Test place:** Branch of Panasonic Appliances Vietnam Co., Ltd. in Hung Yen.

Plot G2, Thang Long Industrial Park II, Lieu Xa Commune, Yen My District, Hung Yen Province, Vietnam

Test agency: Center for Culture Collection and Genetic Resource Conservation of Microorganisms, Institute of Biotechnology**Test date:** 06/04/2022 – 20/05/2022

Test procedure:

1. *Bacterial elimination efficiency test for Blue Ag+ function*: protocol of Panasonic Appliances Vietnam Co., Ltd.

The test organism (*Escherichia coli* and *Staphylococcus aureus*) were cultured in nutrient medium liquid at 37°C for 24 hours (in shaking speed 150 rpm) to give a concentration of 10^7 to 10^8 CFU/ml.

A pieces of the test cotton cloth was sterilized in an autoclave at 121°C, 1 atm for 15 minutes and 3 ml of the cell suspension was dropped onto it.

The sterilization of washing machine and water supply route by sodium hypochlorite liquid: (1) Pour chlorine bleach 300ml into about 70L water in supply bucket. Then supply water into wash tub up to a maximum lever by water supply route and start bacteria elimination; (2) Rinsing washing machine by water again (similar as (1)); (3) Add sodium thiosulfate into 70L water (about 0,002%) to neutralize residual chlorine, rinse the water supply route and wash tub similar as (1) so that residual chlorine concentration in water of wash tub ≤ 0.1 ppm.

The Dummy Laundry was placed in the wash tub of the sample. Three test pieces were fastened to the Dummy Laundry with safety pin at three points where the client was specified. Washing in 2 modes of Bacteria Elimination course: (1) Cotton wash with Blue Ag⁺; (2) Cotton wash (without Blue Ag⁺, rinse speed as with Blue Ag⁺). The water supplied used in the washing process was neutralized residual chlorine by sodium thiosulfate. After washing, the test pieces were taken out, each piece of cloth was washed in 100 ml of distilled water. The obtained counts were converted into the total viable cell count of three test pieces.

2. *Antibacterial efficiency test for Blue Ag+ function (18h after wash)*: JIS L 1902: 2015.

The test organism (*Escherichia coli* and *Staphylococcus aureus*) were cultured in nutrient medium liquid at 37° for 24 hours (in shaking speed 150 rpm) to give a concentration about 10^5 CFU/ml.

The pieces of the test cotton cloth and washing cloth was sterilized in an autoclave at 121°C, 1 atm for 15 minutes.

The sterilization of washing machine and water supply route by sodium hypochlorite liquid: (1) Pour chlorine bleach 300ml into about 70L water in supply bucket. Then supply water into wash tub up to a maximum lever by water supply route and start bacteria elimination; (2) Rinsing washing machine by water again (similar as (1)); (3) Add sodium thiosulfate into 70L water (about 0,002%) to neutralize residual chlorine, rinse the water supply route and wash tub similar as (1) so that residual chlorine concentration in water of wash tub ≤ 0.1 ppm.

The Dummy Laundry was placed in the wash tub of the sample. Six test pieces were fastened to the Dummy Laundry with safety pin at three points where the client was specified. Washing in 2 modes of Bacteria Elimination course: (1) Cotton wash with

Blue Ag⁺; (2) Cotton wash (without Blue Ag⁺, rinse speed as with Blue Ag⁺). The water supplied used in the washing process was neutralized residual chlorine by sodium thiosulfate. After washing, the test pieces were taken out, each piece of cloth was drop 200 microlit of the cell suspension onto it. Three test pieces were determined of cell density at 0 h, each piece was washed in 20 ml of water. The obtained counts were converted into the total viable cell count of three test pieces. The remaining 3 test pieces were kept at 37 degrees for 18 hours, each piece was washed in 20 ml of water. The obtained counts were converted into the total viable cell count of three test pieces.

Test results:

1. Bacterial elimination efficiency test for Blue Ag⁺ function

Test organism	With Ag ⁺		Without Ag ⁺		With Ag ⁺	Without Ag ⁺	Degree of reduction
	Viable cell count (CFU/ml)		Viable cell count (CFU/ml)				
	Before operation	After operation	Before operation	After operation			
	A	B	C	D	E=log (A/B)	F=log (C/D)	G=E-F
<i>Escherichia coli</i> ATCC29922	8.6 x 10 ⁸	<10	8.6 x 10 ⁸	2.03 x 10 ⁵	7.93	3.63	4.31
<i>Staphylococcus aureus</i> ATCC25923	6.3 x 10 ⁸	<10	6.3 x 10 ⁸	3.78 x 10 ⁵	7.80	3.22	4.58
The antibacterial effect is achieved if the degree of reduction (G) ≥ 2					<i>Escherichia coli</i> elimination ratio		99.9951
					<i>Staphylococcus aureus</i> elimination ratio		99.9974

2. Antibacterial efficiency test for Blue Ag⁺ function (18h after wash)

<i>Test bacteria</i>	<i>Escherichia coli</i> ATCC29922	
Test time	Immediately after inoculation	After 18h incubation
Common logarithm for the number of bacteria (Max – Min)		
- Test sample	4.5185	3.3979
- Control sample	5.0086	6.4378
Growth value (F)		1.4292
Antibacterial activity value (A)		2.55
<i>Test bacteria</i>	<i>Staphylococcus aureus</i> ATCC25923	
Test time	Immediately after inoculation	After 18h incubation

Common logarithm for the number of bacteria (Max – Min)		
- Test sample	3.7202	3.7782
- Control sample	5.3263	8.1271
Growth value (F)		2.8008
Antibacterial activity value (A)		2.74

(*) $2.0 \leq A < 3.0$: Effect is recognized; $A \geq 3.0$: A strong effect is observed.

Note:

- The results only apply to tested sample
- Name of sample and Name of client written according to client 's request

Institute of Biotechnology

Center for Culture Collection and Genetic
Resource Conservation of Microorganisms

Tester



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