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Framework for testing performance for hard surface cleaning products

Content

0. Background

This test protocol serves as a proof of compliance with the criterion "Fitness for use" in the Commission Decision 2017/1217 of 23 June 2017 establishing the EU Ecolabel criteria for "Hard Surface Cleaning Products".

The test is for products that fall within the scope of the product group "Hard Surface Cleaning Products". This means cleaning products designed to be used for routine cleaning of hard surfaces such as walls, floors and other fixed surfaces including those in kitchens, windows, glass and other highly polished surfaces or sanitary facilities, such as laundry rooms, toilets, bathrooms, showers.

The performance test can be a laboratory test or a user test. In addition to the performance test, it is the responsibility of the applicant to ensure that the cleaning product is safe to use on the intended surface(s). The conditions for both types of test are described in the following sections.

1. Laboratory test

The aim of the laboratory test is to confirm that the test product cleans as well as or better than a comparable reference product or a reference generic formulation. The highest recommended dilution should be used in the test, when a dosage range is given for a normal soiling.

1.1 Laboratory requirements

The manufacturer's test laboratory or/and an external test laboratory can be approved to conduct testing to document effectiveness of hard surface cleaners if the following requirements are met:

- it must be possible for EU Ecolabel competent bodies to monitor the performance of testing (e.g. on-site visits to the laboratory),
- the EU Ecolabel Competent Body must have access to all data on the product (e.g. technical data sheets),
- whenever possible, the samples must be made anonymous for the test laboratory (e.g. product A and product B). For tests where the reference product is a generic formulation, the tester shall be aware to modify the test method as appropriate,
- the test laboratories must be equipped with the devices described in the test method,
- performance of the effectiveness test as well as the test method must be described in the quality control system.

Competent bodies shall preferentially recognise attestations which are issued by bodies accredited in accordance with the relevant harmonised standard for testing and calibration laboratories and verifications by bodies that are accredited in accordance with the relevant harmonised standard for bodies certifying products, processes and services. Accreditation shall be carried out in accordance with Regulation (EC) No 765/2008 of the European Parliament and of the Council.

1.2 Reference product

- The test product and the reference product shall be of the same product category (designed for the same use, i.e. both should be WC cleaners, kitchen cleaners, sanitary cleaners, flooring cleaners, window cleaners, etc.) and in the same dilution form (RTU, undiluted, concentrated, etc.).
- A marketed reference product or a generic formulation can be chosen as the reference product[1]. A marketed product is understood to be a product that is available for purchase at the time of testing, in the intended market segment and in the intended market region of the applicant's product. The marketed reference product or the generic formulation shall be approved by the competent body in charge of the application prior to the testing.[2]
  If a marketed product is chosen as a comparative reference product (e.g. for all purpose cleaners, for sanitary cleaners or for window cleaners), it shall be one present in the region, where the applicant's product is to be marketed and making the similar claims about cleaning properties as the applicant's product. The marketed product must be approved by the competent body in charge of the application prior to the testing, and the trade name must be referenced in the test report and technical sheets and the label shall be provided to the competent body.
  For concentrated all-purpose cleaners and kitchen cleaners, the reference product shall have the same application, comparable dilution ratio and pH-value as the test product.
- A generic composition not included in Table 1 can be used as a comparative reference product as long as:
  - it has a composition which is representative for the products on the market,
  - it is approved by the corresponding competent body, and
  - the exact formulation is publicly available free of charge.

Table 1 shows several generic formulations that shall be used as reference products for some cleaners, whenever an applicant chooses to use a generic formulation rather than a marketed product.

Table 1. Generic formulations that shall be used as comparative reference products.

Acidic toilet cleaners Source: Recommendation for the quality assessment of acidic toilet cleaners (SOFW-journal 126, 11, 2000)		
Ingredient	**% Composition**	**CAS n., specification**
Citric acid monohydrate	4 %	
Alkane sulphonateHostapur SAS 60	1 %	Hoechst. active
Rheozan	0,23 %	Rhodia
Tap water	94,77 %	
Preparation and observations: Have tap water ready, slowly add Rheozan and stir with the dissolver (tap water) for 30min until completely dissolved. Then add citric acid and alkane sulphonate (pure). Do not use for at least 12h after preparation. The		

[1] A marketed product can be selected regardless of sales volume. It can also be another EU Ecolabel product that has the same intended use.

