

LG ELECTRONICS CO., LTD.

TEST REPORT

SCOPE OF WORKS

STERILIZATION PERFORMANCE TEST OF HYGH TEMP.CYCLE

REPORT NUMBER

RT20E-S0028

ISSUE DATE

28-JUL-2020

PAGES

14

DOCUMENT CONTROL NUMBER

ISTC-QP-FM-25-04 Rev.1

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TEST REPORT FOR LG ELECTRONICS CO., LTD.

Report No.: RT20E-S0028

Date: JUL. 28, 2020

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www.intertek.com

OBJECTIVE

The purpose of the testing is:

Dryer High Temp. Evaluation of sterilization rate of cycle (40 minutes, 100 minutes)

HYPOTHESIS

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of bacteria from laundry.

CONCLUSION

Based on the data collected, the Hypothesis is accepted:

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of *Pseudomonas aeruginosa*, *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Salmonella enteritidis* from laundry.

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ENGINEER



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SECTION 2

OBJECTIVE

The purpose of the testing is:

Dryer High Temp. Evaluation of sterilization rate of cycle (40 minutes, 100 minutes)

SECTION 3

PARAMETERS

The following parameters are controlled

VALUE	DESCRIPTION	UNITS	METHOD
23 ± 5	Test room temperature	°C	Data logger
50 ± 5	Test room humidity	% R.H.	Data logger
35-37	Incubated Temperature	°C	Data logger

The following parameters are monitored

VALUE	DESCRIPTION	UNITS	METHOD
23 ± 5	Test room temperature	°C	Data logger
50 ± 5	Test room humidity	% R.H.	Data logger
35-37	Incubated Temperature	°C	Data logger

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SECTION 4

PRODUCT/MODEL DESCRIPTION

PRODUCT INFORMATION : Giant-C Gas Dryer

MODEL : RP1329AN4S

Note :

1. The model RP1329AN4S was selected as a representative tested model. Refer to the model similarity below.

2. In the model name RP1*29****, RN1*29****, the suffix (*) is variable as below.

- The 1st suffix "*" : Country (0-Korea, 3-Global)
- The 2nd suffix "*" : Body Color (A to Z)
- The 3rd suffix "*" : Vend Type (blank or A to Z)
- The 4th suffix "*" : Layout (1 to 9)
- The 5th suffix "*" : Product Type (blank or A to Z)

3. In the model name GDP1329*G**, GDL1329*G**, the suffix (*) is variable as below.

- The 1st suffix "*" : Vend Type (A to Z)
- The 2nd suffix "*" : Layout (A to Z)
- The 3rd suffix "*" : Product Type (A to Z)

4. In the model name CDG27***P*, CDG27***N*, the suffix (*) is variable as below.

- The 1st suffix "*" : Product Type (A to Z)
- The 2nd suffix "*" : Layout (A to Z)
- The 3rd suffix "*" : Vend Type (A to Z)
- The 4th suffix "*" : Body Color (A to Z)

The only technical difference between LPG and LNG gas dryers is : the replacement of the orifice and adjustment of the regulator adjustment screw (8mbar for Natural Gas to 13mbar for Propane). Further the appliance models stay technically unchanged. Therefore only LPG gas dryer was tested as representative model.

SECTION 5

SAMPLE ACQUISITION

Sample(s) was supplied by the applicant:

SAMPLE #	DESCRIPTION	MODEL	PURCHASE LOCATION	DATE	CONDITION
1	Giant-C Gas Dryer	RP1329AN4S	Prepared by LG	-	Packaged and undamaged

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SECTION 6 HYPOTHESIS

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of bacteria from laundry.

SECTION 7 EQUIPMENT LIST

#	EQUIPMENT DESCRIPTION	MANUFACTURER'S NAME / MODEL # / SERIAL #	INTERTEK ASSET #	CALIBRATION DATE	CALIBRATION DUE	RANGE USED
1	Biological Safety Cabinet	CHC LAB / CHC-888B2-04 / 777A2-04-EK16-093	-	-	-	
2	Stomacher	Interscience / Bag Mixer 400W / 022230S11423	-	-	-	50-400mL
3	Vortexing	Scientific Industries, Inc. / Vortex-Genie2/ 2-141753	-	-	-	
4	Electronic Balance	Ohaus/ PAG-4102/ B519923339	-	2020.03.12	2021.03.12	0.01-4,100g

Note: The equipment measurement uncertainty is stated in the Test Procedure.

