Handling Guide

TEST PROCEDURE FOR MEASURING COTTON SCOURING PERFORMANCE OF TEGOTEX® RL 4050

TEGOTEX® RL 4050 is a 100% biobased surfactant produced through a mild biotechnological fermentation process. It serves as an effective wetting agent and co-emulsifier, particularly in the scouring cotton and wool fabrics. The readily biodegradable Rhamnolipid offers excellent cleaning performance and a low toxicity profile, making it suitable for EU ecolabel formulations.

Value	Property
50%	Active content
28.0 mN/m (pH 5.5)	Surface tension
Non-ionic to partially anionic	Surfactant Type
5.5 – 10	pH stability

SCOURING PROCESS

Greige cotton (woven, 495.2 g/m^2) samples were treated in an Ugolini apparatus with Material-to-Liquor-Ratio (MLR) 1:20 and water hardness of 16° dH.

Four different conditions were compared:

1. Untreated
2. Water control: only water, treated for 1 h at 90°C
3. Alkaline scouring formulation, treated for 1 h at 90°C

Concentration [g/L]	Component
1.5	NaOH powder
1.0	Na_2CO_3
Adjust pH to 12	HCl
2.0	Benchmark (alcohol ethoxylates and solvents); based on active content

4. Bio scouring formulation, treated for 40 min at 50°C

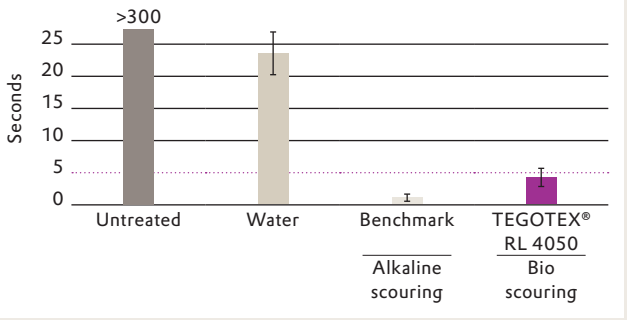
Concentration [g/L]	Component
2.0	TEGOTEX® RL 4050; based on active content
Adjust pH to 8	Na_2CO_3
0.2	BioPrep® 100 (Enzyme, Novonesis)

The scouring treatments were followed by hot tap water (80°C) and cold water (RT) rinsing until the water reached a neutral pH, and air drying. Due to lower pH used in the bio scouring process, less rinsing is needed compared to alkaline scouring.

Performance readouts:

- **Drop test:** the time needed for a droplet of water to spread completely on the fabric was measured (AATCC 39-1980).

Drop Test

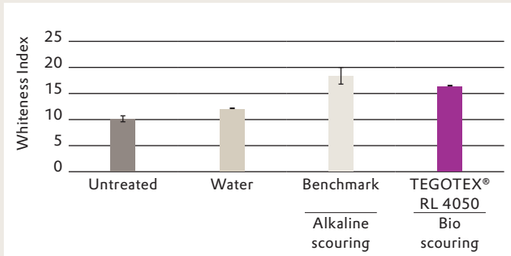


TEGOTEX® RL 4050 improves the absorbency and wettability of textile fabrics by removing hydrophobic impurities, as evidenced by faster absorption of liquid drops within the desired limits of < 5 seconds.

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- **Whiteness Index** was measured with a Datacolor DC850 spectrophotometer.

Whiteness



TEGOTEX® RL 4050 increases the whiteness of cotton after scouring indicating effective removal of natural colorants, waxes, and impurities, resulting in a cleaner, brighter fabric surface suitable for dyeing and finishing.

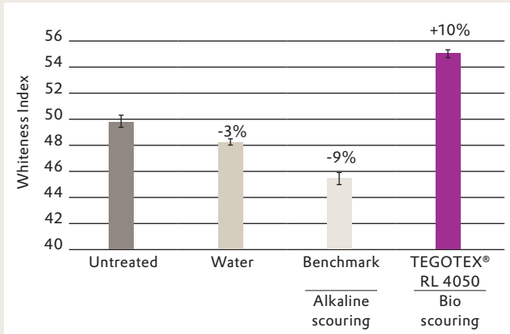
PROCESSABILITY OF SCOURED COTTON IN BLEACHING AND DYEING

- Samples treated as described above were bleached with the following bleaching formulation (MLR 1:20, 45 min at 95°C):

Concentration [g/L]	Component
5.0	H_2O_2 30%
1.5	Peroxide stabilizer
3.0	NaOH 50%
2.0	Benchmark; based on active content

- Bleaching was followed by bath cooling to 40°C, wash for 15 min at 70°C, pH neutralization with acetic acid and rinsing with cold water.

Bleaching efficiency



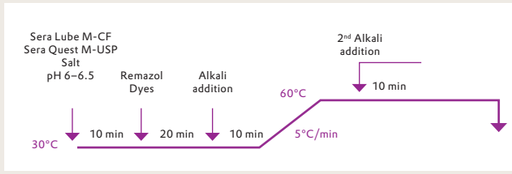
Bleaching of fabrics pretreated with TEGOTEX® RL 4050 increases the whiteness further, confirming the effective removal of impurities. Less damage to the fiber results in a brighter, more uniform surface suitable for dyeing and finishing.

Following bleaching, the cotton samples were dyed using the exhaust method with the following dyeing formulation (MLR 1:20):

Concentration [g/L]	Component
0.05	Remazol Turquoise blue G-133
2.0	Sera Lube M-CF
2.4	Sera Quest M-USP
20	NaCl

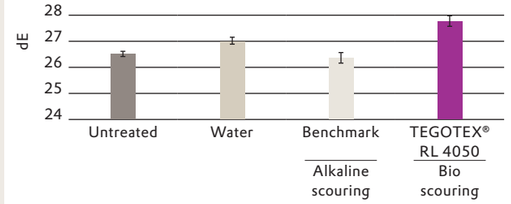
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- Samples were treated as follows (Na_2CO_3 was supplied in two equal additions to reach a final concentration of 5 g/L):



- The samples were rinsed four times with cold tap water for 10 min each, followed by a wash with the benchmark surfactant (1 g/L) for 10 min at 95°C, and finally rinsed with water for 5 min at 95°C until the rinse water showed no color.
- **dE** was measured with a spectrophotometer, and refers to the color different formula CIE76, which calculates color difference in the CIELAB color space. Each sample's CIELAB values after scouring and after dyeing were compared.

Dyeing efficiency



TEGOTEX® RL 4050 pretreatment gently prepares fabrics, enabling deeper dye penetration and more intense coloration by superior dye uptake compared to conventional methods.

HANDPRINT ANALYSIS

- The bio scouring treatment with Rhamnolipids requires lower temperature compared to the standard alkaline scouring treatment.
- Looking at the Scouring process for 1 ton of cotton alone, this leads to 78% reduction of energy consumption and 73% reduction of global warming potential based on the average European grid mix.

into PERFORMANCE

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