

## Technical Information

### Sanitized® T 25-25 Silver

Hygienic protection for textiles with skin contact

<b>Application Area</b>	Application for all types of fibers (except peptide-based fibers), especially recommended for synthetic fibers. Including textiles with constant direct skin contact	Examples:	<p><b>Apparel:</b> Undergarments, outerwear, work, sport and outdoor clothing</p> <p><b>Home textiles:</b> Upholstery, curtains, bathroom textile sets, towels, kitchen towels table cloths, wipes</p> <p><b>Bedding:</b> Mattresses, covers for pillows and duvets, bed sheets, fitted sheets, bed and pillow cases, molleton</p>
<b>Mode of Action and Benefits</b>	<p>Substrates finished with Sanitized® T 25-25 Silver offer a proven excellent skin tolerance and are safe for man and environment.</p> <p>Sanitized® T 25-25 Silver has a safe bacteriostatic effect against a large number of gram positive and gram negative bacteria, including MRSA (methicilline-resistant Staphylococcus aureus) as well as some yeasts and fungi types.</p> <p>The high-tech functionality of Sanitized® T 25-25 Silver effectively reduces the development of bacteria and odor.</p> <p>Sanitized® T 25-25 Silver acts on the bacterial cell membrane, which inhibits function of the microorganism.</p> <p>Sanitized® T 25-25 Silver blocks the respiration and vital food intake of bacteria.</p> <p>Sanitized® T 25-25 Silver interrupts the food chain of house dust mites. Thus, treated articles remain free of house dust mites.</p>	Benefits:	<ul style="list-style-type: none"> <li>› Excellent storage stability</li> <li>› Ready-to-use product</li> <li>› Easy dosage</li> <li>› No binder required</li> <li>› Can be combined with other textile effects such as binders, softeners, wetting agents, fluorocarbons, etc.</li> <li>› Can easily be applied in both padding and exhaust processes</li> <li>› Excellent exhaustion rate</li> <li>› High temperature stability</li> <li>› Non-fading finish</li> <li>› Outstanding washing resistance</li> <li>› Dermatologically tested (OECD 404 and OECD 406)</li> <li>› Free from AOX</li> <li>› bluesign® approved</li> <li>› Accepted for OEKO-TEX Standard 100, classes I – IV</li> <li>› Innovative technology non-nano-based, patent filed</li> </ul>

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### Characteristics

Composition	Photo-desensitized, finely dispersed silver salt
Shipping container	25 kg jerry-can
pH (20°C)	6.5-7.5 (5 % in water)
Ionogenicity	Non-ionogenic, but not compatible with some (usually cationactive) textile chemicals
Density at 20°C	0.98-1.02 g/cm <sup>3</sup> (20°)
Appearance	Yellow-greenish dispersion
Solubility	Dispersible in water
Compatibility*	In general compatible with other textile chemicals such as binders, softeners and other finishing products. Compatibility and fastness such as e.g. thermo-migration must be checked before industrial application. The bath composition as well as the result on the textile must be controlled particularly when using cationic products and optical brighteners. Sanitized <sup>®</sup> T 25-25 Silver can influence the whiteness of textiles; this effect has to be checked in pre-trials. Sulphur containing products such as wool, silk, feathers, etc. may disable the antibacterial efficiency of the product completely.
Fastness*	Excellent washing resistance, light fastness, dry-cleaning resistance, ironing and perspiration fastness. The influence on other characteristics has to be tested. For white textiles testing is recommended; an influence on the degree of whiteness is possible. No or only minimal influence on thermo-migrative behavior.
Temperature stability	In the bath: ≤ 100°C. Drying/fixing at least up to 180°C. Sanitized <sup>®</sup> T 25-25 Silver does not require condensation for fixation.
Skin tolerance	Skin and eye irritant at industrial concentrations (wear gloves and eye protection). Substrates treated with Sanitized <sup>®</sup> T 25-25 Silver have been tested for dermatological safety.
Restrictions of combination	When optical brighteners are applied on a textile with Sanitized <sup>®</sup> T 25-25 Silver, the results should be controlled irrespective of the sequence. The OBA should be a stilbene-based product.
Restrictions of application	Sanitized <sup>®</sup> T 25-25 Silver is not suitable for application on Lavatec equipment. Over dosage of Sanitized <sup>®</sup> T 25-25 Silver must be avoided. Perspiration-light fastness has to be checked when applying Sanitized <sup>®</sup> T 25-25 Silver on OBA treated PA or bright colored PA.

\*Information concerning fastness and compatibility of the finish, relate to the applications known to us for the use of our product and correspond to the current state of our knowledge. The fulfillment of specific requirements for the finished material must be tested by the user in each case before application.

