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Zuständig für Rückfragen / *Contact person* Unser Zeichen / *Our ref.*
Dr. Lorenz, Michael MLO1

Datum / *Date*
29. April 2019

Bericht Nr. / *Report No.* **19.8.1.0348**

Auftraggeber: siehe Anschrift
Client: see address

Prüfgegenstand: LG Fully automatic washing maschine
Test sample: Modell: FH069FD3FS

Auftragsdatum: 01.02.2019
Date of order:

Eingang Prüfgegenstand: 04.02.2019
Receipt of test samples:

Prüfzeitraum: 27.02.2019 bis / to 29.04.2019
Period of testing:

Probenahme: Der Prüfgegenstand wurde uns vom Auftraggeber übersandt.
Sampling: The test sample has been delivered to us by the client.

Der Bericht umfasst 9 Seiten. / *The report comprises 9 pages.*

UNTERSUCHUNGSZIEL / AIM OF TEST

Prüfung des 90 °C Waschverfahren in Anlehnung an die Methode 17.2 des Verbundes für angewandte Hygiene (VAH) zur Bestimmung der Keimreduktion auf mit Mikroorganismen beladenen Bioindikatoren.

Assessment of the 90 °C washing procedure according to method 17.2 of the Association for Applied Hygiene (VAH) for the determination of the germ reduction on microorganism-loaded bioindicators.

PRÜFGEGENSTAND - BESCHREIBUNG / TEST OBJECT - DESCRIPTION

Prüfmuster / Test sample	Serial-No.
LG Fully automatic washing machine	810KWEL38092
Modell: FH069FD3FS - Product code: FH069FD3FS.ASSQEEU	

METHODE / METHODS**In Anlehnung an VAH - Methode 17.2**

Prüfung von Wäschedesinfektionsverfahren bei Temperaturen von ≥ 60 °C

Modifikation

Zusätzlich zur quantitativen Auswertung erfolgt eine weitere Bebrütung und Ausplattierung der Neutralisationsgemische (10^{-1} Ansatz) entsprechend VAH Methoden 17.1.6. bzw. 17.2.6. zur weiteren qualitativen Bestimmung überlebender Testorganismen.

Teststämme

Escherichia coli K12 NCTC 10538
Staphylococcus aureus ATCC 6538
Enterococcus faecium ATCC 6057

Neutralisationsmittel

30 g/l Polysorbat 80 3 g/l Lecithin
1 g/l L-Histidin 5 g/l Natriumthiosulfat
Verdünnungsmittel TSB ad 1000 ml

Trocknungszeit < 4 h

Verdünnungsmittel

Trypton-NaCl
Wasser standardisierter Härte (WSH)

In accordance with VAH method 17.2

Testing of laundry disinfection procedure at temperatures from ≥ 60 °C

Modification

In addition to the quantitative evaluation, the neutralization mixtures (10^{-1} batches) are incubated and plated in accordance to VAH methods 17.1.6. or 17.2.6 for further qualitative determination of surviving test organisms.

Test strains

*Escherichia coli K12 NCTC 10538
Staphylococcus aureus ATCC 6538
Enterococcus faecium ATCC 6057*

Neutralizer

*30 g/l Polysorbate 80 3 g/l Lecithin
1 g/l L-Histidine 5 g/l Sodium Thiosulfate
Diluent TSB ad 1000 ml*

Drying time < 4 h

Diluent

*Tryptone-NaCl
Hard water*

ERGEBNIS / RESULTS

QUANTITATIVER KEIMTRÄGERVERSUCH – IN ANLEHNUNG AN VAH METHODE 17.2
QUANTITATIVE CARRIER TEST – IN ACCORDANCE TO VAH METHOD 17.2

Waschverfahren / <i>Washing procedure</i>	"Disinfection program 90 °C" - LG Fully automatic washing machine - Modell: FH069FD3FS	
Kontrolldesinfektionsprogramm / <i>reference control disinfection program</i>	60	°C
Desinfektionsprogramm / <i>Disinfection program</i>	90	°C
Wasserhärte / <i>water hardness</i>	(14 ± 1) °dH ((2,5 ± 0,2) mmol))	
Beladung / <i>Load</i>	10 kg (100 % CO)	
Organische Belastung / <i>Interfering substance</i>	ohne / <i>none</i>	
Probenverdünnungsmittel / <i>Diluent</i>	WSH und Trypton-NaCl / <i>Hard water and tryptone-NaCl</i>	

