Guidelines for the Comparative Testing of Detergent Products

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ABSTRACT

Comparative testing of the performance of detergent products requires a flexible approach which takes full account of the actual conditions of use of these products by consumers. The AIS has developed guidelines for such a flexible approach, which after the normal international consultations, are now available as ISO standard No. 4319. The large differences in consumers' practices between countries and the continuing changes in all countries do not allow development of international standard procedures for comparative testing of detergents, nor does it seem relevant to use test results from one country in another country. There is, of course, one consolation in all this complexity. If consumers occasionally pick a detergent less suitable for the purpose in mind, it will not cause damage, it will not cost much money, and let's face it, consumers do like to do some comparative product testing themselves.

INTRODUCTION

Comparative product testing is a consumer need; in fact, it is a human habit! It starts in the cradle when the baby expresses clear preference for a dry diaper over a wet one, it develops sometimes to great sophistication during the adult age, and it is still there when one gets on in years and the old, many-time-mended, dressing gown is preferred over a new one. This human habit of comparative product testing parallels one's general pattern of activity, it satisfies the need for exploring new things and its temptation usually runs ahead of one's disposable income. This individual approach to comparative product testing, however, becomes complicated when the number of items to choose from is large and the differences between items serving a similar purpose is small. It can even become time consuming and costly when the items of choice have a long lifetime and involve a major investment like a freezer or an automobile. At this stage, institutional comparative product testing can enter the scene usefully. Institutional comparative testing attempts to anticipate the consumer's experience and by providing information it should help consumers make their choice.

The potential consumer benefit from institutional comparative product testing is obvious – a lower risk of wasting time and money for less suitable or unjustifiably more expensive products. The potential consumer risk is the possibility that the conditions of use and the judgment applied by somebody else are not quite the same as those the consumer had in mind. Hence, institutional comparative testing must be in continuous and very close contact with the actual consumer situation. Testing conditions must be updated continuously and adjusted to the evolution of products and consumers' attitudes and habits.

THE EVOLUTION OF FABRIC WASHING

Institutional comparative testing of detergent products has been quite a popular issue in recent years and only too often one recognizes a strong influence of the common beliefs: (a) washing is easy and simple to simulate in a laboratory beaker; (b) all products are more or less the same and this can be confirmed on a 3 by 3 in. test swatch; (c) there is *one* best product for everyone.

Let's have a look a how these common beliefs compare with reality in the case of fabric washing. Only 25 years ago the only fiber types were cotton, rayon, wool, and silk. The cleansing agent was predominantly soap, with or without some soda ash, silicate, and bleach. Most people were still doing the wash job fully by hand.

Today there are at least ten major fiber types including cotton, rayon, polyester, acrylic, polyamide, wool, elastane, silk, etc., and the number of fabric types becomes multiplied by the number of possible mixtures of fibers and multiplied again by the number of fiber finishes such as "drip dry," "easy iron," "soil release," "flame retardent," etc.

In many countries, washing machines have supplanted manual washing. There are important differences in machine design and choice of washing program when comparing the U.S. with Europe or even within Europe, e.g., the U.K. with Germany. Beyond this consumers are extremely inventive in designing their own wash program.

The detergent at any time had to meet these dramatic changes resulting in today's multicomponent/multifunctional products with differentiation into main areas of use such as heavy duty, light duty, pretreatment, and fabric conditioning. The significance of this differentiation can vary widely between countries and continents, since it is influenced by local situations regarding fibers and fabrics, washing machines, water hardness, and even apparently by remote things like the climate. At the same time and most importantly there is an evolution and sophistication of the consumer's attitude toward cleanliness, hygiene, and convenience. It is amazing to actually see the difference between what different people in the past and today call "clean" or "satisfactory." There is no reason to believe that we are coming to the end of the road. Protection of the consumer and the environment, conservation of water, energy, and certain raw materials already provide further evolutionary inputs – and the changes will continue.

This total background needs to be understood to appreciate that the detergent industry has developed general guidelines for the comparative testing of fabric washing products – and also some other detergent categories – which should help in institutional testing of detergents in many countries to design meaningful comparative testing. Any standard test procedure or fixation of performance standard would immediately show the handicap of being limited to a narrow segment of consumers and probably for only a short space of time.

APPROACH TO COMPARATIVE TESTING

Let's consider fabric washing products further. What are the essential parameters of the guidelines for the comparative testing of these products and in which order does one need to proceed?

Objectives

The objectives of the test need to be set before the actual test design can start. Factors of consideration will include selection of: (a) product type or category; (b) product availability and price; (c) typical and/or specific consumer habits (e.g., load and program selection), consumer attitudes, regional conditions (e.g., water hardness), use instructions, and claims.

Choice of Performance Characteristics To Be Assessed

The overall performance assessment requires always a combination of performance parameters including: (a) fabric appearance (soil removal, whiteness, brightness, redeposition, and stain removal); (b) fabric feel; (c) fabric stability; and (d) effect on washing equipment. The assessment of single parameters will only be of specific relevance.

Fabric Load

For overall performance assessment always use naturally soiled family bundles of known history in a cumulative wash/wear test (25 cycles are recommended).

For preliminary performance assessment naturally soiled family bundles randomly composed may be used in a repetitive wash/wear test (25 cycles are recommended).

Artificially soiled and unsoiled test pieces are only valuable to obtain additional information on specific performance aspects.

Washing Process

Following the objectives of the test, one chooses between machine wash or manual wash and selects detailed conditions, including: type of machine or wash basin, machine cycle or manual input, load size and composition, time, temperature profile, cloth/liquor ratio, rinse, water hardness, detergent concentration, separate bleach, and drying. The process variables must be arranged to match the actual use conditions under consideration.

Appraisal

The visual assessment by expert panel provides the key information on performance, and instrument measurement may be considered for supplementary information. The appraisal of the wash results will include: (a) visual assessment by expert panel; (b) paired comparison on soil removal, stain removal, overall appearance, whiteness, brightness, and redeposition, greying; (c) instrument assessment on special test pieces; (d) fabric feel assessment by expert panel, paired comparison; (e) fabric color, color transfer; (f) fabric stability, fiber damage on test pieces.

Physical Characteristics of Product

Certain deficiencies in the physical characteristics of the product may cause lower than optimal performance and variability in washing results under practical conditions, and the following parameters will need particular attention: density, homogenicity, solubility, dispensibility, and sudsing properties.

Report on Results and Interpretation

The individual product characteristics assessed are independent and represent different performance aspects of the products. There is no way of combining these into one single figure. The final report on the test results should include: (a) objectives of test including possible limitations of scope; (b) comprehensive description of selected test conditions; (c) every single characteristic assessed to be reported separately; (d) results to be expressed as grading in relation to any other product of the same test; (e) statistical analysis of panel grading including mean value and significance of differences; (f) statistical analysis of instrument measurements, mean value, and significance of differences.

In the publication of results, some of this information will need "translation" into a language the consumers will understand.