



CERTIFICATE OF ANALYSIS

Number and date of issue: RN28159 / 15 Sept 2020

Application for testing №: RN28159 / 04 Sept 2020

Period of conducting the tests 11 Sept 2020 r. to 14 Sept 2020

Client:	ATA MERMER
Test object:	Toruko System, model Retail X, serial #20202800003, working under the Toruko technology with models: Dental, Jewellery, Hairdressing, Textile cabinet, Home and office set, I-box virus protection set, Portable set
Scope of tests:	Inoculation (contamination) of pre-sterilized samples of fabric, metal and plastic with a known number of microorganisms from the following strains: Staphylococcus aureus ATCC 6538, Pseudomonas aeruginosa ATCC 9027, Escherichia coli K 12, Candida albicans ATCC 10231, Aspergillus niger 16404. The inoculated samples of fabric, metal and plastic were placed in the Toruko system for an 8 minute cycle, after which the degree of reduction of microorganisms was reported. Expression of results in% for greater accuracy
Conclusion:	After the 8 minutes cycle in the closed Toruko system, model Retail X, serial #20202800003, where a pre-sterilized samples of fabric, metal and plastic were placed, inoculated with a known number of microorganisms from the following strains: Staphylococcus aureus ATCC 6538, Pseudomonas aeruginosa ATCC 9027, Escherichia coli K 12, Candida albicans ATCC 10231, Aspergillus niger ATCC 16404, a degree of reduction from 99.99562% to 100% inclusive is reported in the different samples, as shown in Table 1.
Study performed by:	Ms.Tanya Pancheva, Ph.D., microbiologist, Department manager "Microbiological analyses" at Testing center "GLOBALTEST"

Table 1

Degree of reduction %	Staphylococcus aureus ATCC 6538	Pseudomonas aeruginosa ATCC 9027	Escherichia coli ATCC 8739	Candida albicans ATCC 10231	Aspergillus niger ATCC 16404
Fabric	99.99951	99.99998	99.99921	99.99936	99.99731
Metal	100.00000	100.00000	99.99921	99.99962	99.99562
Plastic	99.99960	99.99993	99.99921	NA	NA

Lab manager:

Dimitar Tanev, Dipl.Eng

signature  stamp 

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Conducting the test:

Preparation of referent microorganisms test suspensions					
Type	Typical bacteria			Yeast	Molds
	S. aureus	Ps. aerug	E. coli	C. albicans	A. brasili
Culture type	ATCC	ATCC	ATCC	ATCC	ATCC
	6538	9027	8739	10231	16404
Suspension solvent	NCI 9g/L; BP				
McFarland	0.5	0.7	0.5	4.0	5.0
Dilution d 1:10	10 ⁻⁶	10 ⁻⁶	10 ⁻⁶	10 ⁻⁵	10 ⁻⁵
Formulation	1/10 x	1/10 x	1/10 x	1/10 x	1/10 x
	1/10 x	1/10 x	1/10 x	1/10 x	1/10 x
	1/10 x	1/10 x	1/10 x	1/10 x	1/10 x
	1/10 x	1/10 x	1/10 x	1/10 x	1/10 x
	1/10 x	1/10 x	1/10 x	1/10	1/10
	1/10	1/10	1/10		
ml, 1:10	1ml suspension + 9ml buffer				
Storing conditions of microorganism suspensions	2-8 °C	2-8 °C	2-8 °C	2-8 °C	2-8 °C
	Up to 24 h	Up to 24 h	Up to 24 h	Up to 24 h	Up to 24 h
Determination the concentration of test suspensions					
Start date:	11 Sept 2020				
End date:	13 Sept 2020				
Quantity of suspension tested on petri dishes, ml	0.1ml	0.1ml	0.1ml	0.1ml	0.1ml
Incubation conditions	30-35 °C	30-35 °C	30-35 °C	20-25 °C	20-25 °C
	24 h	24 h	24 h	3 d	3 d
Media		CSA		SDA	
Distributed-fit					
Results cfu/petri	d	10 ⁻⁵	10 ⁻⁵	10 ⁻⁵	10 ⁻⁵
	petri1 max	210	129	197	74
	petri2 min	204	123	181	70
X average cfu/petri	207.00	126.00	189.00	72.00	16.00
T Coutput[cfu/ml]= (X _{cp} x1/d _{1:10})/ml	207,000,000	126,000,000	189,000,000	72,000,000	16,000,000
	2.07	1.26	1.89	7.20	1.60
	x10 ⁸	x10 ⁸	x10 ⁸	x10 ⁷	x10 ⁷