Escherichia coli K12 NCTC 10538

KBE/Keimträger / <i>cfu/ carrier</i>	4,00x10 ⁷
KBE/Keimträger / <i>cfu/ carrier</i>	3,40x10 ⁷
KBE/Keimträger / <i>cfu/ carrier</i>	2,80x10 ⁷
N ₀ = lg ₁₀ KBE/Keimträger / <i>lg₁₀ cfu/ carrier</i>	7,53
Sollwert N ₀ / <i>set point</i>	≥ 7,18 lg

Keimträger <i>carrier</i>	Kontrollwaschgang 1 – 60 °C <i>Reference control 1 - 60 °C</i>	
	N _w KBE/KTL <i>N_w cfu/carrier</i>	lg KBE/KTL <i>lg cfu/carrier</i>
1	< 14	< 2,15
2	< 14	< 2,15
3	< 14	< 2,15
4	< 14	< 2,15
5	< 14	< 2,15
6	< 14	< 2,15
7	< 14	< 2,15
8	< 10	< 1
9	< 14	< 2,15
10	< 14	< 2,15
sterile Träger / <i>sterile carriers</i>		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Keimträger <i>carrier</i>	Waschgang 1 - 90 °C <i>Washing cycle 1 - 90 °C</i>	
	<i>N_w KBE/KTL</i> <i>N_w cfu/carrier</i>	<i>Ig KBE/KTL</i> <i>Ig cfu/carrier</i>
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Keimträger <i>carrier</i>	Waschgang 2 - 90 °C <i>Washing cycle 2 - 90 °C</i>	
	<i>N_w KBE/KTL</i> <i>N_w cfu/carrier</i>	<i>Ig KBE/KTL</i> <i>Ig cfu/carrier</i>
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Keimträger carrier	Waschgang 3 – 90°C Washing cycle 3 – 90°C	
	N _w KBE/KTL N _w cfu/carrier	Ig KBE/KTL Ig cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Reduktionswerte (R) in Ig₁₀-Stufen je Keimträger (KTL) ausgehend von 7,53 Ig₁₀-Stufen KBE/KTL (E. coli)
 Reduction values (R) in Ig₁₀-steps per germ carrier based on 7,53 Ig₁₀-steps cfu/carrier (E. coli)

Keimträger carrier	Kontrollgang 1 Reference control 1	Waschgang 1 Washing cycle 1	Waschgang 2 Washing cycle 2	Waschgang 3 Washing cycle 3
	R	R	R	R
1	> 5,39	7,53	7,53	7,53
2	> 5,39	7,53	7,53	7,53
3	> 5,39	7,53	7,53	7,53
4	> 5,39	7,53	7,53	7,53
5	> 5,39	7,53	7,53	7,53
6	> 5,39	7,53	7,53	7,53
7	> 5,39	7,53	7,53	7,53
8	> 6,53	7,53	7,53	7,53
9	> 5,39	7,53	7,53	7,53
10	> 5,39	7,53	7,53	7,53

Staphylococcus aureus ATCC 6538

KBE/Keimträger / cfu/ carrier	6,52x10 ⁷
KBE/Keimträger / cfu/ carrier	4,29x10 ⁷
KBE/Keimträger / cfu/ carrier	4,02x10 ⁷
N ₀ = lg ₁₀ KBE/Keimträger / lg ₁₀ cfu/ carrier	7,69
Sollwert N ₀ / set point	≥ 7,18 lg

Keimträger carrier	Kontrollwaschgang 1 – 60 °C Reference control 1 – 60 °C	
	N _w KBE/KTL N _w cfu/carrier	lg KBE/KTL lg cfu/carrier
1	> 6,60x10 ⁵	> 5,82
2	> 6,60x10 ⁵	> 5,82
3	> 6,60x10 ⁵	> 5,82
4	4,00x10 ⁵	5,60
5	5,40x10 ⁵	5,73
6	4,40x10 ⁵	5,64
7	> 6,60x10 ⁵	> 5,82
8	> 6,60x10 ⁵	> 5,82
9	> 6,60x10 ⁵	> 5,82
10	> 6,60x10 ⁵	> 5,82
sterile Träger / sterile carriers		
S1		+
S2		+
S3		+
S4		+
S5		+
S6		+

