

# INSTITUT FRESENIUS

SGS INSTITUT FRESENIUS GmbH · Postfach 1261 · 65220 Taunusstein

Ropimex R. Opel GmbH  
Bildstockerstraße 12

66287 Quierschied-Göttelborn

Taunusstein, 27. July 2005

Sample-entry: 08.06.2005

## Quantitative Determination of the antimicrobial effectiveness according to ASTM Standard E 2180.

Sample-Designation: ceramic tiles coated with Bacoban (Sa.-No. 5178969)  
ceramic tiles non-coated (Reference) (Sa.-No. 5178970)

Testprocedure using 5 microorganisms at standard-temperatures

The testprocedure is suitable for the determination of antimicrobial effectiveness of surfaces. The testing-samples were coated with a defined number of microorganisms and counted after incubation times of 0 and 24 hours. As a reference non-coated, non-antimicrobial treated samples were used.

Incubation-temperatures: Bacteria 36°C±2°C, Fungi 22,5°C±2,5°C

The testprocedure takes place after 5 days, alternatively 10 days of pre-treatment of the ceramic-tiles with the testing-substance.

### Basis for Assessment:

Reduction after 24 h < 1 decimal power  $\triangleq$  no significant bactericidal/fungicidal effectiveness

Reduction after 24 h  $\geq$  1 decimal power < 2 decimal powers  $\triangleq$  low bactericidal/fungicidal effectiveness

Reduction after 24 h  $\geq$  2 decimal powers < 3 decimal powers  $\triangleq$  significant bactericidal/fungicidal effectiveness

Reduction after 24 h  $\geq$  3 decimal powers  $\triangleq$  strong bactericidal/fungicidal effectiveness

The basis of assessment is only valid if the reduction of the control/reference (starting from 0-value) is lower than 0,5 decimal powers within 24h.

Sample-No. 010/5178969-70

Order-No. 401233

Client-No. 10019827

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Competence Center

Consumer Testing Service

SGS INSTITUT FRESENIUS GmbH

Im Maisel 14

65232 Taunusstein



Nach DIN EN ISO/IEC 17025 durch  
die DAP Deutsches Akkreditierungs-  
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Test-Suspensions of the following microorganisms are used:  
(indication for reference and 5-day-value of the coated sample)

<i>Escherichia coli</i>	ATCC 8739	$1,8 \times 10^8$	cfu/ml
<i>Pseudomonas aeruginosa</i>	ATCC 15442	$2,1 \times 10^8$	cfu/ml
<i>Staphylococcus aureus</i>	ATCC 6538	$2,4 \times 10^8$	cfu/ml
<i>Candida albicans</i>	ATCC 10231	$1,3 \times 10^8$	cfu/ml
<i>Aspergillus niger</i>	ATCC 16404	$1,2 \times 10^8$	cfu/ml

Quantitative determination of antimicrobial effectiveness according to ASTM Standard E 2180.

Test-Microorganism	Sample-No.: 5178969 (5 days of pretreatment)			
	cfu*/test-sample			
	after 0h	Standard-deviation	after 0h	Standard-deviation
<i>Escherichia coli</i>	$5,5 \times 10^3$	$4,7 \times 10^2$	< 100	
<i>Pseudomonas aeruginosa</i>	$6,8 \times 10^2$	$4,0 \times 10^2$	< 100	
<i>Staphylococcus aureus</i>	< 100		< 100	
<i>Candida albicans</i>	$1,3 \times 10^6$	$6,9 \times 10^4$	< 100	
<i>Aspergillus niger</i>	$1,1 \times 10^6$	$7,7 \times 10^4$	< 100	

\*cfu: colony forming units

### Assessment:

The product „ceramic tiles coated with Bacoban“ Sample-No. 5178969 (pre-treatment 5 days) has a strong bactericidal effectiveness against the test-microorganisms *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. The product has a strong fungicidal effectiveness against the test-microorganisms *Aspergillus niger* and *Candida albicans*.

Quantitative determination of antimicrobial effectiveness according to ASTM Standard E 2180.

Test-Microorganism	Probe Nr.: 5178970 (Reference)			
	cfu*/test-sample			
	after 0h	Standard-deviation	after 24h	Standard-deviation
<i>Escherichia coli</i>	$1,7 \times 10^6$	$1,2 \times 10^5$	$1,7 \times 10^6$	$8,6 \times 10^4$
<i>Pseudomonas aeruginosa</i>	$1,9 \times 10^6$	$9,2 \times 10^4$	$1,7 \times 10^6$	$1,3 \times 10^5$
<i>Staphylococcus aureus</i>	$2,0 \times 10^6$	$9,4 \times 10^4$	$1,8 \times 10^6$	$1,4 \times 10^5$
<i>Candida albicans</i>	$1,2 \times 10^6$	$8,8 \times 10^4$	$1,1 \times 10^6$	$8,7 \times 10^4$
<i>Aspergillus niger</i>	$1,1 \times 10^6$	$7,2 \times 10^4$	$9,4 \times 10^5$	$7,2 \times 10^4$

\*cfu: colony forming units

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Test-Suspensions of the following microorganisms are used:  
(indication for reference and 10-day-value of the coated sample)

<i>Escherichia coli</i>	ATCC 8739	$2,3 \times 10^8$	cfu/ml
<i>Pseudomonas aeruginosa</i>	ATCC 15442	$3,4 \times 10^8$	cfu/ml
<i>Staphylococcus aureus</i>	ATCC 6538	$2,2 \times 10^8$	cfu/ml
<i>Candida albicans</i>	ATCC 10231	$3,5 \times 10^8$	cfu/ml
<i>Aspergillus niger</i>	ATCC 16404	$4,3 \times 10^8$	cfu/ml

Quantitative determination of antimicrobial effectiveness according to ASTM Standard E 2180.

Test-Microorganism	Sample-No.: 5178969 (10 days of pretreatment)			
	cfu*/test-sample			
	After 0h	Standard-deviation	After 0h	Standard-deviation
<i>Escherichia coli</i>	$5,5 \times 10^4$	$2,3 \times 10^4$	< 100	
<i>Pseudomonas aeruginosa</i>	$1,6 \times 10^5$	$2,7 \times 10^4$	< 100	
<i>Staphylococcus aureus</i>	$1,2 \times 10^5$	$5,9 \times 10^4$	< 100	
<i>Candida albicans</i>	$3,5 \times 10^6$	$2,6 \times 10^4$	< 100	
<i>Aspergillus niger</i>	$5,9 \times 10^4$	$1,2 \times 10^4$	$7,0 \times 10^3$	$8,2 \times 10^2$

\*cfu: colony forming units

**Assessment:**

The product „ceramic tiles coated with Bacoban“ Sample-No. 5178969 (pre-treatment 10 days) has a strong bactericidal effectiveness against the test-microorganisms *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. The product has a strong fungicidal effectiveness against the test-microorganism *Candida albicans* and a significant fungicidal effectiveness against the test-microorganism *Aspergillus niger*.

Your sincerely

**SGS INSTITUT FRESENIUS GmbH**



i.V. Dr. Christian Wunderlich