



Adding value
since 1935



SANITIZED® PURETEC™

The solution for outstanding sports textiles

WHY IS IT WORTHWHILE TO TREAT TEXTILES WITH SANITIZED® PURETEC™?

An antimicrobial finish prevents unpleasant odors in textiles. It does this by hindering odor-causing bacteria from multiplying on the textile over the long term. It pays to treat textiles with Sanitized® Puretec™ antimicrobial technology:

- Antimicrobial textiles offer consumers peace of mind and confidence by ensuring that their textiles stay fresh for longer and unpleasant odors do not build up.
- Consumers with an active lifestyle can wear textiles several times without hesitation. No sweat odors develop in the textiles.
- With an antimicrobial finish, consumers can wash textiles less frequently. This saves them time, water, detergent, and energy.
- An antimicrobial finish prevents permastink, which is caused by bacteria and biofilms.
- Sanitized® Puretec™ technology is metal and particle free. The technology is proven safe for humans and the environment. In addition, Sanitized® Puretec™ is a more sustainable solution for odor prevention than metal-based technologies.
- The lasting effectiveness of Sanitized® Puretec™ technology is proven by internationally recognized test standards.
- Sanitized® Puretec™ meets the standards of OEKO-TEX® and bluesign®. The technology meets global regulatory requirements for an antimicrobial additive.

The following pages describe the Sanitized® Puretec™ technology in detail.



GREATER HYGIENE NEEDS AND MORE WIDESPREAD USE OF SPORTSWEAR REQUIRES POWERFUL ANTIMICROBIAL SOLUTIONS.

Lately, [SANITIZED AG](#) has noticed a consistently growing demand for effective and long-lasting hygiene function from the market and from consumers.

Edited.com quantifies the increased demand: Apparel arrivals described as “antimicrobial” are up 100%, and “anti-bacterial” apparel has risen 117% at US and UK sportswear retailers.¹ This trend is also boosted by the current popularity of “athleisure”.

“Athleisure” describes the blurring of the boundaries between sportswear and everyday apparel. Clothing that was designed to be sportswear is increasingly worn in day-to-day life – whether at home, at work, or on the go, and the COVID-19 pandemic seems to be accelerating this trend. Many consumers have gotten used to leggings or jogging pants and do not want to go back to wearing formal and more uncomfortable apparel. At the same time, it is becoming more socially acceptable to wear sportswear. This has led to the creation of a standalone category for athleisure apparel, or “crossover” clothing that bridges the gap between workout clothing and elegant, everyday apparel.² Furthermore, according to a McKinsey survey, 75% of all industry representatives believe that this athleisure clothing trend will continue.³

1 Marci, K. (2021). Activewear market analysis. Edited.com. <https://blog.edited.com/blog/resources/activewear-market-analysis> Retrieved October 11, 2021, from URL

2 Tsapovsky, F. (2020). Once a WFH Staple, Athleisure Gets Down to Business. Wired.com. <https://www.wired.com/story/athleisure-gets-down-to-business/> Retrieved October 11, 2021, from URL

3 McKinsey and Company. (2021). *Sporting Goods 2021*. New York. p. 26-37.

EVERYDAY SPORTSWEAR – BUT WITHOUT THE SMELL, PLEASE

Sportswear is mainly composed of artificial fibers, which develop unpleasant odors very quickly. While this can be ignored to a certain degree when exercising outdoors, it is an entirely different matter if the garment made of artificial fiber is worn at both the fitness center and, for instance, at the workplace. Both wearers of such athleisure apparel and the people around them will appreciate the effective antimicrobial treatment that prevents the growth of bacteria known to produce unpleasant odors.

Furthermore, bacteria that metabolize sweat create a biofilm on the textile that is very difficult to wash off. As a result, even freshly washed sportswear often stinks, and these textiles can become waste prematurely.⁴ The unpleasant odor that emanates from the biofilm on the textile is called “permastink” and can also be prevented by using an effective antimicrobial treatment.