Keimträger carrier	Waschgang 1 – 90 °C Washing cycle 1 – 90 °C	
	N _w KBE/KTL N _w cfu/carrier	lg KBE/KTL lg cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0

sterile Träger / sterile carriers	
S1	-
S2	-
S3	-
S4	-
S5	-
S6	-

Keimträger carrier	Waschgang 2 - 90 °C Washing cycle 2 - 90 °C	
	N_w KBE/KTL N_w cfu/carrier	I_g KBE/KTL I_g cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Keimträger carrier	Waschgang 3 – 90 °C Washing cycle 3 – 90 °C	
	N _w KBE/KTL N _w cfu/carrier	Ig KBE/KTL Ig cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Reduktionswerte (R) in Ig₁₀-Stufen je Keimträger (KTL) ausgehend von 7,69 Ig₁₀-Stufen KBE/KTL (S. aureus)
 Reduction values (R) in Ig₁₀-steps per germ carrier based on 7,69 Ig₁₀-steps cfu/carrier (S. aureus)

Keimträger carrier	Kontrollgang 1 Reference control 1	Waschgang 1 Washing cycle 1	Waschgang 2 Washing cycle 2	Waschgang 3 Washing cycle 3
	R	R	R	R
1	< 1,87	7,69	7,69	7,69
2	< 1,87	7,69	7,69	7,69
3	< 1,87	7,69	7,69	7,69
4	2,09	7,69	7,69	7,69
5	1,96	7,69	7,69	7,69
6	2,05	7,69	7,69	7,69
7	< 1,87	7,69	7,69	7,69
8	< 1,87	7,69	7,69	7,69
9	< 1,87	7,69	7,69	7,69
10	< 1,87	7,69	7,69	7,69

Enterococcus faecium ATCC 6057

KBE/Keimträger / cfu/ carrier	2,02x10 ⁷
KBE/Keimträger / cfu/ carrier	2,72x10 ⁷
KBE/Keimträger / cfu/ carrier	1,62x10 ⁷
N ₀ = lg ₁₀ KBE/Keimträger / lg ₁₀ cfu/ carrier	7,33
Sollwert N ₀ / set point	≥ 7,18 lg

Keimträger carrier	Kontrollwaschgang 1 – 60 °C Reference control 1 – 60 °C	
	N _w KBE/KTL N _w cfu/carrier	lg KBE/KTL lg cfu/carrier
1	6,00x10 ⁵	5,78
2	5,16x10 ⁵	5,71
3	4,60x10 ⁵	5,66
4	5,20x10 ⁵	5,72
5	5,60x10 ⁵	5,75
6	6,14x10 ⁵	5,79
7	4,00x10 ⁵	5,60
8	4,40x10 ⁵	5,64
9	6,00x10 ⁵	5,78
10	4,80x10 ⁵	5,68
sterile Träger / sterile carriers		
S1		+
S2		+
S3		+
S4		+
S5		+
S6		+

Keimträger carrier	Waschgang 1 – 90 °C Washing cycle 1 – 90 °C	
	N _w KBE/KTL N _w cfu/carrier	lg KBE/KTL lg cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0

sterile Träger / sterile carriers	
S1	-
S2	-
S3	-
S4	-
S5	-
S6	-

Keimträger carrier	Waschgang 2 - 90 °C Washing cycle 2 - 90 °C	
	N_w KBE/KTL N_w cfu/carrier	I_g KBE/KTL I_g cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Keimträger carrier	Waschgang 3 – 90 °C Washing cycle 3 – 90 °C	
	N _w KBE/KTL N _w cfu/carrier	Ig KBE/KTL Ig cfu/carrier
1	< 1	0
2	< 1	0
3	< 1	0
4	< 1	0
5	< 1	0
6	< 1	0
7	< 1	0
8	< 1	0
9	< 1	0
10	< 1	0
sterile Träger / sterile carriers		
S1	-	-
S2	-	-
S3	-	-
S4	-	-
S5	-	-
S6	-	-

Reduktionswerte (R) in Ig₁₀-Stufen je Keimträger (KTL) ausgehend von 7,33 Ig₁₀-Stufen KBE/KTL (E. faecium)
 Reduction values (R) in Ig₁₀-steps per germ carrier based on 7,33 Ig₁₀-steps cfu/carrier (E. faecium)