SECTION 8 TECHNICAL STAFF

#	Staff Name	Area of Expertise
1	Seulki Park	Senior Researcher / Pukyong National Univ.
2	Dumin Jo	Graduate Student / Pukyong National Univ.
3	Yejun Song	Undergraduate Student/ Pukyong National Univ.
4	Rody Ju	Technical Manager / Intertek Testing Korea Ltd.
5	Bo Park	Laboratory Director / Intertek Testing Korea Ltd.

Note: Complete training records for staff are available upon request

Testing was conducted at :

LG Electronics Inc.

84,Wanam-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, 51554, Republic of Korea

Testing was performed by :

Pukyong National Univ.

45, Yongso-ro, Nam-gu, Busan, Republic of Korea

Witnessed by :

The engineers of Intertek Testing Services Korea Ltd.

4/F, A-JU Digital Tower, 7, Ahasan-ro 5 -gil, Seongdong-gu, Seoul, Korea

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SECTION 9

TEST PROCEDURE

9.1 Test Set up :

Items		Requirement	Condition
Electrical Supply	Voltage	230 V	230 V
	Frequency	60 Hz	60 Hz
Ambient Temperature		(23 ± 5) °C	(23 ± 5) °C
Ambient humidity		(50 ± 5) % R.H.	(50 ± 5) % R.H.
Case 1		High Temp. Cycle 40 minute	
Case 2		High Temp. Cycle 100 minute	

9.2 Test method

9.2.1 Microorganisms

- 9.2.1.1 *Staphylococcus aureus* ATCC 6538
- 9.2.1.2 *Pseudomonas aeruginosa* ATCC 9027
- 9.2.1.3 *Escherichia coli* ATCC 8739
- 9.2.1.4 *Klebsiella pneumoniae* ATCC 4352
- 9.2.1.5 *Salmonella enteritidis* KCCM 12021

9.2.2 Preparation of test

- 9.2.2.1 Test Load : IEC load, 3.75kg Towel is used for weight correction.
- 9.2.2.2 Preparation of test piece : IEC load, Positive control, Negative control, Test sample.
Five types of bacteria were incubated in TSB at 35 to 37 ° C for 24 hours, and the inoculation concentrations of $10^9 \sim 10^{10}$ CFU / mL were prepared by inoculating 2 mL of positive control and test sample.

9.2.3 Test progress

- 9.2.3.1 Bone dry test load and all specimens are sterilized under conditions of 121 °C and 15 psi for 15 minutes.
 - 9.2.3.2 Positive control Specimen bacteria 2mL Immediately after inoculation, measure the number of microorganism.
 - 9.2.3.3 After inoculation of 2mL of test specimens, the test load and the IEC standard detergent are put into the washing machine together to carry out the test course.
 - 9.2.3.4 Measure the number of microorganism in the test specimen.
 - 9.2.3.5 After the test course is conducted, the test load and the negative specimen are introduced to proceed with the blowing course for 20 minutes.
 - 9.2.3.6 Measure the number of microorganism a negative specimen.
- 9.2.4 Evaluated the data as below Calculation.

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Percent reduction = $[(a-b)/a] \times 100$

a : the microorganism number of before Hygiene course

b : the microorganism number of after Hygiene course

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SECTION 10
TEST RESULT

<Case 1>

1. *Staphylococcus aureus* (Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	4.5×10 ⁶	4.2×10 ⁶	5.8×10 ⁶	6.37×10 ⁶	4.5×10 ⁶	4.0 × 10 ⁶
	4.1×10 ⁶		7.3×10 ⁶		3.9×10 ⁶	
	4.0×10 ⁶		6.0×10 ⁶		3.6×10 ⁶	
Test 1	2.3×10 ³	2.9×10 ³	4.0×10 ³	3.6 × 10 ³	2.9×10 ³	3.17 × 10 ³
Test 2	2.4×10 ³		3.0×10 ³		3.8×10 ³	
Test 3	3.0×10 ³		3.8×10 ³		2.8×10 ³	
Reduction rate (%)	99.93		99.94		99.92	