HYGIENE AWARENESS PLAYS A ROLE IN THE PURCHASING DECISION

The COVID-19 pandemic has affected more than just consumers' clothing preferences. In addition to the trend of sportswear being worn more on a day-to-day basis, hygiene awareness has increased overall, and this is also reflected in consumer behavior: 16% of surveyed American consumers have stated that one of their three most common reasons for purchasing another brand is due to health and hygiene reasons.⁵

These trends prompted SANITIZED AG to develop an innovative product portfolio using their expertise in hygiene concepts. During this process, the Swiss company focused on hygiene concepts for synthetic fibers like the ones used for sportswear.

4 Munk, S., Johansen, C., Stahnke, L. H., & Adler-Nissen, J. (2001). Microbial survival and odor in laundry. *Journal of Surfactants and Detergents*, 4(4), 385-394. <https://doi.org/10.1007/s11743-001-0192-2>

5 McKinsey & Company. (2021). COVID-19 US Consumer Pulse Survey 2/18-2/22/2021



SANITIZED® PURETEC™: THE CUSTOMIZED SOLUTION FOR SPORTSWEAR

Besides demanding highly effective antimicrobial treatments, consumers have high expectations regarding the environmental compatibility and sustainability of their sportswear. According to the IBM Institute for Business Value, 53% of consumers are either “purpose-driven consumers” or “brand-driven consumers”, and both consumer categories greatly value sustainability.⁶ Figure 1 illustrates how consumers are distributed among the different types, along with how their values are aligned.

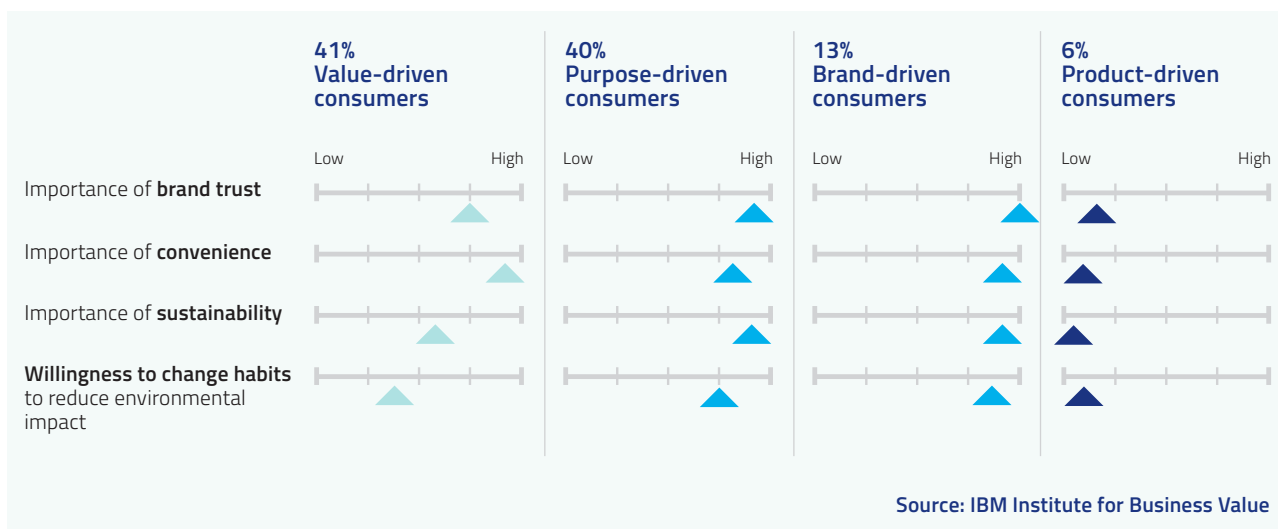


FIGURE 1: CATEGORIZATION BASED ON A GLOBAL SURVEY OF CONSUMERS BY IBM⁶

6 Haller, K., Lee, J., & Cheung, J. (2020). Meet the 2020 consumers driving change - Why brands must deliver on omnipresence, agility and sustainability. Armonk: IBM Corporation.

Figure 2 illustrates the distribution of the corresponding consumer types for the various product categories. When buying apparel or footwear, sustainability is an important decision-making criterion. Sportswear brands cannot ignore such trends. The brands have a strong presence in the market, which is why they often play a leading role. As such, the leading brands value the fact that the textile's ingredients meet the requirements of independent labels such as bluesign® or OEKO-TEX® (see figure 3).