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### Application Pretreatment

The durability of a Sanitized® treatment demands that textiles are free of all impurities and foreign substances (e.g. brighteners, surfactants, unfixed dyes, coning oils, etc.) before the textile is treated with a Sanitized® product. To achieve the best performance it is mandatory to follow the below procedure.

The textile should show the following values before application of the Sanitized® product :

Rapid test: Target < Sec. Knitted material  
Drop test: Target < 10 Sec. woven fabric or similar  
pH value of the textile material: Target < pH value 7

These values indicate that the textile is pure. The ultimate proof is given by an extraction with analysis of the extract.

#### Discontinuous pre-wash for textiles > 5 % elasthane

Treatment on jet machine (liquor ratio 1:10)

1. 1-2 g/l Humectol C liq  
1 g/l Ladiquest 2005 liq c  
30 minutes at 85°C, then drain
2. Rinse warm (80°C) for 10 minutes, then drain
3. 2 g/l Sirrix NE liq  
2 g/l acetic acid 60 %  
15 minutes at 40°C, then drain
4. Rinse cold for 10 minutes

#### Discontinuous pre-wash for textiles < 5 % elasthane

Treatment on jet machine (liquor ratio 1:10)

1. 2 g/l Imerol JSF liq  
1 g/l Ladiquest 2005 liq c  
0.5 g/l caustic soda  
30 minutes at 85°C, then drain
2. Rinse warm (80°C) for 10 minutes, then drain
3. 2 g/l Sirrix NE liq  
2 g/l acetic acid 60%  
15 minutes at 40°C, then drain
4. Rinse cold for 10 minutes

#### Continuous pre-wash

Treatment on a continuous washing machine with six washing chambers.

1. Chamber	2. Chamber	3. Chamber	4. Chamber	5. Chamber	6. Chamber
water: 85°C	water: 85°C	water: 85°C	water: 85°C	water: 40°C	cold water
2 g/l Hostapal MRZ liq 1 g/l Ladiquest 2005 liqc 1 g/l caustic soda	2 g/l Hostapal MRZ liq 1 g/l Ladiquest 2005 liqc 1 g/l caustic soda			3 g/l Sirrix NE liq 3 g/l acetic acid 60%	

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### Dosage recommendations

Dosage %	Recommendations
0.2-0.3	5-10 Home launderings
0.3-0.4	< 20 Home launderings
0.4-0.8	>20 Home launderings
1.0	Dust mites

### Padding process

- Required dosage** The application quantity of Sanitized® T 25-25 Silver is determined according to the type of substrate, the application process and the washing fastness requirements.
- 0.2-0.8 % Polyester , cotton and blends thereof  
0.2-0.8 % Polyamide
- Sanitized® T 25-25 Silver has to be stirred thoroughly before discharging from the can.**
- Bath preparation** **Sanitized® T 25-25 Silver is added as last component to the prepared bath while stirring, undiluted and unfiltered.**
- Feed the whole water quantity into the bath. Add the additional chemicals, e.g. wetting agents, dispersions, sewability improving agents, handle improving agents, flame retardants, etc. Finally, add the undiluted Sanitized® T 25-25 Silver under stirring. In order to verify the compatibility with other finishing products pre-trials are recommended, especially with cationic products.
- Sanitized® T 25-25 Silver is a faintly photosensitive product in the bath, therefore protect the bath against glaring light and use it quickly. The preparation should be kept homogeneous by stirring (for safe use, shake or stir package before discharging the product). It is strongly recommended to add a surfactant or wetting agent to the bath before adding Sanitized® T 25-25 Silver, e.g. Hostopal MRN.
- Padding process** The product can be applied in all usual pick-up proportions. Ideally Sanitized® T 25-25 Silver should be applied at slightly acidic to neutral pH conditions.

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Padding Required dosage in g/l in relation to textile weight:

Application concentration [%]	liquor pick up [%]									
	40	50	60	70	80	90	100	110	120	
	Mass of Sanitized® T 25-25 Silver in the bath in gram/litre (g/l)									
0.2	5.0	4.0	3.3	2.9	2.5	2.2	2.0	1.8	1.7	
0.3	7.5	6.0	5.0	4.3	3.8	3.3	3.0	2.7	2.5	
0.4	10.0	8.0	6.7	5.7	5.0	4.4	4.0	3.6	3.3	
0.5	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2	
0.6	15.0	12.0	10.0	8.6	7.5	6.7	6.0	5.5	5.0	
0.7	17.5	14.0	11.7	10.0	8.8	7.8	7.0	6.4	5.8	
0.8	20.0	16.0	13.3	11.4	10.0	8.9	8.0	7.3	6.7	
0.9	22.5	18.0	15.0	12.9	11.3	10.0	9.0	8.2	7.5	
1.0	25.0	20.0	16.7	14.3	12.5	11.1	10.0	9.1	8.3	
1.1	27.5	22.0	18.3	15.7	13.8	12.2	11.0	10.0	9.2	

Drying/Condensation Temperatures up to 180°C are possible. Sanitized® T 25-25 Silver fixes sufficiently without thermal condensation simply by drying.