Keimträger carrier	Kontrollgang 1 Reference control 1	Waschgang 1 Washing cycle 1	Waschgang 2 Washing cycle 2	Waschgang 3 Washing cycle 3
	R	R	R	R
1	1,55	7,33	7,33	7,33
2	1,62	7,33	7,33	7,33
3	1,66	7,33	7,33	7,33
4	1,61	7,33	7,33	7,33
5	1,58	7,33	7,33	7,33
6	1,54	7,33	7,33	7,33
7	1,73	7,33	7,33	7,33
8	1,69	7,33	7,33	7,33
9	1,55	7,33	7,33	7,33
10	1,65	7,33	7,33	7,33

Temperatur-Zeit- Aufzeichnungen / *temperature time recordings*

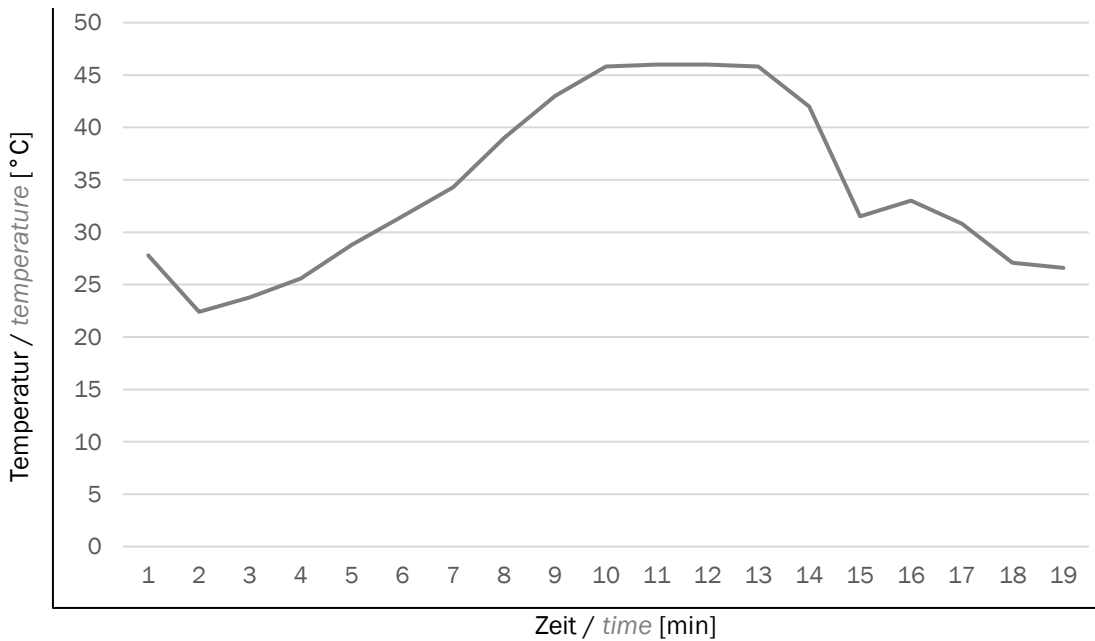


Abbildung 1: *Temperaturaufzeichnung von Kontrollwaschgang 1 - Abhängigkeit von der Zeit*
Figure 1: *Reference control 1- temperature and time profile*

