SGS INSTITUT FRESENIUS

DAkkS Deutsche Akkreditierungsstelle D-PL-14115-02-00

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Ropimex R. Opel GmbH
Bildstocker Straße 12
66538 Neunkirchen

Customer No.: 10089634
Order No.: 4135050
Sample No.: 170427073

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SGS INSTITUT FRESENIUS
Im Maisel 14
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Taunusstein, 27.06.2017

Report No.: 4135050-02_V2

This version replaces the test report 4135050-02 from 29.05.2017. In Table 2.1 the heading was corrected.

Quantitative analysis of the antimicrobial effect based on ASTM E 2180

Sample Entry: 20.04.2017

Testing Period: 08.05.2017 – 15.05.2017

SGS Sample Number	Sample Designation:
170427073	ceramic tiles (OP-Fliesen) coated with Bacoban DL; LOT 7032712; MHB 03/2019
OP-Fliese	ceramic tiles uncoated (Reference)

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27.06.2017

Test conditions:

The Test was performed based on

ASTM E 2180 – Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials

With this diagnose it is possible to see if the product has an antimicrobial surface. Both test surfaces have been covered with a defined number of microorganisms in a suitable culture medium and evaluated after 24 hours. Uncoated, not antimicrobial apparelled test surfaces were used as reference (analysis after 0 and 24 hours).

Incubation temperature: Bacteria 36°C ± 2°C; Yeast 22,5°C ± 2,5°C.

The test procedure takes place after 10 days of pre-treatment of the ceramic tiles (OP-Fliesen) with the testing substance (0.1 mL/surface).

Requirement: ≥ 2 log (JIS Z 2801)

Test organism suspension:

Bacterial strains were used for the test:

Pseudomonas aeruginosa (ATCC 15442)
Staphylococcus aureus (ATCC 6538)
Escherichia coli (ATCC 8739)
Candida albicans (ATCC 10231)

0.4 mL of the sustainable agar test suspension was taken onto test surface. The instilled test suspension was covered with a film (coverslip).

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Results:

Table 1: Test suspension

Test-microorganisms	inoculum, [cfu/mL]
Pseudomonas aeruginosa (ATCC 15442)	4.95×10^8
Staphylococcus aureus (ATCC 6538)	4.40×10^8
Escherichia coli (ATCC 8739)	4.55×10^8
Candida albicans (ATCC 10231)	3.95×10^8
cfu: colony forming units	

Table 2: Reference material: ceramic tiles (OP-Fliesen)

(Sample No.: OP-Fliesen)	Untreated surface: ceramic tiles (OP-Fliesen)		
Test-microorganisms	cfu/test surface after 0h *	cfu/test surface after 24h *	log/test surface after 24h *
Pseudomonas aeruginosa (ATCC 15442)	8.91×10^5	2.09×10^6	6.32
Staphylococcus aureus (ATCC 6538)	3.39×10^5	7.59×10^5	5.88
Escherichia coli (ATCC 8739)	1.66×10^6	8.71×10^5	5.94
Candida albicans (ATCC 10231)	5.62×10^5	1.07×10^6	6.03
cfu: colony forming units * = Average value of 3 approaches			

Table 2.1: Bacoban DL; LOT 7032712; MHB 03/2019

(Sample No.: 170424073)	Treated surface: ceramic tiles (OP-Fliesen) with Bacoban		
Test-microorganisms	cfu/test surface after 0h *	cfu/test surface after 24h *	Reduction R [log]
Pseudomonas aeruginosa (ATCC 15442)	3.24×10^5	< 100	**>4.32**
Staphylococcus aureus (ATCC 6538)	1.74×10^3	< 100	**>3.88**
Escherichia coli (ATCC 8739)	4.89×10^4	< 100	**>3.94**
Candida albicans (ATCC 10231)	1.12×10^5	< 100	**>4.03**
R: log (untreated test surface after 24 h / treated test surface after 24 h) cfu: colony forming units * = Average value of 3 approaches			

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Assessment:.

According to the results of the test the product **Bacoban DL; LOT 7032712; MHB 03/2019** shows a strong bactericidal activity against the test-microorganisms *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus.* The product shows a strong fungicidal activity against the test-microorganism *Candida albicans*.

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