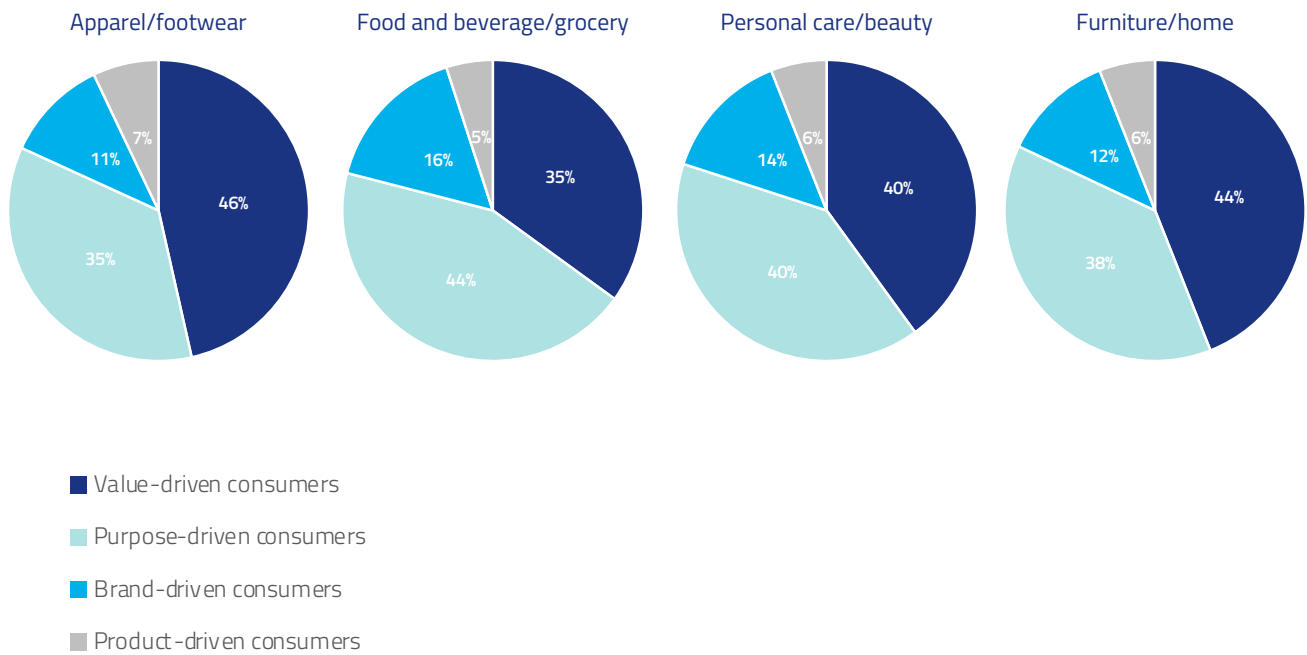


FIGURE 2: DISTRIBUTION OF CONSUMER TYPES ACROSS DIFFERENT PRODUCT CATEGORIES ACCORDING TO IBM⁶



FIGURE 3: BLUESIGN® AND OEKO-TEX® ARE IMPORTANT LABELS FOR TEXTILES, ESPECIALLY SPORTSWEAR

At SANITIZED AG, we are aware of the needs of consumers and brands. Sanitized® Puretec™ meets market requirements regarding both product performance and required ecological and economical elements.

This is proven by the characteristics of Sanitized® Puretec™ 20-19 technology:

- Effectively prevents the growth of bacteria – for long-lasting, fresh textiles
- Prevents the formation of permastink – increasing the useful life of the textile
- Metal- and nano-free technology
- Ecological and economical technology: bluesign® and OEKO-TEX®-approved
- Easy to apply
- High wash resistance
- Global availability
- Tailor-made solutions meet customer requirements
- Best available technology

This overview shows that many of the advantages relate to sustainability and safety. The active substance does not spill into the environment when washed or worn. In addition, Sanitized® Puretec™ does not contain any metals. Since metals, particularly precious metals such as silver, are rare and require a lot of effort to obtain, metalliferous technologies are less sustainable. Extracting metal consumes a great deal of energy and produces high CO₂ emissions.