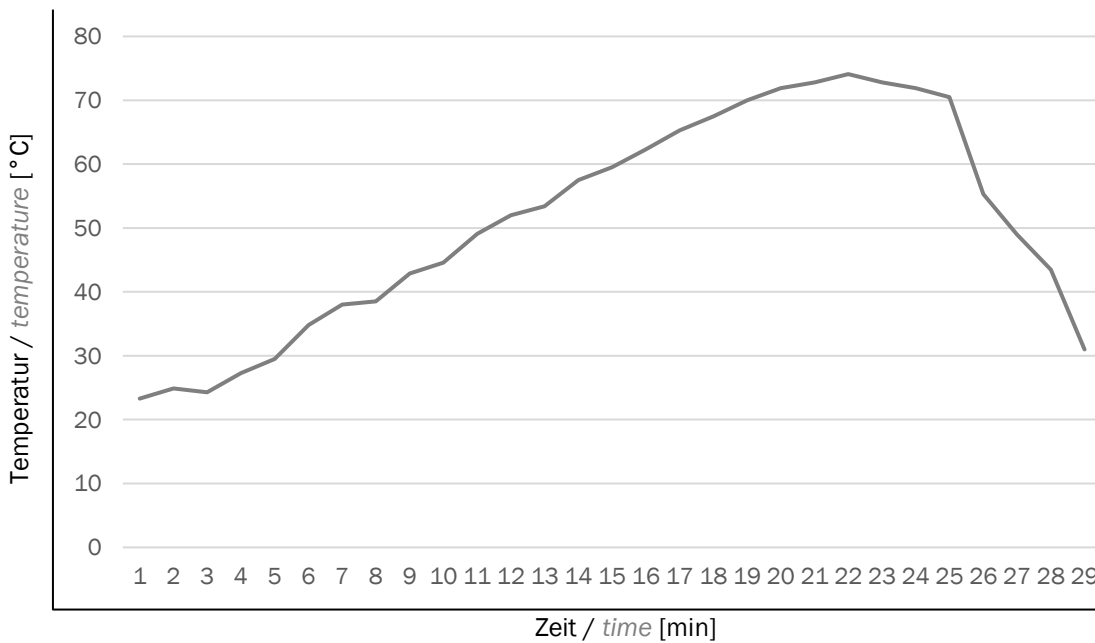


Abbildung 1: *Temperaturaufzeichnung von Waschgang 1 - Abhängigkeit von der Zeit*
Figure 1: *Washing cycle 1 - temperature and time profile*

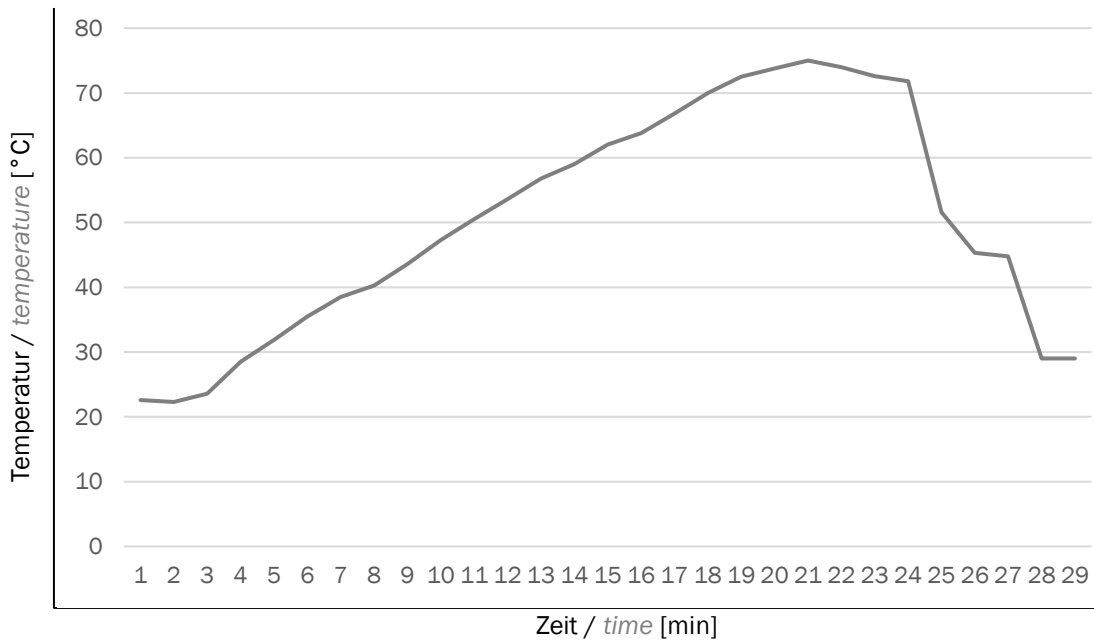


Abbildung 1: **Temperaturaufzeichnung von Waschgang 2 - Abhängigkeit von der Zeit**
Figure 1: **Washing cycle 2 - temperature and time profile**