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Precision:

<u>The media and strains used are according to PhEur 2.6.12</u>									
Analysis:	Indoor irradiation			Suspension test - precision in execution between two petri					
Samples used:	Fabric, Metal, Plastic								
Type MO	Count cfu/petri						Theoretical range of variation of $\frac{1}{\sqrt{\bar{A}}} \cdot 100$	≥	Calculated range of variation $\frac{\log a_{max} - \log a_{min}}{\log \bar{A}} \cdot 100$
	a max	loga max	a min	loga min	average, \bar{A}	log \bar{A}			
Staphylococcus aureus	210	2.322219	204	2.309630	207.00	2.315925	6.950480	≥	0.543590
Pseudomonas aeruginosa	129	2.110590	123	2.089905	126.00	2.100247	8.908708	≥	0.984865
Escherichia coli	197	2.294466	181	2.257679	189.00	2.276072	7.273930	≥	1.616278
Candida albicans	74	1.869232	70	1.845098	72.00	1.857165	11.785113	≥	1.299490
Aspergillus brasiliensis	17	1.230449	15	1.176091	16.00	1.203270	25.000000	≥	4.517495
Acceptance criteria:	Calculated range of variation < Theoretical range of variation								

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Materials:

Test	Inoculation with 0.1ml 10 ⁸ 10 ⁷ cfu test MO/ material
Materials used:	Fabric, Metal, Plastic – pre-sterilized
1. The surface of the material is contaminated with a control suspension, with a known concentration of the control microorganism	
2. The material is irradiated in the device in one cycle	
3. The material is immersed and washed with 100 ml of sterile solvent, leaving the remaining number of microorganisms in the solvent.	
4. The residual number of microorganisms on the material was determined by a membrane filtration method, filtering the entire amount of solvent through a cellulose-nitrate filter with a pore size of 0,45 µm	
5. The filters were placed by aseptic technique on petri suitable for control microorganisms with sterile media, after which the petri were thermostated at suitable periods and temperatures suitable for the development of microorganisms.	
6. The number of microorganisms on the used filters was determined	

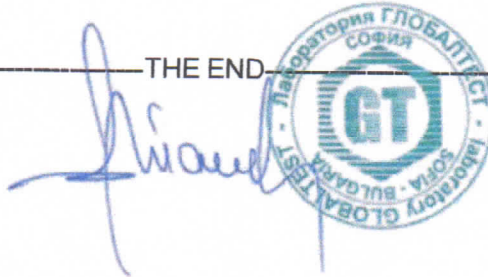
Start date: 11 Sept 2020 – End date: 14 Sept 2020										
Dilution, d		Fabric			Metal			Plastica		
Reported		cfu/ petri			cfu/ petri			cfu/ petri		
Staphylococcus aureus				101			0			82
Pseudomonas aeruginosa				3			0			9
Escherichia coli			>	150		>	150		>	150
Candida albicans				46			27			NA
Aspergillus brasiliensis				43			70			NA

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Reduction:

Test MO	Inoculated cfu on material (cfu/0.1 ml)	Content of viable microorganisms on the material			Log reduction		
		Fabric	Metal	Plastic	Fabric	Metal	Plastic
					log 10	log 10	log 10
Staphylococcus aureus	20,700,000	101	0	82	5.3	7.3	5.402156
Pseudomonas aeruginosa	12,600,000	3	0	9	6.6	7.1	6.146128
Escherichia coli	18,900,000	150	150	150	5.1	5.1	5.100371
Candida albicans	7,200,000	46	27	NA	5.2	5.4	-
Aspergillus brasiliensis	1,600,000	43	70	NA	4.6	4.4	-

THE END



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