PERMASTINK

Permastink is a problem that consumers of synthetic textiles are familiar with. After wearing for a short period of time, the textiles smell unpleasant. The cause of this problem is bacteria that settle in the textile fibers. Together with body fats, dirt, and sweat, they form a biofilm. In addition, synthetic textiles are washed at low temperatures. Low washing temperatures are not sufficient to remove the odor-causing bacteria together with the biofilm from the textile fibers. If a textile has an antimicrobial finish, the bacteria do not settle in the textile in the first place and permastink is a thing of the past.

WHAT IS SANITIZED® PURETEC™ AND HOW DOES IT WORK?

Sanitized® Puretec™ technology is based on the quat-silane ingredient dimethyl-teradecyl-3-(trimethoxysilyl)-propylammonium chloride (figure 4).

A quat silane consists of a silane base (silicone monomer) and an ammonia compound with a long hydrocarbon chain with a length of 14 carbon atoms (C14). During the application process, the silane bases connect to each other and the textile to create a bond. This strong and permanent bond explains the high wash resistance. In the subsequent drying process at temperatures of over 120°C, the silane bases link to each other and the textile.

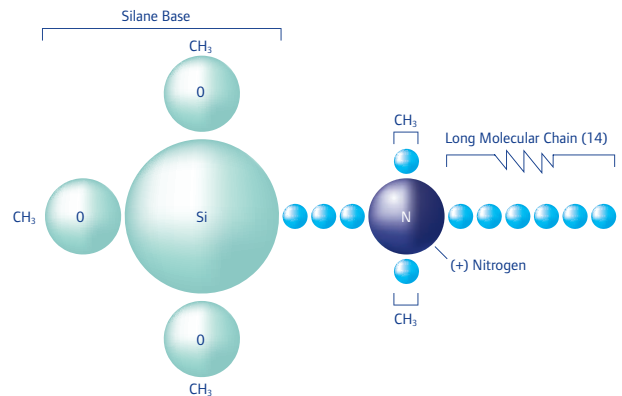
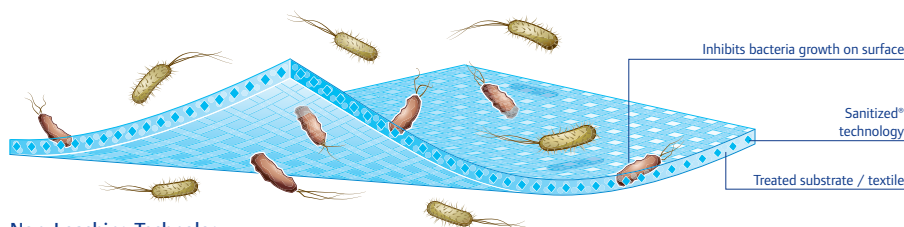


FIGURE 4: THE CHEMICAL STRUCTURE OF PURETEC™ – QUAT-SILANE

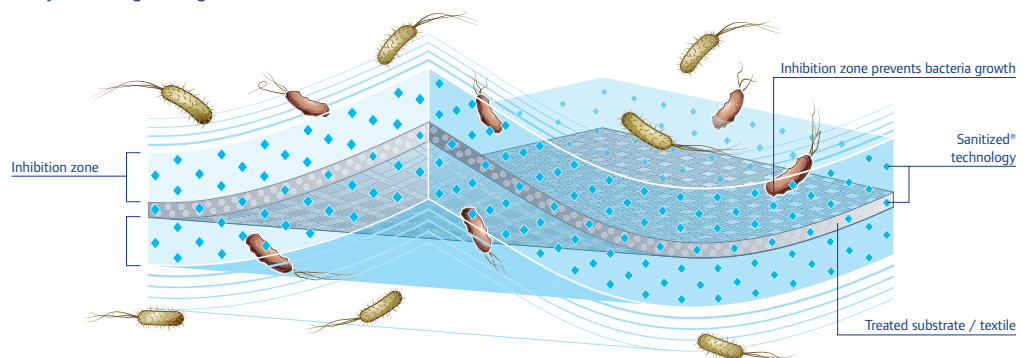
NON-LEACHING VS. LEACHING TECHNOLOGY

Thanks to the firmly adherent fiber coating, the active ingredient is not rinsed off nor does it seep into the environment while the apparel is worn due to its “non-leaching” technology. Compared to “leaching” technologies that create a zone of inhibition for microbes by consistently and lightly emitting active ingredients into the environment, “non-leaching” technologies only affect the substrate directly (see figures 5 and 6).