[2] Note to Competent Bodies: A database with the marketed reference products that have been approved by the different Competent Bodies (CBs) can be found in CIRCA (only accessible to CBs).

following physic-chemical parameters must be complied with: Viscosity: 550mPass ± 50 (Brookfield 20 °C, Spindle 2, 20 rpm or alternatively Brookfield 20 °C, 450mPa/s±50 with a small sample adapter spindle 31, 20 rpm) Viscosity adjustment by adding Rheozan		
Bathroom cleaner		
Ingredient	**% Composition**	**CAS n., specification**
Citric acid monohydrate	4 %	
Hostapur SAS 60	1 %	Hoechst, active
Tap water	95 %	
Preparation and observations: Same for as for acidic toilet cleaners, but without adding Rheozan for viscosity; pH value of the reference to be adjusted to 3.5.		
All-purpose cleaners* Source: Recommendation for the quality assessment of all-purpose cleaners (SOFW-journal 141, 6, 2015)		
Ingredient	**% Composition**	**CAS n., example**
Sodium hydroxyde,	1,74 %	aqueous solution conc 45%
Alkylbenzene sulfonic acid C_{10-13}	6 %	ca conc 97%
Fatty acid C_{12-18}	1 %	Edenor K12-18 (100%)
Fatty alcohol ethoxylate C_{12-18}, 7EO	4 %	Dehydol LT 7 (100%)
Fatty alcohol ether sulfate C_{12-14}, 2EO Na salt	4,29 %	Texapon N70 (70%)
Methylisothiazoline/benzisothiazolinone	0,1 %	Acticide MBR1
Water, fully demineralized	82.87 %	
Preparation and observations: Take approx. ¾ of the water as a basis, add sodium hydroxide (NaOH), add alkylbenzene sulfonic acid and stir for at least 15 min. Add fatty acid and stir for at least 10 min. Add fatty alcohol ethoxylate and stir for ca 10 min. Add fatty alcohol ether sulfate and stir until full dissolved. Control pH value (target value 9.3±0.3) if this target is not met; adjust with NaOH. Add preservative (i.e. methylisothiazoline/benzisothiazolinene), add remaining water, stir for 10 min Appearance: yellowish, clear		

** APCs can be very different depending on their application (pH value, dilution, concentration of detergents, etc.). Therefore before using this generic formulation it shall be ensured that the properties of the reference product are similar to the test product.*

1.3 Dosage

Dosages used shall be as follows:

1.3.a) Undiluted products

- *Clear drying and streak formation performance is tested in RTU form (diluted form of the undiluted products):* The dosage and dilution used shall be the recommended reference dosage and dilution for normal soil or normal use. If a dosage or dilution interval is given, the lowest recommended dosage or highest recommended dilution must be used in the test. If no recommended dosage is given, both the reference product and the test product shall be tested using the same dosage.

- *Cleaning performance is tested in RTU form:* Only if the test is not successful and the product claims on the packaging/user instructions that it can also be used under its undiluted form, a second test should be performed under the undiluted conditions. The dosage and dilution used shall be the recommended reference dosage and dilution for normal soil or normal use. If a dosage or dilution interval is given, the lowest recommended dosage or highest recommended dilution must be used in the test. If no recommended dosage is given, both the reference product and the test product shall be tested using the same dosage. The results of the test performance should be compared to those of the generic formulation or marketed product.

1.3.b) Ready to use products

Clear drying and streak formation performance and cleaning performance are tested in RTU form. The dosage and dilution used shall be the recommended reference dosage and dilution for normal soil or normal use. If a dosage or dilution interval is given, the lowest recommended dosage or highest recommended dilution must be used in the test. If no recommended dosage is given, both the reference product and the test product shall be tested using the same dosage.

1.3.c) Powder products or other solid forms

Powder products or other solid forms shall be tested in their "RTU form" and shall be prepared following the recommended dilution instructions.

1.4. Soiling

The soil or soil mixture must be relevant for the use of the product, homogeneous and, if prepared artificially, based on well-described substances. Enough soil for the whole test must be prepared in a single batch. The soil mixture to be tested for each type of product and the information about its preparation are specified in Table 2.

Table 2. Reference sources of soil and fat mixture to be tested for each type of product. Equivalent soil and fat mixtures can also be used.

Product	Soiling mixture	Preparation of the soiling - Source
Bathroom cleaners	Descaling: lime soap and limescale	SOFW-Journal 129, 11-2003
Acid toilet cleaners	Descaling: limescale	SÖFW-Journal 126, 11-2000
Kitchen cleaners	Fat removing	SOFW-Journal 144, 7+8/2018
	Descaling: limescale[3]	test on white Carrarra marble
	Descaling: lime soap[3]	SOFW-Journal 144, 7+8/2018
All-purpose cleaners	Fat removing	SOFW-Journal 141, 6-2015
Window cleaners	Light fat removing	No official test has been found.
	Strip-less drying	

Window cleaners (formulation for fat soiling)
Source: ABL LABORATOIRE www.abl-laboratoire.fr

Ingredient	% composition	Comments
Peanut oil	81,3%	Available in SIGMA
Kaolin	18,7%	Available in FLUKA

Preparation and observations:
Mix the ingredients until the mix is homogenous. Spread 1g of this soil on a mirror (30 x 30 cm) with a pipette by crossing like a paint. Place the mirror into the oven at 100°C for 2h and .leave it to cool for 1h before testing.

