



SpeechMike Premium

Antimicrobial housing

Explanation and test results

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ANTIMICROBIAL EFFECT

The antimicrobial effect of the SpeechMike Premium housing is based on an addition agent (sterions) that is put into the plastic before molding the housing parts.

This means that the antimicrobial effect of the SpeechMike Premium housing is homogeneous in the plastic material.

The advantage is that the antimicrobial effect is also given in the holes of the microphone and the speaker.



As the antimicrobial effect is not based on a coating, it can not be wiped off by any cleaning detergents.

TECHNOLOGY

WHAT IS ANTIMICROBIAL?

Whilst *antibacterial* media exclusively work against bacteria, *antimicrobial* materials work against a range of different microorganisms:

- Bacteria (e.g. pneumo-cocccobacilli and multi-resistant micro-organisms such as MRSA.)
- Viruses (e.g. HIV, influenza etc.)
- Fungi (e.g. Aspergillums Niger)
- Algae

With antimicrobial material microorganisms are practically permanently eliminated from any object.

Examples for applications of antimicrobial material are:

- Bio implants or endoscopes in the medical environment
- Ventilating shafts (reduction of fungi, viruses and bacteria)
- Water pipes (avoiding the development of legionella)
- Filter systems (for air and water purification)
- Cooling systems in food industry (avoiding fungi and bacteria)
- Sanitary installations
- Hygienic articles, etc.

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HOW LONG DOES THE ANTIMICROBIAL WORK?

Sterions continually form ions with high activity.

These ions are suitable to attack the cellular metabolic systems that primitive organisms mortify.

Depending on the doses of the additive the effect is more intensive or weaker.

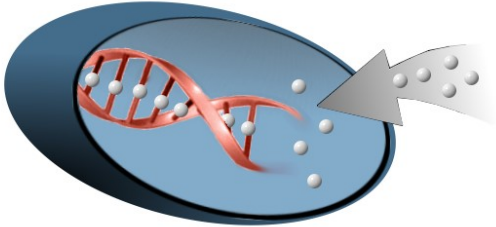


Illustration by SteriOne

HOW LONG DOES THE ANTIMICROBIAL EFFECT LAST?

According to supplier information the antimicrobial effect last for 5 years minimum.

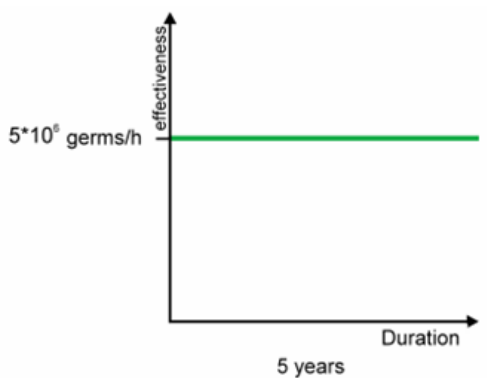


Illustration by SteriOne

MEDICAL APPLICATIONS

Materials with antimicrobial addition agents have the effect that:

- The settling and transmission of germs is reduced
- Nosocomial infections are decreased
- The rest risk of cleaning is reduced
- Resistances are avoided

REDUCED CLEANING RISKS

From our experience we know that SpeechMikes are sterilised daily by the cleaning personell.

Unfortunately, this process is not always reliable (especially in the speaker grille and the microphone grille area) so, that due to the continued use germs may be transferred from one user to the next.

When the SpeechMike housing is filled with sterions the germs are destroyed immediately.

More information on the antimicrobial effect can be gained on the Internet at www.sterione.com or by googling the term "antimicrobial".

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CLEANING

As mentioned above the SpeechMike Premium can be cleaned with standard cleaning appliances without harming the antimicrobial effect.

Ideally wipes should be used like e.g.

- Bacillol 30 Tissues
or alternatively
- Bacillol Tissues
- Bacillol Wipes
- Bode X-Wipes
- Sterillium Wipes

With the above listed and/or similar products all outside parts of the SpeechMike can be cleaned and sterilized.

The impossibility to clean the holes of the mic and the speaker it's not a problem, because the antimicrobial character of the housing is still effective there.

⚠ ATTENTION: It should be avoided that liquid gets into the device.