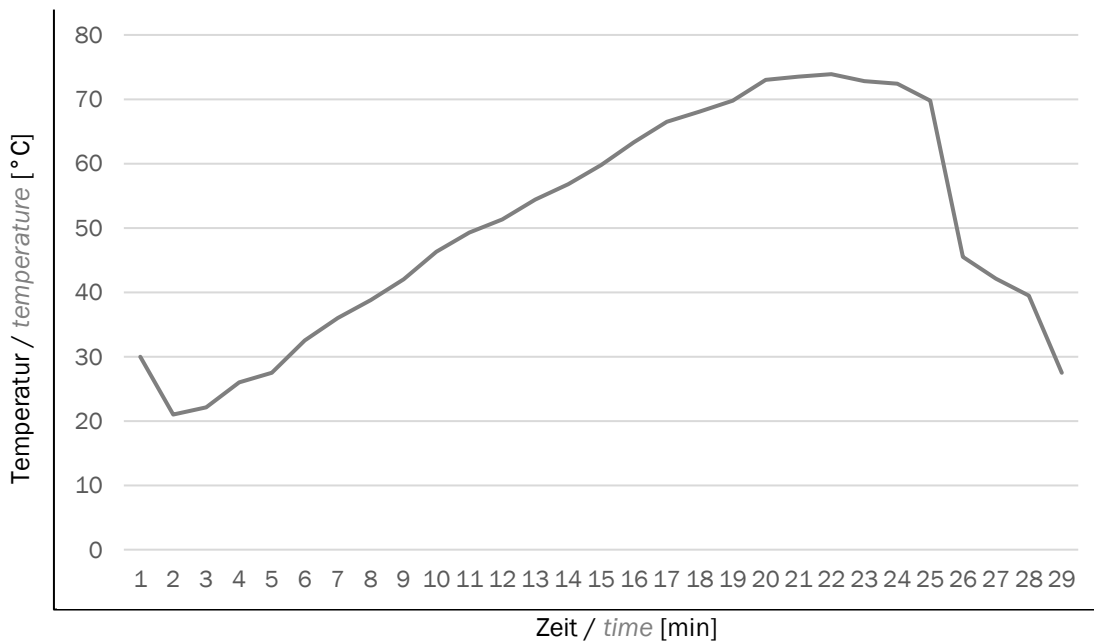


Abbildung 1: **Temperaturaufzeichnung von Waschgang 3 - Abhängigkeit von der Zeit**
Figure 1: **Washing cycle 3 - temperature and time profile**

ZUSAMMENFASSUNG / CONCLUSION**BEURTEILUNGSKRITERIEN****Anforderungen im quantitativen Keimträgerversuch nach VAH Methode 17.2**

Ein Wäschedesinfektionsverfahren gilt als wirksam, wenn eine Ig-Keimreduktion um mindestens 7 lg₁₀ Stufen nachgewiesen wird. Außerdem dürfen in 100 ml Waschflotte nach Beendigung der Desinfektionsphase sowie auf den sterilen Kontrollläppchen keine Testorganismen nachweisbar sein.

Eine Untersuchung der Flotte war aufgrund der technischen Voraussetzungen bedingt leider nicht möglich.

ASSESSMENT CRITERIA**Requirements for the quantitative carrier test in accordance to VAH method 17.2**

A laundry disinfection procedure is considered effective if a microbial reduction of at least 7 lg₁₀ steps is proven. In addition, no test organisms must be detectable in 100 ml wash liquor after completion of the disinfection phase or on the sterile control carriers.

An examination of the liquor was not possible due to the technical conditions.

BEURTEILUNG**QUANTITATIVER KEIMTRÄGERVERSUCH**

Das geprüfte thermische Waschverfahren „Programm 90 °C“ zeigte eine ausreichende Keimreduktion der Bioindikatoren mit Reduktionswerten von mehr als 7 lg₁₀-Stufen gegenüber *Escherichia coli* K12 NCTC 10538, *Staphylococcus aureus* ATCC 6538, *Enterococcus faecium* ATCC 6057 unter praxisnahen Bedingungen in drei Waschversuchen. Auf den vormals sterilen Kontrollläppchen war *Escherichia coli* K12 NCTC 10538, *Staphylococcus aureus* ATCC 6538, *Enterococcus faecium* ATCC 6057 nicht nachweisbar.

ASSESSMENT**QUANTITATIVE CARRIER TEST**

The tested thermal washing procedure "Program 90 °C" showed a sufficient microbial reduction of the bio-indicators with reduction values of more than 7 lg₁₀-steps under practical conditions in three washing tests against the test organisms *Escherichia coli* K12 NCTC 10538, *Staphylococcus aureus* ATCC 6538, *Enterococcus faecium* ATCC 6057. All test organisms were not detectable on the previously sterile control carriers.