Special remark Treatments causing a structural change of the textile surface, e.g. reductive cleaning or emerizing, have to be conducted prior to the application of Sanitized® T 25-25 Silver.

### Exhaust process

Application concentration The application concentration of Sanitized® T 25-25 Silver depends on the type of substrate, the application process and the washing fastness requirements. Not suitable for HT processing.

0.2-0.8 % Polyester, cotton and mixtures thereof  
0.2-0.8 % Polyamide

### Dosage recommendations

Dosage %	Recommendations
0.2-0.3	5-10 Home launderings
0.3-0.4	< 20 Home launderings
0.4-0.8	>20 Home launderings
1.0	Dust mites

Bath / Preparation **Stir Sanitized® T 25-25 Silver thoroughly before discharging from the can.** Sanitized® T 25-25 Silver must be applied as first component in the exhaustion process. Exhaustion process: First component Sanitized® T 25-25 Silver.

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Softeners and other textile chemicals (e.g. wetting agents, sewing improvers, handling improvers, fluorocarbons, flame-proof agents, etc.) can usually be added in the same bath after a residence time of at least 15-20 minutes at the exhaustion temperature and thereupon be applied.

Exhaustion process Required concentration in grams Sanitized® T 25-25 Silver per 100 liter bath (g/100l) in relation to textile weight.

		Liquor ratio = 1:x							
		5	6	7	8	9	10	11	12
Application concentration [%]		Mass of Sanitized® T 25-25 Silver /100 l bath (g/hl)*							
		0.2	40.0	33.3	28.6	25.0	22.2	20.0	18.2
0.3	60.0	50.0	42.9	37.5	33.3	30.0	27.3	25.0	
0.4	80.0	66.7	57.1	50.0	44.4	40.0	36.4	33.3	
0.5	100.0	83.3	71.4	62.5	55.6	50.0	45.5	41.7	
0.6	120.0	100.0	85.7	75.0	66.7	60.0	54.5	50.0	
0.7	140.0	116.7	100.0	87.5	77.8	70.0	63.6	58.3	
0.8	160.0	133.3	114.3	100.0	88.9	80.0	72.7	66.7	
0.9	180.0	150.0	128.6	112.5	100.0	90.0	81.8	75.0	
1.0	200.0	166.7	142.9	125.0	111.1	100.0	90.9	83.3	
1.1	220.0	183.3	157.1	137.5	122.2	110.0	100.0	91.7	

\*The application amount is indicated in g/100 l bath. At volumetric addition, mass in g/volume can be replaced by ml/volume, without correction.

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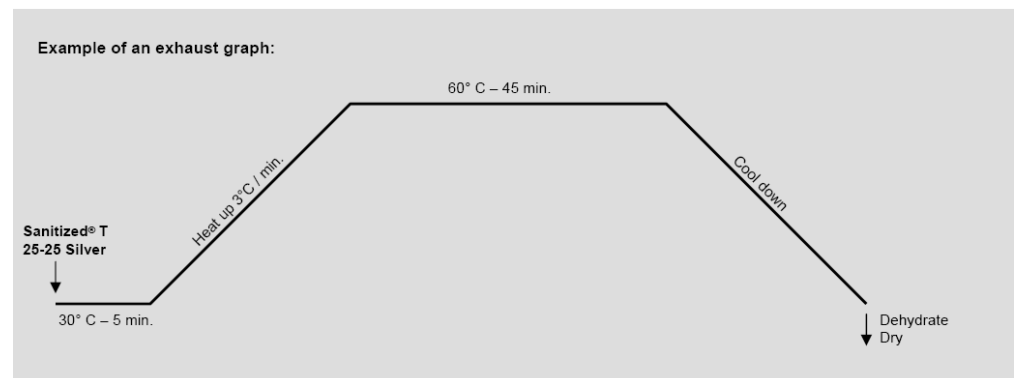
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**Process prescription** The best results are achieved using a short liquor ratio ( $\leq 1:10$ ) and a slightly acidic pH. Sanitized® T 25-25 Silver can be exhausted with the technically usual procedures and temperatures, preferably between 40°C and 80°C. Residence time should be at least 30 min.

