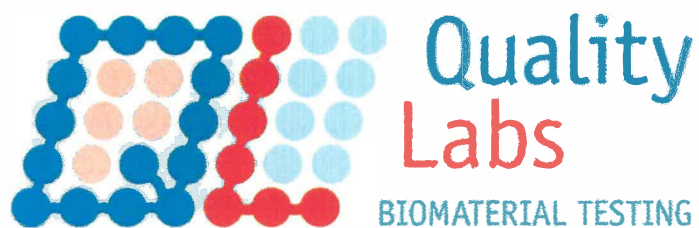


Work Order	3521.2
Setup-Code	200331-10313-22196-02



Test Report

ISO 22196 (Mod)

Measurement of antibacterial activity on plastics surfaces

Test Object:

Thermalife Interior Anti-Microbial after 1 year of artificial aging versus Escherichia coli DSM 1576

Work Order	3521.2
Setup-Code	200331-10313-22196-02

Report on Findings

Client: Thermalife mbH
Address: Am Grarock 3
33154 Salzkotten

Work order no.: 3485.2

Test object: Thermalife Interior Anti-Microbial after 1 year of artificial aging
versus *Escherichia coli* DSM 1576

Sample description: Paint

Date of receipt of sample: 2019-Dez-02

Type of test: ISO 22196-07: Plastics — Measurement of antibacterial activity on
plastics surfaces

Test Germ: *Escherichia coli* DSM1576 ATCC8739 ISML CC 02/023

Test laboratory: QualityLabs BT GmbH

Address: Neumeyerstrasse 46a
90411 Nuremberg, Germany

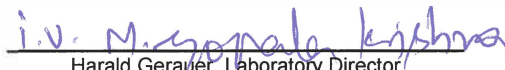
Setup-Code: 20031-10313-22196-02

Sample material: n.b.

No. of pages in report: 7

Report on findings to the client: **Place and date of preparation:** Nuremberg, 2020-Apr-17
Recipient: mig mbH

Laboratory Director:


Harald Gerauer, Laboratory Director
QualityLabs BT GmbH

Released:


Markus Zehe, Managing Director
QualityLabs BT GmbH

Work Order	3521.2
Setup-Code	200331-10313-22196-02

Declaration on Quality Assurance

This investigation was performed and supervised according to the standard operating procedure "SOP zu ISO 22196 (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 ISO 22196.

During the test, a thin liquid-film containing the bacteria (1.25×10^4 CFU / cm²) is applied directly to the test sample (5 cm x 5 cm). To avoid desiccation a foil (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 (t_0 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 a minimum of 24 hours, the bacteria are separated from the sample surfaces using ultrasound and vortex devices and the number of viable germs is determined (t_{24} value).

Work Order	3521.2
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Assessment of antimicrobial activity

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

Germ reduktion [log scales]	Antibacterial activity
< 3	Not sufficient antimicrobial activity
≥ 3	Sufficient antimicrobial activity

Work Order	3521.2
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References to Testconditions

Testconditions		
Sample size	25	cm ²
Foil size	16	cm ²
Volume Inoculum	400	µl
Sample cleaning	-	-

References to deviations, preincubations, special test conditions

Samples were stored for 56 days at 50 °C previous to the test.

Test Report ISO 22196 (Mod)

Work Order	3485.2
Setup-Code	191203-10313-22196-02

Test Results

	Sample Name	Sample Code	t_0 (cells/cm ²)			t_{24} (cells/cm ²)			Reduction [%]	Log Reduction
1	Thermalife Interior	103130212190002	4.8×10^4	3.6×10^4	6.6×10^3	4.9×10^2	7.5×10^2	9.4×10^2	-	Reference
2	Thermalife Interior Anti-Microbial	103130212190003				$< 1.0 \times 10^1$	$< 1.0 \times 10^1$	$< 1.0 \times 10^1$	> 99.99	> 4

*see "Interpretation of Results", page 6

Test strain	<i>Escherichia coli</i> DSM1576 ATCC8739 ISML CC 02/023
Initial cell count inoculum / cm ²	1.25×10^4
Initials of the editor	MZ
Measurement ended on	Apr-17-2020

Work Order	3485.2
Setup-Code	191203-10313-22196-02

Comments on test objects

NONE

Interpretation of the results based on the measurements

NONE

Editor: Mr. Zehe 

Crosschecked: Mr. Mannala 

References

ISO 22196-07: Plastics — Measurement of antibacterial activity on plastics surfaces