1.5. Procedure and testing requirements

The cleaning procedure shall reflect realistic use conditions (i.e. considering the mechanical factor of cleaning) and can be manual or performed by machinery.

Each product shall be tested in at least 5 repetitions. The order of testing of the products shall be randomised.

[3] Only if the manufacturers claim on the package a descaling effect or a possible use on this kind of surface (e.g. sink cleaner)

The quantity of soil applied to tiles or another substrate shall be the same for each tile or substrate-part, weighed in grams to one decimal point (within a tolerance ± 0,5g).

The test must be capable of generating results that provide a measure of the cleaning performance according to the product tested. Cleaning performance can be measured visually, photometrically (i.e. measuring reflectance), gravimetrically or by means of another relevant method. The method of measurement, including a possible scoring system, shall be decided in advance.

To prepare the RTU form according to the manufacturer instructions, water at a water hardness level of 2,5mmol $CaCO_3$/l shall be used and homogenized. (Information about how to achieve this water hardness can be found in the preparation specification of SOFW-Journal 141, 6-2015). Prepared cleaning product solutions may be used at most for one working day and shall be homogenised prior to any use.

Table 3. Procedure for testing the cleaning performance of the different products. Equivalent test methods can be used.

Product	Parameter to be tested	Procedure - Source
Bathroom cleaners (RTU)*	Limescale removal properties tested on horizontal and vertical surfaces Lime soap removal	SOFW-Journal 129, 11-2003 When testing bathroom cleaners according to SOFW-Journal 126, 11-2000 the reference cleaner as described in table 1 can be used
Bathroom cleaners (undiluted)	Limescale removal properties tested on horizontal or vertical surfaces Lime soap removal	
Acid toilet cleaners	Limescale removal properties	SOFW-Journal 126, 11-2000
Kitchen cleaners	Limesoap and limescale properties (if claimed to be effective)	SOFW-Journal 144, 7+8/2018
	Fat removing	SOFW-Journal 144, 7+8/2018
All-purpose cleaners	Fat removing	SOFW-Journal 141, 6-2015
Window cleaners (RTU)*	Light fat removing Clear drying and streak formation	As leaving a clean and stripe-less surface is also one of the main performance aspects of window cleaners, the method for stripe-less drying as described in the IKW method (SOFW Journal 130, 54-2005) for APC could be used for window cleaners.

** the lowest concentration, i.e. highest dilution, shall be used in the test method*
For undiluted window cleaners the same requirements are applied.

1.6 Assessment

The assessment of cleanliness must include testing and comparison of the test product with a reference product.

For the test product to be considered to have fulfilled the performance requirements, its results must be positive in all the repetitions[4]. If the result is less than all positive, 5 new repetitions must be performed. Of these 10 repetitions, a ratio (positive results/total number of results) of 0,8 must be achieved. In case limescale removal is tested for an acidic toilet cleaner, a ratio of 0,7 (7 positive results/10 repetitions) shall be considered as a positive outcome of the test.

As an alternative the applicant may use statistical methods and demonstrate with a one-sided 95% confidence range that the test product is as good as or better than the reference product.

[4] "Positive results" mean that the cleaning performance of the test product is equal or better than that of the reference product.

Table 4. Assessment of the results for testing the cleaning performance of the different products

Product	Assessment according to the procedure described in
Bathroom cleaners	SOFW-Journal 129, 11-2003
Toilet cleaners	SOFW-Journal 126, 11-2000
Kitchen cleaners	SOFW-Journal 144, 7+8/2018
All-purpose cleaners	SOFW-Journal 141, 6-2015
Window cleaners	Test window cleaner product should be as good as a reference product and better than water of a defined hardness.
	SOFW-Journal 130, 54-2005 (only the method for stripe-less drying)

1.7 Documentation requirements

All tests must be reported in accordance with the following points to be included in the report:

- Description of how the test and reference products were made anonymous to the person(s) performing the test..
- Description of the reference product and description of how the reference product was chosen and approved by the corresponding competent body. If the test product has a corresponding generic formulation in Table 1 and it is not used, justification of the choice of the reference product or any other generic formulation. If an alternative generic formulation is used, that formulation shall be provided.
- Description of the dosages used for the test product and the reference product.
- Description of the type(s) of surface(s) and soil mixture used in the performance test and their relevance for the test product.
- Description of the procedures for adding the soil to the substrate and the quantities. The quantities applied should be expressed in grams to one decimal point.
- Description of how the cleaning capacity was measured and raw data from all repetitions stated in terms of cleaning capacity.
- All raw data used in the testing and calculations and statistical evaluation of the data, if applicable.