2. *Pseudomonas aeruginosa* (Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.2×10 ⁶	1.47×10 ⁶	1.63×10 ⁶	1.31×10 ⁶	6.2×10 ⁶	6.3 × 10 ⁶
	1.8×10 ⁶		1.22×10 ⁶		7.4×10 ⁶	
	1.4×10 ⁶		1.08×10 ⁶		5.3×10 ⁶	
Test 1	1.0×10 ⁰	1.0×10 ⁰	3.0×10 ⁰	2.0×10 ⁰	1.0×10 ⁰	0.33×10 ⁰
Test 2	1.0×10 ⁰		0.0×10 ⁰		0.0×10 ⁰	
Test 3	1.0×10 ⁰		3.0×10 ⁰		0.0×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

3. *Escherichia coli* (Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	2.5×10 ⁶	2.8×10 ⁶	5.3×10 ⁶	4.77×10 ⁶	5.4×10 ⁶	3.93×10 ⁶
	2.9×10 ⁶		4.0×10 ⁶		4.8×10 ⁶	
	2.8×10 ⁶		5.0×10 ⁶		1.6×10 ⁶	
Test 1	8.5×10 ¹	9.2×10 ¹	4.0×10 ⁰	2.67×10 ⁰	1.6×10 ¹	1.33 × 10 ¹
Test 2	9.9×10 ¹		2.0×10 ⁰		1.1×10 ¹	
Test 3	9.2×10 ¹		2.0×10 ⁰		1.3×10 ¹	
Reduction rate (%)	99.99		99.99		99.99	

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4. *Klebsiella pneumoniae*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.1×10 ⁶	1.27×10 ⁶	1.9×10 ⁶	1.97×10 ⁶	2.0×10 ⁶	2.57 × 10 ⁶
	1.2×10 ⁶		1.9×10 ⁶		2.0×10 ⁶	
	1.5×10 ⁶		2.1×10 ⁶		3.7×10 ⁶	
Test 1	4.4×10 ¹	3.2×10 ¹	1.7×10 ¹	1.77×10 ¹	6.0×10 ⁰	7.67×10 ⁰
Test 2	2.8×10 ¹		1.1×10 ¹		1.1×10 ¹	
Test 3	2.4×10 ¹		2.5×10 ¹		6.0×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

5. *Salmonella enteritidis*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.5×10 ⁶	1.2×10 ⁶	3.3×10 ⁶	3.4×10 ⁶	1.1×10 ⁶	2.73 × 10 ⁶
	1.0×10 ⁶		3.1×10 ⁶		6.0×10 ⁶	
	1.1×10 ⁶		3.8×10 ⁶		1.1×10 ⁶	
Test 1	1.1×10 ¹	8.67×10 ⁰	3.0×10 ⁰	1.67×10 ⁰	1.0×10 ⁰	0.33×10 ⁰
Test 2	8.0×10 ⁰		2.0×10 ⁰		0.0×10 ⁰	
Test 3	7.0×10 ⁰		0.5×10 ⁰		0.1×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

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<Case 2>

1. *Staphylococcus aureus*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	4.5×10 ⁶	4.2×10 ⁶	5.8×10 ⁶	6.37×10 ⁶	4.5×10 ⁶	4.0 × 10 ⁶
	4.1×10 ⁶		7.3×10 ⁶		3.9×10 ⁶	
	4.0×10 ⁶		6.0×10 ⁶		3.6×10 ⁶	
Test 1	1.96×10 ²	2.46×10 ²	9.00×10 ¹	1.35×10 ²	2.60×10 ¹	4.60×10 ¹
Test 2	3.01×10 ²		1.88×10 ²		6.80×10 ¹	
Test 3	2.40×10 ²		1.28×10 ²		4.40×10 ¹	
Reduction rate (%)	99.99		99.99		99.99	