If liquid gets onto the printed circuit board malfunction can occur at least for the time until the liquid is evaporated.

However, there is absolutely no safety risk, because the SpeechMike is just supplied by the 5V from the USB connector.

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ANTIMICROBIAL TESTS

SUMMARY

Overall we have got excellent results from the test lab about the effect of the antimicrobial additive in the SpeechMike Premium housing parts.

The test results showed that with an average reduction factor of 2 the additive/plastic compound in the SpeechMike Premium housing clearly eliminates *E.coli* and of *Staphylococcus aureus* bacteria over the test period.

Please find below a detailed description on what has been done in the laboratory.

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TEST STANDARDS

The tests were done on SpeechMike Premium housing parts according to the following standards: **JIS Z 2801** and **ISO 22116:2007**

These standards are related to “Tests for Antimicrobial Activity and Efficacy” or “Test for Antimicrobial Activity of Plastics”

TEST PROCEDURE

The surface of the SpeechMike Premium housing is coated with suspensions of 2 different bacteria.

After several hours the number of bacteria that were left on the surface is counted according to a scientific count method.



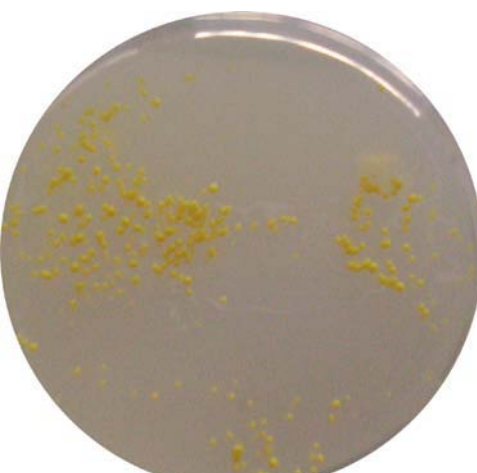

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TEST RESULTS

The test results are translated from German.

If needed the original reports can be requested from product management at Speech Processing Solutions GmbH.

Sample observations

Rest CFU e.coli reduction > 100.000/3h	0-sample - e.coli
 A petri dish with a red agar medium. The surface is mostly clear, with several small, dark, pinpoint colonies scattered across the area, indicating a significant reduction in bacterial count.	 A petri dish with a red agar medium. The surface is completely covered with a dense, confluent layer of dark, pinpoint colonies, representing a high initial bacterial load.
Rest CFU m.luteus reduction 100.000/3h	0-sample - m.luteus
 A petri dish with a white agar medium. The surface is mostly clear, with several small, yellowish, pinpoint colonies scattered across the area, indicating a significant reduction in bacterial count.	 A petri dish with a white agar medium. The surface is completely covered with a dense, confluent layer of yellowish, pinpoint colonies, representing a high initial bacterial load.

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TEST LABORATORY

ofi Technologie & Innovation GmbH

Date: 23.11. 2012

Person in charge: Dr. Michael Pyerin, Manager Pharma und Medical products

Test report no.: 408.818

- ✳ **Note:** We used 6 pieces of each SpeechMike Premium upper housings Code no. 5103 107 7244.1 with the correct additive/plastic compound (2% SAN X 10) in the samples.
All housing parts of this device are made of identical material. Therefore an assessment of the lower housing part was omitted.

Samples

Manufacturer: Speech Processing Solutions GmbH

- 6 pieces upper housing
- Material: ABS

TEST METHOD

The test was done according to **JIS Z 2801:2000**.

In this test the bacteria "*Escherichia coli*" and "*Staphylococcus aureus*" were used.

On the test samples and proof samples areas with 0.3 ml of the germ suspensions were inoculated

The samples were stored (incubated) for 24 hours in closed sterilised petri dishes (humidity >90%) at a temperature of 23± 2°C.

After the incubation the number of remaining bacteria was determined.