Exhaust process:

- › Prepare the water
- › Add wetting agent
- › Adjust pH value between 4.5 – 5 with acetic acid or citric acid
- › Add corresponding amount of Sanitized® T 25-25 Silver
- › Perform a short run: 5 min. at 30°C
- › Heat up at a rate of 1-3 °C/min.
- › Keep during at least 30 min. at processing temperature
- › After 15-20 min. the other compatible textile chemicals can be added
- › Keep at constant processing temperature for further 15-20 min.
- › In case further textile chemicals should be added, exhaust according to the requirements for those chemicals, but allow residence for further 15 min. at a pH value of  $\leq 7$
- › Cool down at a rate of 1-3°C/min.
- › Remove bath liquor
- › Avoid rinsing if possible
- › Drain and dry



**Dry condensation** Temperatures up to 180°C are possible. Sanitized® T 25-25 Silver fixes sufficiently without thermal condensation, simply through the drying of the textile.

**Special remark** Processes causing a structural change of the textile surface, such as reductive cleaning or emerizing, must be carried out before application of Sanitized® T 25-25 Silver on the textile. Pretreated textiles, however, must be ready for finishing, i.e. washable chemicals must be eliminated without leaving any residue before starting application.

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### Environmental Management

- Storage** Sanitized<sup>®</sup> T 25-25 Silver should not be led into open waters or sewage systems.
- Air** The statutory regulations with regard to air pollution should be followed.
- Water** Residue of bath preparations of forced applications such as padding, coating, foaming and spraying must not be conducted to public sewage plants. Measures must be taken for an appropriate disposal of treatment of these liquids. The following methods can be used:
1. Disposal according to legal instructions for hazardous waste
  2. Chemical precipitation of the silver using salts – neutralizing or slightly alkalinizing of the preparation/the bath (pH value 7-9)
    - › Add per kg Sanitized<sup>®</sup> T 25-25 Silver in the precipitation tank 4.5 g Sodium sulphide hydrate (CAS 27610-45-3, technical, with a content of  $\geq 60\%$ ), stir, let sediment or filter
    - › Please note: in vicinity of acid the sodium sulphide releases highly toxic hydrogen sulphide, recognizable from the smell of addled eggs. Safety data and regulations for handling of hydrogen sulphide have strictly to be observed.
    - › Conduct the filter effluent to the sewage plant
    - › Dispose of filter residue appropriately
  3. The silver contents remaining in the filter residue can be refined and recycled.

The exhaustion bath can be disposed of observing the local statutory regulations concerning waste water disposal.

Sanitized<sup>®</sup> Silver technologies are developed for outstanding washfastness and stability to assure that only smallest amounts of silver are released during standard washing procedures.

The ecological risks from silver in waste water are considered low, because silver is not water soluble. Soluble silver ions rapidly bond with sulfurous compounds, which are found practically everywhere and convert them to the insoluble inactive substance, silver sulfide.

Because of its practically evanescent solubility, silver sulfide is regarded as biologically inactive according to current scientific knowledge.

Sulfur containing compounds are particularly abundant in waste water and sewage treatment plants. This assures a quick conversion into harmless silver sulfide.



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#### Microbiological Testing

The following test method is recommended to check the built-in hygiene function of the finished textiles:

Hygiene function	Germ count method	Bacteria
Material protection	(DIN EN 14119)	Yeasts, micro-fungi
Dust mite protection	Heat escape method: NF G 39-011	Dust mites

Documentation concerning this test method can be requested from the responsible Clariant agent.

#### Sanitized® Quality Seal

With a simple license agreement we transfer the rights to use the Sanitized® quality seal to you. Only substrates corresponding with the SANITIZED standard are allowed to bear the Sanitized® quality seal.

Please request the detailed SANITIZED “Licensing agreement” documentation.

#### Storage Handling

Storage stability	12 months from the delivery date in unopened original container
Temperature stability	Up to 50°C. Protect Sanitized® T 25-25 Silver against frost.

Sanitized® T 25-25 Silver is a light-sensitive product. The container immediately must be closed after use. Protect the product in the commercial form and in the application bath against strong UV exposure. Normal conditions at the production site, however, should not cause any problems for working with the open product.

Additional safety and environmental information is to be found in the separate safety data sheet.

SANITIZED is a trademark, which is registered in numerous countries. All statements in communications regarding the technical application of our products refer to the possibilities for their use, as known to us, and reflect the current state of our knowledge. Due to the numerous possible application variations in the industrial practice and the necessarily limited number of application examples that have been prepared, this information is given without

obligation or liability of any kind on our part. Safety data and instructions can be obtained either from the technical information about our products or are available on request. Before every application of this product it must first be ensured whether its intended use conforms to legal requirements, whether an official notification or registration is required, that there are not undesired effects in the application of the products or use of the treated material and whether any special precautions have to be

taken for the protection of the plant personnel or the environment. Claims must be in compliance with the statutes and regulations of the country in which an item treated with a Sanitized® product is placed into circulation; the possible non-binding wording for such claims is found on our homepage. The party using a claim must ensure the permissibility of the claim in each specific individual case. SANITIZED AG is not liable for claims, which are made with reference to treated items.