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Solvetex VI
New International Wetcleaning Study 2018

The goal of the Solvetex projects is to provide reference documentation for the textile cleaning industry. In Solvetex VI the cleaning performance of wet cleaning processes are evaluated under practical conditions to provide a benchmark for the professional textile cleaners. Wet cleaning processes meeting the minimum requirements are awarded with a statement of achievement by CINET.

TKT

TKT is the Dutch technical knowledge centre for the textile care industry, for both the dry cleaning industry and the laundry industry. TKT initiates and coordinates technical and sustainable innovation projects f¬or the Dutch and the International textile care industry. TKT is imbedded in international and networks and has extensive expertise about technological aspects of cleaning and washing such as (amongst others) sustainability of cleaning, alternative cleaning processes, energy saving, hygiene of cleaning and washing, life cycle assessments, environmental legislation for dry cleaners & laundries, textile functionalities and their relationship to washing processes. There are many ongoing projects about these aspects. Additionally, practical knowledge is transferred to the companies in the form of online educational material, both on a national and on an international level. TKT is closely affiliated to the Dutch national associations FTN (Industrial Textile Services) and Netex (Retail Textile cleaning), as well as the umbrella association CINET (the international committee of professional textile care).

1. Introduction

Up to now the Solvetex projects, as executed by TKT The Netherlands on behalf of CINET, aimed at evaluating the cleaning performance of cleaning technologies in real life (practical) conditions to provide a benchmark for the professional textile cleaners. In the projects Solvetex I, II and III the cleaning performance of the currently used solvents were evaluated, like PERC, HCS, Siloxane D5 (GreenEarth), Dibutoxymethane (Solvon K4), CO2, Rynex 3, iPura HCS and iPura siloxane D5. In the project Solvetex IV four wet cleaning systems were evaluated. The last years new solvents have entered the market, providing new opportunities and cleaning solutions. These results were laid down in Solvetex V. Throughout the PTC industry worldwide, there is also an increasing demand for independent information on the performance of the new wet cleaning processes in terms of cleaning performance, textile product quality, process conditions (including finishing) and required knowhow. This need led to the new benchmark project, Solvetex VI.

The aim of the project was to evaluate the performance of wet cleaning processes by setting a minimum of International standards on performance requirements to give an actual picture of the quality of the current wet cleaning technology. Quality aspects incorporated were stain removal, greying and dimensional change. Wet clean processes meeting the minimum requirements are rewarded with a statement of achievement by CINET. The statement of achievement is a proof to the market that the rewarded wet cleaning system meets with the quality standards of CINET for textile care processes for sensitive garments. The study is performed on 6 major international systems: Alliance, BÜFA, Cole & Wilson, Electrolux, Kreussler and Seitz.

CINET Comité INternational de L'Entretien du Textile
Internationales Komitee für Textilpflege
International Committee of Textile Care

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2. Set-up project

Quality aspects of wet cleaning as stain removal, greying and dimensional change were measured using a textile package to judge appearance. Dimensional change and test swatches were used to measure stain removal and greying. The tests were executed by an independent research institute.

A representative textile package was composed, existing of:
- A men's blazer (polyester/wool)
- A men's blazer (100% wool)
- A pullover (100% wool)

The test materials for the assessment were:
- Model swatches with standard stains for spot removal
- Model fabric of wool for greying

The machine load existed of the textile package, the test swatches and additional textiles normally cleaned by the textile cleaner to meet the required (optimal) load.

To be able to make a correct comparison of the cleaning performances, the complete cleaning system was tested, including the equipment, the used detergent or cleaning enhancer, the required finishing process and the used settings or programs. Pre and after spotting or any other special pre- of after-treatment were not included. The process conditions were supplied by the cleaning system suppliers

The evaluation was based on the following criteria:
- Stain removal (of the model soil on the multi soil monitoring swatches)
- Greying of wool (on the test swatch)
- Determination of visual appearance of the textile package
- Dimensional change of the cleaned garments after finishing.

2.1 Stain removal

The stain removal was measured using standard stain swatches with representative stains, water soluble as well as non-water soluble:
- Non-water-soluble stains: pigment/sebum (wool), cocoa/lanolin, olive oil/pigment, motor oil/pigment, pigment/sebum (PET/cotton), pigment/sebum (cotton), egg yolk, grass, make-up and lipstick.
- Water-soluble stains: red wine, coffee, tea, blood/milk/ink, blood, spinach.

The soil removal is measured by measuring the Y-value using a reflectometer and expressed in % soil removal, which is defined as:

$$\text{Stain removal (\%)} = \frac{Y_{\text{after cleaning}} - Y_{\text{before cleaning}}}{Y_{\text{white fabric}} - Y_{\text{before cleaning}}} * 100\%$$

Equation 1

2.2 Greying

The greying is measured on a 100% wool white cloth after 10 cycles of cleaning. The greying is measured by measuring the Y-value of the test fabric using a reflectometer and defined as:

$$Greying = Y_{\text{fabric before cleaning}} - Y_{\text{fabric after cleaning}}$$

Equation 2

2.3 Determination of visual appearance

The visual appearance was assessed by the research institute on the appearance of bubbles, crease and ripples on the following garment parts:
- Back of the garment
- Front of the garments
- Overlay
- Seams
- Collar/lapel

The visual appearance of the garments at those locations was assessed with a grade 1 (good), 2 (medium) or 3 (bad) after 3 cleaning cycles

2.4 Dimensional change of the cleaned garments

The dimensional change was measured by measuring the distance between 2 marks on the garments before and after 3 cleaning cycles and expressed in a percentage of dimensional change DC, as defined in equation 3.

$$DC\ [\%] = \frac{A - B}{B} * 100$$

Equation 3

The dimensional change of the garments was established by measuring the dimensional change DC in % at the following parts of the garments:
- Arm left
- Arm right
- Back length
- Back width

Figure 1) Assesment of dimensional change.