Schloss Hohenstein, 29. April 2019

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Results VAH Chapter 17.2 / EN 16616

Test-Nr.:	19.8.1.0348	Test Date:	24.04.2019-29.04.2019
Productname	LG automatic washing machine Modell: FH069FD3FS Product code: FH069FD3FS.ASSQEEU Serial-No.: 810KWEL38092	Load:	10 kg (100 % cotton)
Test Temperature	90 °C (60 °C)		
Testorganism:	Escherichia coli K12 NCTC 10538		

Control KTL:

	CFU/KTL	MW CFU/KTL	log KTL
KTL 1	4,00E+07	3,40E+07	7,53
KTL 2	3,40E+07		
KTL 3	2,80E+07		

Test-Nr.: 19.8.1.0348
 Testorganism: Escherichia coli K12 NCTC 10538
 Wash cycle: control wash cycle 1 (water only) - 60 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	log N ₀		
						CFU	log CFU	
KTL 1	-1	3	2	5	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 2	-1	0	1	1	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 3	-1	2	1	3	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 4	-1	2	0	2	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 5	-1	3	0	3	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 6	-1	1	0	1	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 7	-1	1	0	1	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 8	-1	0	0	0	pos.	<10	<1	>=6,53
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 9	-1	1	2	3	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				
KTL 10	-1	2	1	3	neg.	< 14	< 2,14	>5,39
	-2	0	0	0				
	-3	0	0	0				
	-4	-	-	-				

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Escherichia coli K12 NCTC 10538
 Wash cycle: wash cycle 1 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				
	-3	0	0	0				
	-4	0	0	0				

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Escherichia coli K12 NCTC 10538
 Wash cycle: wash cycle 2 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Escherichia coli K12 NCTC 10538
 Wash cycle: wash cycle 3 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,53
	-2	0	0	0				7,53
	-3	0	0	0				
	-4	0	0	0				

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Results VAH Chapter 17.2 / EN 16616

Test-Nr.:	19.8.1.0348	Test Date:	24.04.2019-29.04.2019
Productname	LG automatic washing machine Modell: FH069FD3FS Product code: FH069FD3FS.ASSQEEU Serial-No.: 810KWEL38092	Load:	10 kg (100 % cotton)
Test Temperature	90 °C (60 °C)		
Testorganism:	Staphylococcus aureus ATCC 6538 Escherichia coli K12 NCTC 10538		

Control KTL:

	CFU/KTL	MW CFU/KTL	log KTL
KTL 1	6,52E+07	4,94E+07	7,69
KTL 2	4,29E+07		
KTL 3	4,02E+07		

Test-Nr.: 19.8.1.0348
 Testorganism: Staphylococcus aureus ATCC 6538
 Wash cycle: control wash cycle 1 (water only) - 60 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	log N ₀		7,69
						CFU	log CFU	log R
KTL 1	-1	>330	>330	>660	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>660				
	-3	>330	>330	>660				
	-4	-	-	-				
KTL 2	-1	>330	>330	>330	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>330				
	-3	>330	>330	>330				
	-4	-	-	-				
KTL 3	-1	>330	>330	>330	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>330				
	-3	>330	>330	>330				
	-4	-	-	-				
KTL 4	-1	>330	>330	>330	pos.	4,00E+05	5,60	2,09
	-2	>330	>330	>330				
	-3	200	200	400				
	-4	-	-	-				
KTL 5	-1	>330	>330	>330	pos.	5,40E+05	5,73	1,96
	-2	>330	>330	>330				
	-3	240	300	540				
	-4	-	-	-				
KTL 6	-1	>330	>330	>330	pos.	4,40E+05	5,64	2,05
	-2	>330	>330	>330				
	-3	200	240	440				
	-4	-	-	-				
KTL 7	-1	>330	>330	>330	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>330				
	-3	>330	>330	>330				
	-4	-	-	-				
KTL 8	-1	>330	>330	>330	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>330				
	-3	>330	>330	>330				
	-4	-	-	-				
KTL 9	-1	>330	>330	>330	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>330				
	-3	>330	>330	>330				
	-4	-	-	-				
KTL 10	-1	>330	>330	>330	pos.	> 6,60E+05	> 5,82	< 1,87
	-2	>330	>330	>330				
	-3	>330	>330	>330				
	-4	-	-	-				

	Plate 1	Plate 2	V _c	Growth
KTL 1				pos.
KTL 2				pos.
KTL 3				pos.
KTL 4				pos.
KTL 5				pos.
KTL 6				pos.

