Test Report

JIS Z 2801:2012 (Mod)

Antimicrobial products – Test for antimicrobial activity and efficacy

Test Object:

Coated Leneta-Foil vs. E. coli DSM 1576
Report on Findings

Client: Nano-Care Deutschland AG
Address: Alfred-Nobel-Straße 10
66793 Saarwellingen

Work order no.: 3109.1
Test object: Coated Leneta-Folie vs. E. coli DSM 1576

Sample description: lackierte Kunststofffolien
Date of receipt of sample: 08.06.2018

Type of test: JIS Z 2801:2012 Antimicrobial products – Test for antimicrobial activity and efficacy
Test Germ: Escherichia coli DSM1576 ATCC8739 ISML CC 02/023
Test laboratory: QualityLabs BT GmbH
Address: Neumeyerstrasse 46a
90411 Nuremberg, Germany

Setup-Code: 180611-10290-2801-01
Sample material: Leneta-Folie
No. of pages in report: 7

Report on findings Place and date of preparation: Nuremberg, 14.9.2018
Recipient: Nano-Care Deutschland AG

Laboratory Director: ____________________________________________
Harald Gerauer, Laboratory Director
QualityLabs BT GmbH

Released: _______________________________________________________
Markus Zehe, Managing Director
QualityLabs BT GmbH
Declaration on Quality Assurance
This investigation was performed and supervised according to the standard operating procedure “SOP zu JIS Z 2801:2012 (Mod)” by QualityLabs BT GmbH. The laboratory and process are continually monitored by independent, external authorities, as well as by internal audits.

Archiving
A copy of the test report, a protocol of the measurement as well as the accompanying correspondence and business records are archived by QualityLabs BT GmbH. The retention period is at least 10 years.

Test description
Anti-bacterial activity is determined in accordance with a modified version of JIS Z 2801:2012.

During the test, a thin liquid-film containing the bacteria (1.25 x 10^4 CFU / cm²) is applied directly to the test sample (Standard: 5 cm x 5 cm). To avoid desiccation a foil (Standard: 4cm x 4cm, Stomacher Bags) is applied. Immediately after inoculation, the bacteria from the reference sample are separated from the sample and the enveloping foil surfaces using ultrasound and vortex devices and the number of viable germs (CFU – colony-forming units) is determined (t₀ value). A further set of reference samples and samples given anti-microbial treatment is incubated with bacteria in a liquid-film and the enveloping foil in a damp environment at 37°C. After 24 hours, the bacteria are separated from the sample surfaces using ultrasound and vortex devices and the number of viable germs is determined (t₂₄ value).
Assessment of antimicrobial activity

A logarithmic germ reduction of $\geq 3$ log scales of the antimicrobial sample in comparison to the respective reference is used as assessment criterion to pass the antimicrobial test.

<table>
<thead>
<tr>
<th>Germ reduktion [log scales]</th>
<th>Antibacterial activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&lt; 3$</td>
<td>Not sufficient antimicrobial activity</td>
</tr>
<tr>
<td>$\geq 3$</td>
<td>Sufficient antimicrobial activity</td>
</tr>
</tbody>
</table>
## References to Testconditions

<table>
<thead>
<tr>
<th>Testconditions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>25</td>
<td>cm²</td>
</tr>
<tr>
<td>Foil size</td>
<td>16</td>
<td>cm²</td>
</tr>
<tr>
<td>Volume Inoculum</td>
<td>400</td>
<td>µl</td>
</tr>
<tr>
<td>Sample cleaning</td>
<td>Isopropanol</td>
<td>-</td>
</tr>
</tbody>
</table>

## References to deviations, preincubations, special test conditions

NONE
## Test Results

<table>
<thead>
<tr>
<th>Sample Name</th>
<th>Sample Code</th>
<th>$t_0$ (cells/cm$^2$)</th>
<th>$t_{24}$ (cells/cm$^2$)</th>
<th>Reduction [%]</th>
<th>Log Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leneta-Folie P121-10 (Reference)</td>
<td>102900806180001</td>
<td>9.0 x 10$^4$</td>
<td>1.1 x 10$^5$</td>
<td>5.1 x 10$^5$</td>
<td>-</td>
</tr>
<tr>
<td>Liquid Guard clean + primer + wipe</td>
<td>102900806180002</td>
<td>&lt; 1.0 x 10$^1$</td>
<td>&lt; 1.0 x 10$^1$</td>
<td>&lt; 1.0 x 10$^1$</td>
<td>&gt; 99.99</td>
</tr>
<tr>
<td>Liquid Guard pro + wipe</td>
<td>102900806180003</td>
<td>&lt; 1.0 x 10$^1$</td>
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<td>&lt; 1.0 x 10$^1$</td>
<td>&gt; 99.99</td>
</tr>
</tbody>
</table>

*see “Interpretation of Results”, page 6

### Test strain

*Escherichia coli DSM1576 ATCC8739 ISML CC 02/023*

Initial cell count inoculum / cm$^2$: 1.25 x 10$^4$

Initials of the editor: MZ

Measurement ended on: Jun-15-2018
Comments on test objects

NONE

Interpretation of the results based on the measurements

NONE

References

JIS Z 2801:2012  Antimicrobial products – Test for antimicrobial activity and efficacy