3. International standards

CINET has established International standards for the quality of wet cleaning. These standards are used to identify whether a wet cleaning system meets with the quality standards of professional textile care systems.

- For stain removal, the standard is that the sum of the stain removal in %, as defined in equation 1, for all non-watersoluble stains should be >100 and the sum of the stain removal in % for all watersoluble stains should be >125.
- The standard for greying is that the greying, as defined in equation 2, should be < 10 after 10 cleaning cycles.
- To pass the assessment of the visual appearance, all aspects should be assessed 1 or 2 after 3 cleaning cycles.
- The dimensional change of the garments should be 2% or less after 3 cleaning cycles. The dimensional change is measured after finishing.

Figure 3) Results greying G after 10 cycles.

Figure 4) Results for the dimensional change of the garments after 3 cycles.

4. Results

The performance of the processes of 6 suppliers were tested by an independent test institute and are presented here. The results for stain removal are presented below in figure 2.
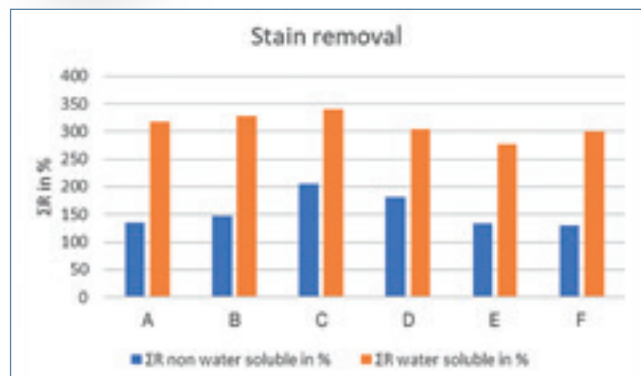

Figure 2) Results stain removal R.

The results for greying after 10 cycles are presented in figure 3.

The results for the dimensional change of the garments after 3 cycles are presented in figure 4.

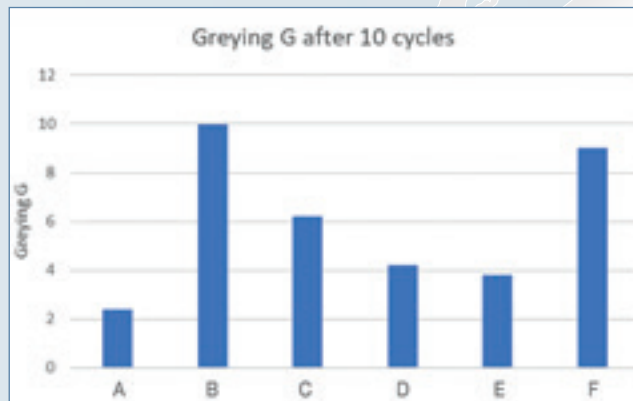For none of the suppliers a grading of 3 was given to the visual appearance of the garments. So, concluding, the results for stain removal, greying and the visual appear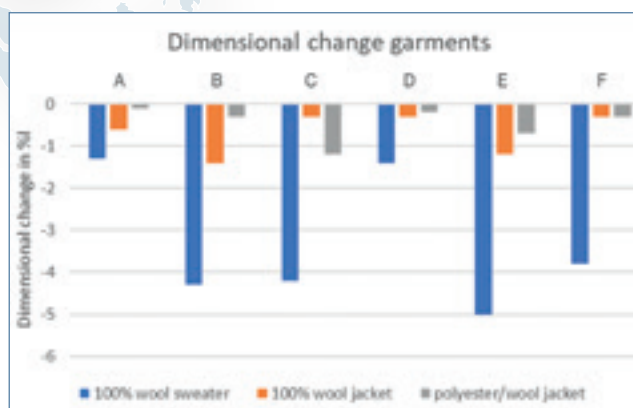ance after cleaning met with the standards for the quality of wet cleaning as set by CINET. The dimensional change of the jackets, 100% wool and polyester/wool, also met with the standards as set for the quality of wet cleaning. The dimensional change for the sweater showed somewhat larger values. This is probably due to the fact that, contrary to the practice in industry, the sensitive sweater was cleaned and dried together with the jackets and therefore the drying and cleaning procedure for jackets and sweaters together cannot be optimal for both and that the finishing process with applied pressure was set to be identical for all partners and could therefore not be adapted to the demands of the specific cleaning process . An optimal setting of the cleaning and drying process for the sweater together with an optimal setting for the finishing process of the sweater should be able to lead to improved results for the dimensional change of the sweater.

5. Conclusion

CINET is therefore pleased to announce that the following suppliers have participated in the project and that their cleaning performance proved to meet with the CINET-standards for wet cleaning:

- Alliance
- Büfa
- Cole & Wilson
- Electrolux
- Kreussler
- Seitz

CINET will therefore reward these suppliers with the statement of achievement on wet cleaning and grant them with the wet cleaning certificate.

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