Non-Leaching Technology

The active substance is bonded on the fiber and not released. An inhibition zone is not formed around the treated material. The growth of bacteria on the protected surface is inhibited. This mechanism has excellent wash durability for a long-lasting antimicrobial effect.



Leaching Technology

The active substance is slowly released from the substrate creating a stable inhibition zone only around the treated material. This mechanism explains the reduced wash durability of the antimicrobial effect.

FIGURE 5: "NON-LEACHING" TECHNOLOGY VS. "LEACHING" TECHNOLOGY

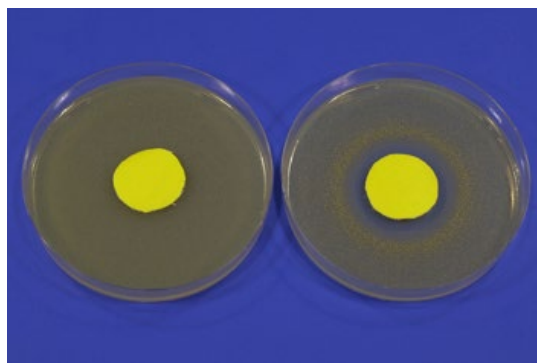


FIGURE 6: NON-LEACHING VS. LEACHING TEXTILE SAMPLE

Because no active ingredients are leaked into the environment, “non-leaching” technology is generally regarded as more positive than a “leaching” technology from a sustainability perspective. The different way in which it works also explains the high wash resistance and lifespan of a “non-leaching” technology such as Sanitized® Puretec™ in real-life use. But how does Sanitized® Puretec™ work?

MODE OF ACTION

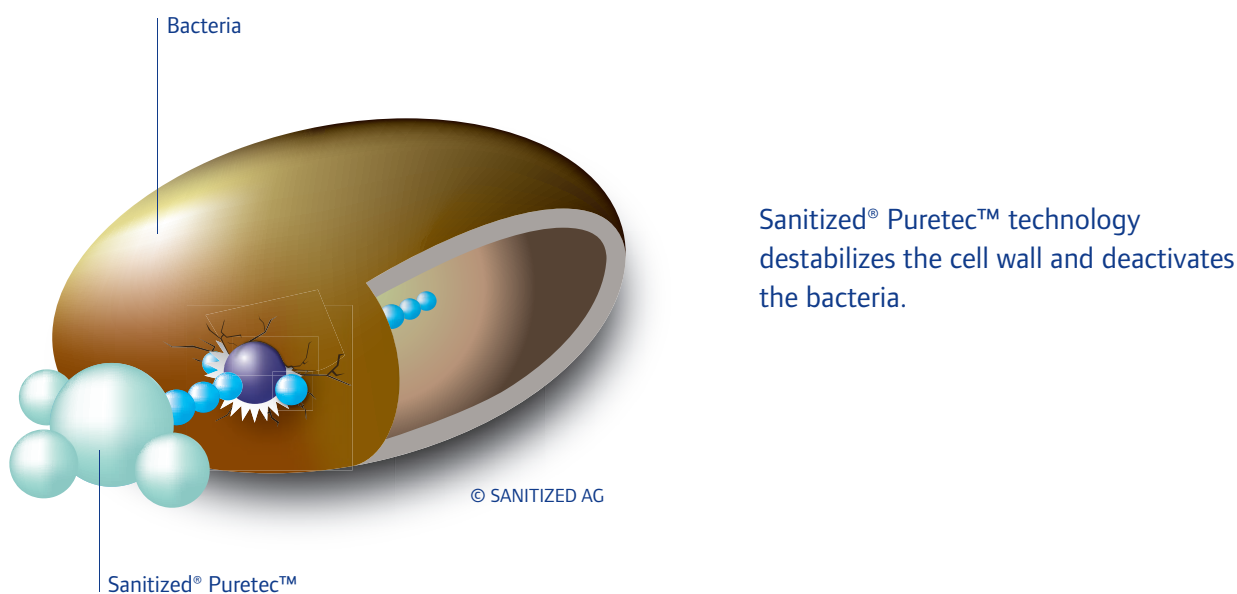


FIGURE 7: SANITIZED® PURETEC™ DESTABILIZES THE CELL WALL AND THUS DEACTIVATES THE BACTERIUM

The schematic illustration in figure 7 shows how the patented quat-silane technology Puretec™ by Sanitized® works against bacteria. The bacteria cell walls are destabilized by the interaction with the long carbon chain and the positive charge of the ammonium silane, which deactivates the bacteria and results in a reduction of odor from sweat on textiles.