APARATUS

For the test, the following bacterial strains were used:

- *Escherichia coli* DSM 787
- *Staphylococcus aureus* DSM 346

Used apparatus

Heating cabinet: Memmert (**ofi** equipment no.: 2.184)

Incubator: Stabilitherm (EB 118-2) (**ofi** equipment No.: 2.648)

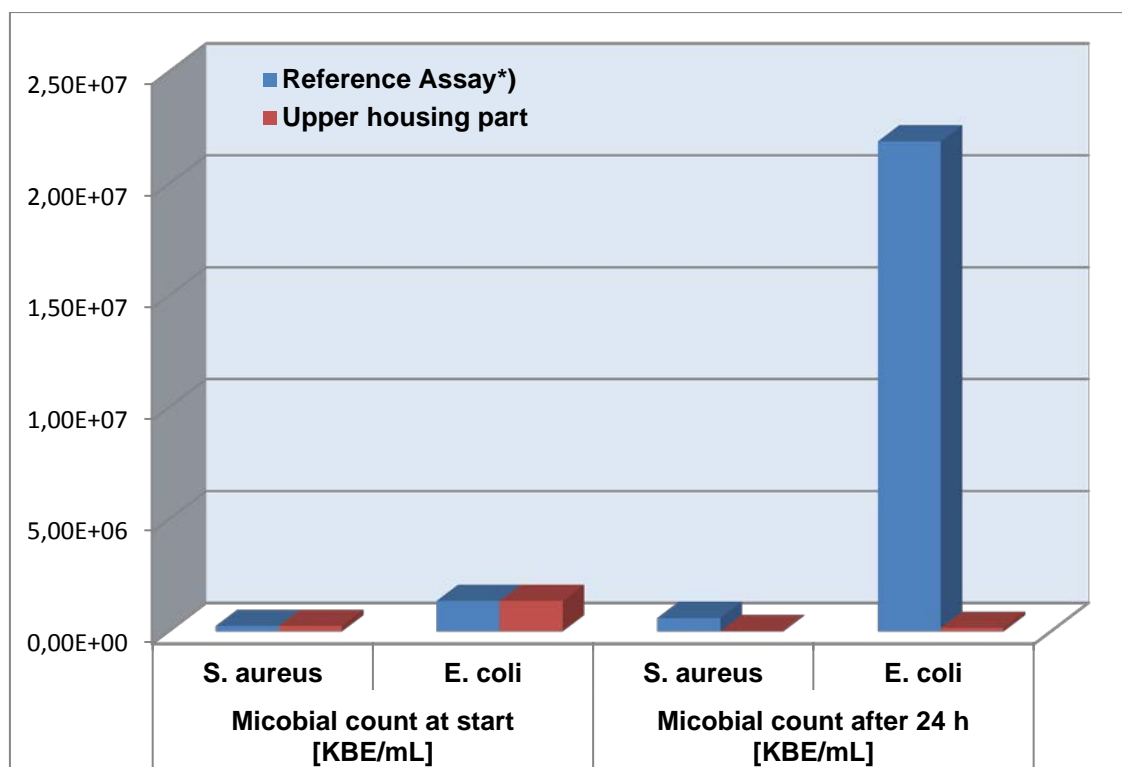
Microscope: Leitz SM Lux (**ofi** equipment No.: 1.510)

Autoclave: Varioklav Dampfsterilisator 400 E (**ofi** equipment No.: 2.210)

Work bench: Laminar Flow Biosafe (**ofi** equipment No.: 2.194)

QUANTITATIVE SAMPLE ANALYSIS

Sample	Microbial count at start [KBE/mL]		Microbial count after 24 h [KBE/mL]		Reduction factor [$R=\log(B/C)$]	
	<i>S. aureus</i>	<i>E. coli</i>	<i>S. aureus</i>	<i>E. coli</i>	<i>S. aureus</i>	<i>E. coli</i>
Reference Assay*)	2,40E+05	1,36E+06	5,94E+05	2,19E+07	----	----
Upper housing part	2,40E+05	1,36E+06	7,98E+03	1,56E+05	1,87	2,15



*) same plastic material but without antimicrobial additive

Regarding the evaluation of the results of the applied test procedure, a significant antibacterial effect of the material tested is given from a reduction factor of 2.

RESULTS

The results after 24 hours show an antimicrobial effect for “*Staphylococcus aureus* and a significant antimicrobial effect for “*Escherichia coli*”.

LIST OF REFERENCES

- www.sterione.com
- **ofi** Technologie & Innovation GmbH, Prüfbericht Nr.: 408.818 vom 2012-11-23

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