

## *sani-tex* and *elam sani-tex*

### Technical facts

*sani-tex* and *elam sani-tex* are auxiliaries for garment finishing treatments with high hygiene standards. Both have compositions that include QAC-based raw materials among their active contents.

QACs (quaternary ammonium compounds) are widely reported in literature to be active towards a variety of microorganisms and are recognized to be among the most useful and versatile sanitizing agents (1).

QACs are commonly employed in the treatment of water, hard surfaces, as well as in leather and textile industries, due to their broad antimicrobial spectrum, their relatively low toxicity, non-volatility and their relatively chemical stability (2).

Regarding their mechanism of action, it has been known that QACs target predominantly the membrane of microorganisms (1,3) causing generalized damage towards phospholipid bilayer (4).

In several circumstances, it was demonstrated that QACs are also active versus different types of viruses. In particular, inactivation is more effective against lipophilic viruses, as Herpes simplex, vaccinia, influenza or adenovirus (5).

QAC-based compounds included in *sani-tex* and *elam sani-tex* have a cationic charge, which translates into the advantage of ensuring compatibility with a large number of finishing agents, thus including cationic softeners.

Being non-volatile organic compounds and quite chemically stable, QACs will continue to be effective on the fabric substrates after the initial application.

### Certified properties

*sani-tex* excellent ability to remove bacteria from fabrics has also been tested and certified. Fabric samples, treated at 30°C for 10 minutes with 4% of product on weight of goods, were then tested, in accordance with UNI EN ISO 20743:2013, by an external laboratory to evaluate their bactericidal effect against *Staphylococcus aureus* and *Klebsiella pneumoniae*.

Achieved results in both cases attest an excellent bactericidal effect, with values well above the minimum required. Numerically speaking, the antibacterial activity obtained against *Staphylococcus aureus* (3.47) is much higher than the minimum required value (2.00), while against *Klebsiella pneumoniae* (7.88) it is almost four times the minimum value. However, since it is a logarithmic scale, these differences are even extremely greater.

Since it contains the same active ingredient as *sani-tex*, also *elam sani-tex* is able to guarantee similar results, if applied following the instructions given in the technical data sheet.



## REFERENCES

(1) - *Anti-Infective Agents in Medicinal Chemistry*, 2006, Vol. 5, No. 1 – Pag. 33 and following - *Cationic Surfactants and Lipids as Anti-Infective Agents* - Ana M. Carmona-Ribeiro\*, Débora B. Vieira and Nilton Lincopan.

(2) - *Quaternary ammonium biocides as antimicrobial agents protecting historical wood and brick* - Katarzyna Rajkowska, Anna Koziróg, Anna Otlewska, Małgorzata Piotrowska, Paulina Nowicka-Krawczyk, Bogumił Brycki, Alina Kunicka-Styczyńska and Beata Gutarowska - Institute of Fermentation Technology and Microbiology, Faculty of Biotechnology and Food Sciences, Lodz University of Technology, Łódź, Poland; Department of Algology and Mycology, Faculty of Biology and Environmental Protection, University of Lodz, Łódź, Poland; Laboratory of Microbiocides Chemistry, Faculty of Chemistry, Adam Mickiewicz University, Poznań, Poland.

(3) - Merianos, J. J. In *Disinfection, sterilization, and preservation*; Block, Ed.; Lea & Febiger: Philadelphia, 1991, pp. 225–255.

(4) - CLINICAL MICROBIOLOGY REVIEWS, Jan. 1999, p. 147–179 - Vol. 12, No. 1 - *Antiseptics and Disinfectants: Activity, Action, and Resistance* – Gerald McDonnell and A. Denver Russel.

(5) - *Journal of Hospital Infection* (1998) 38, 283-295 - *The action of three antiseptics/disinfectants against enveloped and non-enveloped viruses* - A. Wood and D. Payne.

Rimini, 08/28/2020

## CERTIFICATE OF ANALYSIS n°2010583-001 del 08/28/20 20

Lab. sample lot id.: **2010583**  
Sample receipt date: **08/07/2020**  
Sampling carried out by: **Client**

Client:

**Kemin Textiles S.r.l.**  
**Strada Acquasalata, 7 D/E**  
**47899 Serravalle – Repubblica di San Marino**  
**(SM)**

Lab. sample id: **2010583-001**  
Client sample id: **Denim fabric "SANITEX" (40x40 cm)**  
Analysis start: **08/07/2020** Analysis end: **08/28/2020**

Parameters	U.M.	Results	Test Methods
Staphylococcus aureus [R] bactericidal effect	log	3,47	UNI EN ISO 20743:2013
Klebsiella pneumoniae [R] bactericidal effect	log	7,88	UNI EN ISO 20743:2013

U.M. = Unit of Measurement

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The sampling was carried out by Gruppo CSA S.p.A. by using an accredited method.

### Additional information

#### *Staphylococcus aureus*

- Strain: ATCC 6538
- Inoculum concentration (UFC/ml):  $2.8 \times 10^5$
- Logarithm difference for the three control specimens (acceptable if less than 1): Tzero = 0,08; T24h = 0,07
- Logarithm difference for the three antibacterial test specimens (acceptable if less than 2): Tzero = 0,12; T24h = 0,15
- Growth value F ( $F = \log C_t - \log C_0$ ): acceptable if  $\geq 0.5$ : +3,19 ( $\log C_t$  8,53;  $\log C_0$  5,34)
- Growth value G ( $G = \log T_t - \log T_0$ ): -1,75 ( $\log T_t$  3,63;  $\log T_0$  5,38)
- Antibacterial activity value A ( $A = F - G$ ): +3,47
- Acceptability criterion:  $A < 2$  NO EFFECT;  $2 \geq A < 3$  SIGNIFICANT EFFECT;  $A \geq 3$  STRONG EFFECT
- Measurement method: count on Petri dishes

follows CERTIFICATE OF ANALYSIS n°2007533-005 del 07/07/2020

*Klebsiella pneumoniae*

- Strain: ATCC 4352
- Inoculum concentration (UFC/ml):  $2.6 \times 10^5$
- Logarithm difference for the three control specimens (acceptable if less than 1): Tzero = 0,21; T24h = 0,35
- Logarithm difference for the three antibacterial test specimens (acceptable if less than 2): Tzero = 0,30; T24h = 0,26
- Growth value F( $F = \log C_t - \log C_0$ ); accettabile se  $\geq 0.5$ : +3.55( $\log C_t$  8.96;  $\log C_0$  5.41)
- Growth value G ( $G = \log T_t - \log T_0$ ): -4.33( $\log T_t$  1.079;  $\log T_0$  5.41)
- Antibacterial activity value A ( $A = F - G$ ): +7,88
- Acceptability criterion:  $A < 2$  NO EFFECT;  $2 \geq A < 3$  SIGNIFICANT EFFECT;  $A \geq 3$  STRONG EFFECT
- Measurement method: count on Petri dishes

Technical judgement: the product has an antibacterial effect.

Analytical results are referred only to the samples tested.  
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Laboratory Production Unit

The Director  
(Dr. Ivan Fagiolino)