TEST RESULTS

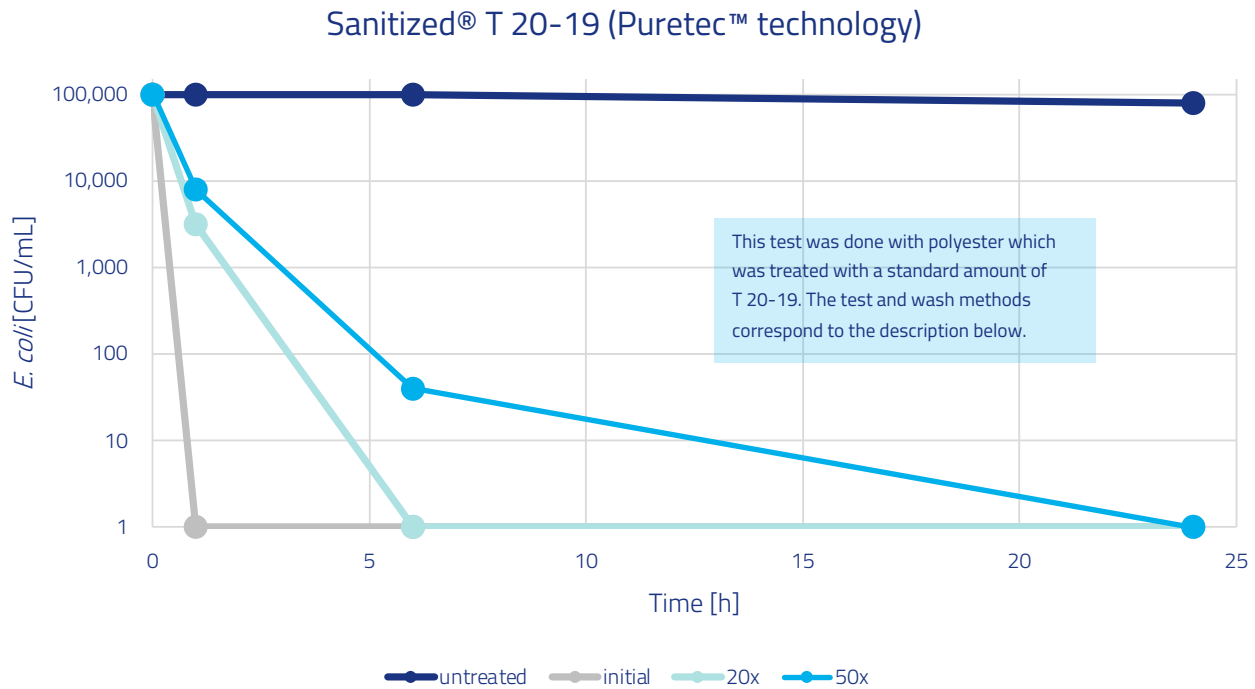


FIGURE 8: TEST RESULTS FOR A CLOTH TREATED WITH A STANDARD DOSE WITHOUT WASHING, AFTER 20 WASHES, AND AFTER 50 WASHES, ALONG WITH AN UNTREATED COMPARISON SAMPLE AFTER 1 HOUR, 6 HOURS, AND 24 HOURS OF CONTACT TIME

Figure 8 shows the outstanding effectiveness of the Sanitized® Puretec™ treatment against *E. coli* on polyester. It is apparent that, although the increasing number of washes somewhat slows down the effect, bacterial growth is almost fully deactivated even after 50 washes within 24 hours. 50 washes are a very high number for a sports textile. By increasing the dose above the selected standard value, the curve can be moved to the left, thereby achieving a faster effect. Our experts evaluate whether this is worthwhile for each individual application.

E. COLI

Escherichia coli (abbreviated *E. coli*) - also known as coliform bacteria - is a bacterium normally found in the human and animal intestines. It is one of the most common causative agents of human infectious diseases.