2. *Pseudomonas aeruginosa*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.2×10 ⁶	1.47×10 ⁶	1.63×10 ⁶	1.31×10 ⁶	6.2×10 ⁶	6.3 × 10 ⁶
	1.8×10 ⁶		1.22×10 ⁶		7.4×10 ⁶	
	1.4×10 ⁶		1.08×10 ⁶		5.3×10 ⁶	
Test 1	0.0×10 ⁰	0.0×10 ⁰	4.0×10 ⁰	2.33×10 ⁰	0.0×10 ⁰	0.33×10 ⁰
Test 2	0.0×10 ⁰		3.0×10 ⁰		0.0×10 ⁰	
Test 3	0.0×10 ⁰		0.0×10 ⁰		1.0×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

3. *Escherichia coli*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	2.5×10 ⁶	2.8×10 ⁶	5.3×10 ⁶	4.77×10 ⁶	5.4×10 ⁶	3.93×10 ⁶
	2.9×10 ⁶		4.0×10 ⁶		4.8×10 ⁶	
	2.8×10 ⁶		5.0×10 ⁶		1.6×10 ⁶	
Test 1	1.0×10 ⁰	1.0×10 ⁰	2.0×10 ⁰	4.33×10 ⁰	1.0×10 ⁰	1.33×10 ⁰
Test 2	1.0×10 ⁰		5.0×10 ⁰		1.0×10 ⁰	
Test 3	1.0×10 ⁰		6.0×10 ⁰		2.0×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

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4. *Klebsiella pneumoniae*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.1×10 ⁶	1.27×10 ⁶	1.9×10 ⁶	1.97×10 ⁶	2.0×10 ⁶	2.57 × 10 ⁶
	1.2×10 ⁶		1.9×10 ⁶		2.0×10 ⁶	
	1.5×10 ⁶		2.1×10 ⁶		3.7×10 ⁶	
Test 1	0.0×10 ⁰	1.0×10 ⁰	1.0×10 ⁰	0.33×10 ⁰	1.0×10 ⁰	7.0×10 ⁰
Test 2	2.0×10 ⁰		0.0×10 ⁰		5.0×10 ⁰	
Test 3	1.0×10 ⁰		0.0×10 ⁰		6.0×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

5. *Salmonella enteritidis*

(Unit : CFU/ml)

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.5×10 ⁶	1.2×10 ⁶	3.3×10 ⁶	3.4×10 ⁶	1.1×10 ⁶	2.73 × 10 ⁶
	1.0×10 ⁶		3.1×10 ⁶		6.0×10 ⁶	
	1.1×10 ⁶		3.8×10 ⁶		1.1×10 ⁶	
Test 1	0.0×10 ⁰	0.33×10 ⁰	0.0×10 ⁰	0.33×10 ⁰	5.0×10 ⁰	4.67×10 ⁰
Test 2	1.0×10 ⁰		0.0×10 ⁰		3.0×10 ⁰	
Test 3	0.0×10 ⁰		1.0×10 ⁰		6.0×10 ⁰	
Reduction rate (%)	99.99		99.99		99.99	

SECTION 11

Conclusion

Based on the data collected the Hypothesis is accepted:

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of *Pseudomonas aeruginosa*, *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Salmonella enteritidis* from laundry.

- End -

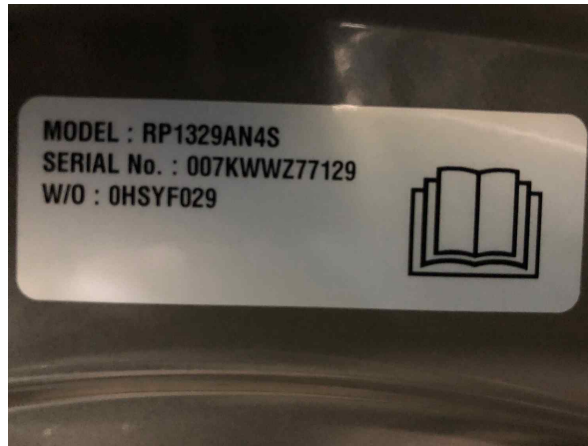
APPENDIX I. PHOTOS OF SAMPLE



<Front view>

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APPEXDIX II. Label



<Rating ravel>