



Effect of care products on leather properties

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Upholstery leathers for furniture and automotive uses are subjected to intensive wear conditions. Cleaning and care at regular time intervals are therefore necessary, or at least highly recommended. The choice of a suitable care product for the respective leather type and the appropriate means of application deserve special attention.

Within the last few years, a number of examples indicate that inappropriate or inadequate application of leather care products may result in damage in long term use. The occurrence of surface damages, such as finish partial flaking off or breaking and colour change lead to customer complaints, and often result in legal conflicts. These cause substantial costs to the leather manufacturing and processing industries. In addition, there is a loss in consumer confidence in furniture and automotive leather with all the detrimental economic consequences.

The objective when manufacturing these leathers is to fabricate a long-lasting product, and this includes the surface design or characteristics. However, it is known that - depending on leather end-use and the resulting wear conditions - leather care is often essential to maintain the material in optimal condition (1, 2).

Clearly, upholstery leather (like any other upholstery material) is subjected to continuous dust and soiling so a regular and type-matched care is advisable. And, generally, customers should not let soiling become too severe, as this can complicate cleaning measures (3, 4).

It can be considered that the tasks of leather care are readjustment to the new condition, the removal of wear marks and the "finishing" of leather for further wear. This involves anti-soiling, hydrophobing and oleophobing treatment and includes a degree of impregnation, and often has to restore both the natural leather humidity and grease lost in use (5, 6). The products employed also need to increase the protection of leather against numerous external influences such as mechanical abrasion, the action of UV radiation and higher temperatures, changes in humidity, and diverse "chemical" media (oil, sun cream, perspiration, hand grease, etc).

A need for reproducible test methods

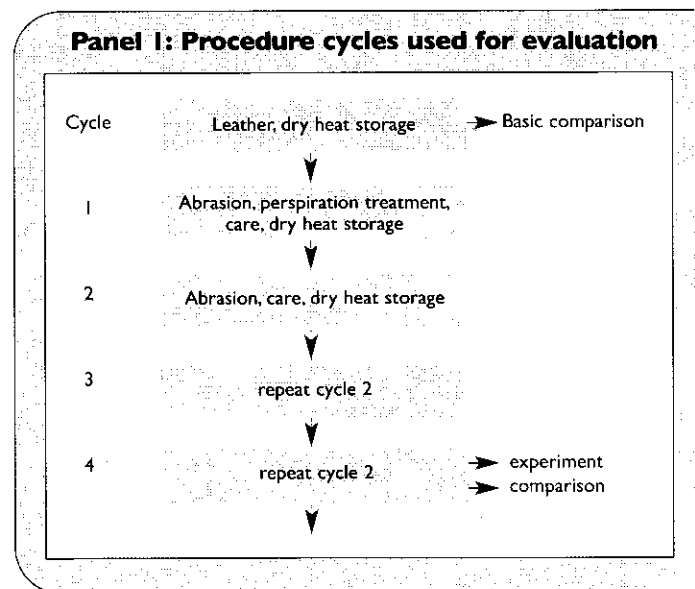
Occasionally, leather care products are sent to testing departments to assess their suitability for leather care. In this event, and depending on customer demands, products are applied on leather so that the visual appearance and appropriate leather properties can be assessed. Often, this testing procedure does not include the influence of factors associated with aging and the method of product application. In this situation a more realistic and reproducible suitability test is required that is based on simulations of wear aging and repetitive application of care products.

In the field of the artificial aging of leather, a number of investigations have been made, and a correlation has been found between realistic aging of leathers and a set of thermal storage conditions. On the basis of measuring the bending-stiffness of leathers, it has been established that the storage of leather at 80°C for four hours corresponds to a natural aging (in a living room) of approximately nine months (7).

The investigation

One of the aims of this research project was to develop a reproducible testing procedure that include both the simulation of different wearing loads and the well-defined application of cleaning and care products on the leather surface.

After studying various wearing factors - dry heat, mechanical load (abrasion / rubbing under load), artificial perspiration, UV irradiation, and humidity - in terms of their effect on leather properties, the combination of dry heat, abrasion and perspiration treatment was selected. This enabled a cycle of wear simulation and care product application that can be repeated as often as necessary. This cycle is illustrated in *Panel 1*:



With reference to *Panel 1*, in the first stage of the cycle three steps were developed:

- The abrasion step was performed in a Martindale device by fixing the leather sample in the lower position and by rubbing 1000 cycles with a defined wool cloth under a load of 12 kPa using the pilling head.
- Perspiration treatment was carried out by applying a constant amount of a solution of artificial perspiration on filter paper, followed by close contact with the leather surface at 37°C, for three hours and under a load of 2 kg. After this step, leather samples had to be dried overnight in standard climate conditions (23°C, 50% relative humidity).