E. coli is a Gram-negative bacterium. Achieving efficacy against Gram-negative bacteria is more difficult than achieving efficacy against Gram-positive bacteria. Therefore, it can be assumed that an antimicrobial additive that is effective against Gram-negative bacteria will also be effective against Gram-positive bacteria.

INNOVATION IN SAMPLE PREPARATION AND TEST METHODOLOGY

As an antimicrobial additive isn't visible, nor can it be felt, microbiological tests must be carried out to prove the antimicrobial efficacy. The test method must be tailored to the mode of action of the used active substance on the substrate in question. For this reason, a different test procedure is recommended for non-leaching active ingredients compared to leaching ones. Therefore, SANITIZED AG has been working closely with the IAC (International Antimicrobial Council) to identify a test and sample preparation method.

WHAT IS IAC?

The International Antimicrobial Council (IAC) is a not-for-profit organization dedicated to promoting the safe and effective use of antimicrobials and odor-controlling technologies within industries where microbial contamination is of concern. To further this effort, IAC provides education to users of these technologies, participates in the development of test methods and standards, and certifies test laboratories, textile mills, and odor-control technologies. The IAC establishes verification programs for the use of antimicrobials and odor-controlling technologies to protect the public from any potential misuse and manages quality assurance programs for retailers and brand name companies to assure consistent, reproducible performance from treated products.

Learn more: <https://amcouncil.org/>

List of IAC-certified test labs: <https://amcouncil.org/antimicrobial-test-labs/>

TECHNICAL INFORMATION

Sanitized® Puretec™ can be applied both in the exhaust and padding processes.

Puretec™ can be combined with many different textile effects, such as fluorocarbons, moisture management, or softeners.

Sanitized® Puretec™ technology is noteworthy for its high, wash-resistant effectiveness with moderate usage concentrations. Below you will find a table with the usual usage concentrations and the corresponding number of wash cycles at which its excellent antimicrobial properties have been proven.

Dosage % of Sanitized® T 20-19 (Puretec™ technology)	Home Wash Cycles
0.2-0.3	< 20 Home Wash Cycles
0.3-0.4	> 20 Home Wash Cycles
0.4-0.6	> 40 Home Wash Cycles

FIGURES REGARDING THE SUSTAINABILITY OF SANITIZED® PURETEC™

SANITIZED AG has compared various sustainability aspects of Sanitized® Puretec™ with alternative products on the market and examined differences in the extraction of silicon dioxide and metals. Due to the concentrated product form of Sanitized® Puretec™, significantly less packaging volume, transport effort, and CO₂ emissions occur during transport compared to the diluted product alternatives available on the market.

CO₂ SAVINGS DUE TO THE GREATER CONCENTRATION OF SANITIZED® PURETEC™ TECHNOLOGY COMPARED TO COMPETITOR TECHNOLOGY

The higher flash point compared to competitor technology allows Puretec™ to be transported and stored as a concentrate. This results in less packaging material and less CO₂ emissions during transport compared to a diluted product at a ratio of about 1 to 10.

	Sanitized® T 20-19 (Puretec™ technology)	Diluted Products (ratio 1:10)	Savings
IBC* production ⁷	19.50kg CO ₂	195.00kg CO ₂	175.5kg CO ₂
IBC* combustion	47.10kg CO ₂	471.00kg CO ₂	423.9kg CO ₂
Transport ⁸	6,101t CO ₂	61,010t CO ₂	54,909t CO ₂

*Intermediate Bulk Container (IBC)

7 Nobuhiko, N., et al. (2002). Life Cycle Inventory Analysis of CO₂ Emissions (Manufacturing Commodity Plastics in Japan), LCA Case Studies.

8 ECTA., Cefic., Responsible Care. (2011). Guidelines for Measuring and Managing CO₂ Emissions from Freight Transport Operations. <https://www.ecta.com/wp-content/uploads/2021/03/ECTA-CEFIC-GUIDELINE-FOR-MEASURING-AND-MANAGING-CO2-ISSUE-1.pdf> Retrieved October 11, 2021, from URL



CONTACT US

If you have any questions or want our support, please contact your regular SANITIZED AG distributor or our Customer Service Desk. We look forward to hearing from you and are glad to advise you.



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