Test-Nr.: 19.8.1.0348
 Testorganism: Staphylococcus aureus ATCC 6538
 Wash cycle: wash cycle 1 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Staphylococcus aureus ATCC 6538
 Wash cycle: wash cycle 2 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Staphylococcus aureus ATCC 6538
 Wash cycle: wash cycle 3 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,69
	-2	0	0	0				7,69
	-3	0	0	0				7,69
	-4	0	0	0				7,69

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Results VAH Chapter 17.2 / EN 16616

Test-Nr.:	19.8.1.0348	Test Date:	24.04.2019-29.04.2019
Productname	LG automatic washing machine Modell: FH069FD3FS Product code: FH069FD3FS.ASSQEEU Serial-No.: 810KWEL38092	Load:	10 kg (100 % cotton)
Test Temperature	90 °C (60 °C)		
Testorganism:	Enterococcus faecium ATCC 6057 Escherichia coli K12 NCTC 10538		

Control KTL:

	CFU/KTL	MW CFU/KTL	log KTL
KTL 1	2,02E+07	2,12E+07	7,33
KTL 2	2,72E+07		
KTL 3	1,62E+07		

Test-Nr.: 19.8.1.0348
 Testorganism: Enterococcus faecium ATCC 6057
 Wash cycle: control wash cycle 1 (water only) - 60 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	log N ₀		
						CFU	log CFU	
KTL 1	-1	>330	>330	>330	pos.	6,00E+05	5,78	7,33 1,55
	-2	>330	>330	>330				
	-3	320	280	600				
	-4	-	-	-				
KTL 2	-1	>330	>330	>330	pos.	5,16E+05	5,71	1,62
	-2	>330	>330	>330				
	-3	280	236	516				
	-4	-	-	-				
KTL 3	-1	>330	>330	>330	pos.	4,60E+05	5,66	1,66
	-2	>330	>330	>330				
	-3	300	160	460				
	-4	-	-	-				
KTL 4	-1	>330	>330	>330	pos.	5,20E+05	5,72	1,61
	-2	>330	>330	>330				
	-3	280	240	520				
	-4	-	-	-				
KTL 5	-1	>330	>330	>330	pos.	5,60E+05	5,75	1,58
	-2	>330	>330	>330				
	-3	320	240	560				
	-4	-	-	-				
KTL 6	-1	>330	>330	>330	pos.	6,14E+05	5,79	1,54
	-2	>330	>330	>330				
	-3	300	314	614				
	-4	-	-	-				
KTL 7	-1	>330	>330	>330	pos.	4,00E+05	5,60	1,73
	-2	>330	>330	>330				
	-3	200	200	400				
	-4	-	-	-				
KTL 8	-1	>330	>330	>330	pos.	4,40E+05	5,64	1,69
	-2	>330	>330	>330				
	-3	280	160	440				
	-4	-	-	-				
KTL 9	-1	>330	>330	>330	pos.	6,00E+05	5,78	1,55
	-2	>330	>330	>330				
	-3	300	300	600				
	-4	-	-	-				
KTL 10	-1	>330	>330	>330	pos.	4,80E+05	5,68	1,65
	-2	>330	>330	>330				
	-3	240	240	480				
	-4	-	-	-				

	Plate 1	Plate 2	V _c	Growth
KTL 1				pos.
KTL 2				pos.
KTL 3				pos.
KTL 4				pos.
KTL 5				pos.
KTL 6				pos.

Test-Nr.: 19.8.1.0348
 Testorganism: Enterococcus faecium ATCC 6057
 Wash cycle: wash cycle 1 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Enterococcus faecium ATCC 6057
 Wash cycle: wash cycle 2 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				
	-4	0	0	0				

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.

Test-Nr.: 19.8.1.0348
 Testorganism: Enterococcus faecium ATCC 6057
 Wash cycle: wash cycle 3 (water only) - 90 °C

	Dilution	Plate 1	Plate 2	V _c	Growth	CFU	log N ₀	
							log CFU	log R
KTL 1	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 2	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 3	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 4	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 5	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 6	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 7	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 8	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 9	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33
KTL 10	-1	0	0	0	neg.	< 1	0,00	7,33
	-2	0	0	0				7,33
	-3	0	0	0				7,33
	-4	0	0	0				7,33

	Plate 1	Plate 2	V _c	Growth
KTL 1				neg.
KTL 2				neg.
KTL 3				neg.
KTL 4				neg.
KTL 5				neg.
KTL 6				neg.