2. User test

The aim of the user test is to show whether the test product cleans as well as or better than a comparative reference product.

2.1 Selection of the test centres or testers[5]

For the testing of non-professional grade products, responses must be received from a minimum of 80 persons, randomly selected in the sales region and who normally use a product of the same product category as the test product.

Random selection requires the use of some form of random sampling (e.g. stratified random sampling, simple random sampling without replacement). It is important to use a random sample because it relies on the laws of probability to select a representative sample and then the results can then be used to make inferences about the background population.

For testing of professional grade products, responses must be received from at least 5 professional users or test centres, selected in the sales region and that normally use a product of the same product category as the test product.

[5] Testers and test centres may be selected among the customers of the manufacturer of the test product.

2.2 Procedure, dosage and reference products

The test must be performed on the type(s) of surface relevant in relation to the recommendations of the manufacturers.

The test period must allow for at least five uses of the test product and the reference product[6].

The dosages used must be the dosage recommended by the manufacturers.

The test product and the product normally used[7] by the testers or test centre should be of the same product category (e.g. RTU, undiluted product), designed for the same purpose (e.g. WC cleaner, kitchen cleaner, sanitary cleaner, flooring cleaner, window cleaner) and claiming similar properties[8].

2.3 Testing requirements (methods and evaluation)

Effectiveness of the product under test must be assessed based on its ability to remove soil (and, if tested, fat) and leave a clean surface.

The test persons must reply to the question 'How effective do you consider the test product to be compared to the product you normally use (considered as the reference product)?' or equivalent. At least three possibilities for a response must be available (e.g. 'poorer', 'as good as' and 'better').

At least 80% of the testers for non-professional products or 5 test centres for professional products must assess the test product to be 'as good as' or 'better' than the product normally used (i.e. reference product).

2.4 Documentation requirements

A detailed test report shall be provided to the competent body, including the following information/documentation on:
- The description of the selection of the testers (randomly for non-professional grade products) or the test centres and a description of the sampling method chosen and how it was performed.
- The information provided by the testers or test centres and a summary describing how the testing was performed.
- The type of surface(s) the product was tested on.
- The duration and frequency of use of the product and dosage used.
- The guidance given to the testers.
- Calculations and documentation showing that at least 80 % of the testers or 5 test centres assess the product to be as good as or better than the reference product.
- A declaration from the testers or the test centres providing information on the product that they normally use and that served as the reference product.
- The label and technical sheet of the reference product to check its compliance with the requirements set out of for the reference product: type (e.g. RTU, undiluted product), purpose (e.g. WC cleaner, kitchen cleaner, sanitary cleaner, flooring cleaner, window cleaner) and the type(s) of surfaces it can clean.
- For each tester or test centre, the following information must be available, e.g. in the form of answers to a questionnaire:

  – The dosage used by the tester or test centre,

[6] Each use should be performed as the test person or test centre would normally use his/her product in terms of frequency.
[7] A product normally used means for example which has been used weekly (by the test centre or testers) for at least one year.
[8] Both the test product and reference product can be manufactured by the same manufacturer.

- A statement declaring that the test and reference product have been tested and compared at least five times,
- The result of the comparison of the test product and the reference product.

3. References

SOFW-Journal 126, 11-2000, 'Recommendation for the quality assessment of acidic toilet cleaners, SOFW-Journal, 126, pp 50-56, 2000
SOFW-Journal 129, 11-2003 'Recommendation for the quality assessment of bathroom cleaners, SOFW-Journal, 129, pp 42-48, 2003
SOFW-Journal 130, 54-2005 'Recommendation for the quality assessment of the product performance of all-purpose cleaners', SOFW-Journal, 130, pp 54-66, 2005
SOFW-Journal 141, 6-2015, 'IKW Recommendation for the quality assessment of product performance of all-purpose cleaners 2014, SOFW-Journal, 141, pp 47-56, 2015

Annex 1: Example of reporting template

A template for reporting the description of the procedures and the results of the tests are available here (http://ec.europa.eu/environment/ecolabel/documents/HSC.xlsx). This template is not mandatory to show compliance with Criterion 6, "Fitness for use".