

Recommendations for the quality assessment of leather care products

Quality recommendations issued by Industrieverband Körperpflege- und Waschmittel e.V. (IKW – the German Cosmetics, Toiletries, Perfumes and Detergents Association), Department of Cleaning and Maintenance Products, Frankfurt am Main (version 2002)

Foreword to these recommendations

1. Objective
2. Environment
3. Assessment of test results
4. Legal provisions and voluntary agreements (packaging & labelling)
5. Further development

1. Objective

The IKW member companies share their expert knowledge of the products they manufacture with the general public. This is done in the form of quality recommendations. IKW has retained the expert committee 'Cleaning and Maintenance Products' (Fachauschuß Putz- und Pflegemittel – FP) to draft such recommendations. The FP is composed of experts from competitor companies. This ensures the neutrality of the committee. The quality recommendations are to enable a qualified testing of products by the companies themselves, consumers and test institutes. Quality standards are laid down and need to be fulfilled by the given products to meet the expectations of consumers and manufacturers.

2. Environment

This clearly defined objective is directly linked to the efforts of manufacturers of cleaning and maintenance products to develop optimal quality standards for their goods.

The manufacturers of cleaning and maintenance products see the realisation of this aim as an integral part of the international initiative 'Responsible Care'. Basically this initiative stands for the commitment to continuously improve health and environmental protection which obviously includes the pursuit of a lasting and future oriented – sustainable – development. Furthermore natural resources are to be used in a sparing and efficient manner, to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Against this backdrop the 'recommendations for quality assessment' serve to encourage company staff to act responsibly towards man and the environment in the development and manufacture of products whilst coming up to the expectations of consumers in terms of efficacy, safety and environmentally compatible products.

3. Assessment of test results

The quality standards determine what qualities are relevant to a given product and to what extent these qualities must be present. It should be noted that each finished product has a certain spectrum of quality characteristics largely oriented to consumer expecta-

tions so that in every product some characteristics are deliberately emphasised and others are made to seem less important. Moreover the desired combination of product characteristics is subject to constant change, depending on the latest technical possibilities and new consumer habits. Quality recommendations must not impair such developments. Consequently, for each product, only one overall result is valid to determine whether the product comes up to quality requirements or not. Emphasis on isolated test criteria is inadmissible and may be misleading.

4. Legal provisions and voluntary agreements

Regarding composition, packaging and labelling inter alia the valid versions of the following statutory requirements must be observed wherever applicable:

- The German foodstuffs and commodities act (Lebensmittel- und Bedarfsgegenstände-gesetz – LMBG)
- The German commodities ordinance (Bedarfsgegenstände-verordnung)
- The German chemicals act (Chemikaliengesetz – ChemG)
- The German dangerous substances ordinance (Gefahrstoffverordnung - GefStoffV)
- The German detergents and cleaning products act (Wasch- und Reinigungsmittel-gesetz – WRMG)
- The German ordinance on flammable liquids (Verordnung über brennbare Flüssigkeiten – VbF)

CARE PRODUCTS

- Technical rules on compressed gases (Technische Regeln Druckgase – TRG 300)
- The German calibration act (Eichgesetz – EichG)
- The German packaging ordinance (Verpackungsordnung – VerpackV)
- The German ordinance on prepacked products (Fertigpackungsverordnung – FPV)
- The German ordinance on the transport of dangerous goods by road/rail (Gefahrgutverordnung Straße/Schiene – GGVS/GGVE)
- Recommendation for the phase-out of APEO (Empfehlung zum Verzicht auf APEO)

Here reference is made only to the most important rules so that this listing does not claim completeness. Compliance with these rules is the prerequisite for the marketing of a product and falls in the manufacturer's scope of responsibility. It is not the purpose of these recommendations to ensure compliance with all relevant provisions. In each individual case the legal situation must be examined as legislations are frequently amended.

5. Further developments

The expert committee 'Cleaning and Maintenance Products' is aware that the further development of the products themselves and changes in raw materials and consumer habits may necessitate the further development also of these recommendations. The recommendations for the quality assessment of leather care products submitted here replace the recommendations in their version of 1990. The new recommendations take into account the state of the art and the changed market situation.

Products covered by these recommendations for quality assessment

A. Oil products, pasty and liquid

Definition

Oil products, generally also called shoe

cream or shoe polish, are cleaning and maintenance products for those types of smooth leather that are not lastingly darkened or stained by solvents. Such leathers have a more or less thicker polymer coating and are generally designated finished or smooth leathers. Oil products are pasty, creamy or liquid mixtures that consist essentially of natural, partly synthetic and synthetic waxes and solvents, in particular white spirit. Most traded products are pasty to ointment-like; the share of liquid products is much lower. Oil products are easy to apply on leather surfaces. After drying and polishing they provide a low to high gloss and water-repellent, flexible protective film. Usually pasty shoe creams are filled in metal cans; however some shoe creams are distributed in plastic packagings, rarely in tubes or bottles. These products are supplied in a wide range of colours and colourless.

B. Emulsion products, pasty and liquid

Definition

Emulsion products are cleaning and maintenance products for all smooth leathers, in particular for leather types with little or no surface protection that are darkened or stained by oil products.

Emulsion products are pasty, creamy or liquid mixtures that consist of waxes, water and emulsifiers. Frequently solvents – such as hydrocarbons or alcohols and special active constituents (e.g. impregnating agents and polymer dispersions as well as colouring agents) are added. Emulsions are traded in many colours and colourless.

Emulsion products are packed in cans, tubes, pots and bottles made of metal, plastic or glass. For easier handling, these products often come with a special applicator device (sponge applicator or brushing device).

A special case are so-called self-shine maintenance products that are applied as liquid emulsions from plastic or glass bottles with a spreading device onto the leather and leave a self-shine film after drying.

C. Leather care products as spray or foams

Definition

Leather care products as sprays or foams are solutions or dispersions of care substances, i.a. hydrophobic agents, waxes, colouring agents etc (also called constituents). They are filled in suitable

packagings with or without propellants. The product is released as a fine spray or foam. Special forms are two-compartment cans and squeeze bottles (for foams).

Leather care sprays can be used for all types of leather and leather products. Because of their mild and even application they are suitable for high-quality and sensitive leathers (especially suede leathers).

Foams are used mainly for the cleaning of smooth leathers but impregnating properties can be added.

Explanations regarding the tables

The following **Tables** show which tests must be carried out for major leather care products (+) and which tests are not relevant (-). Outcomes of the testing of product properties and use properties, respectively, are stated in two separate tables.

Where products do not fall in any of the given product groups, relevant tests are to be carried out depending on the product claims stated on the pack copy of the respective product.

Assessment table: Product properties		Oil products		Emulsion products		Leather care products as sprays or foams	Testing
		pasty	liquid	pasty	liquid		
Properties							
1	Product name including brand name	+	+	+	+	+	
2	Manufacturer and/or distributor	+	+	+	+	+	
3	Information						
3.1	Field of application	+	+	+	+	+	Testing to check the correctness of information provided by the manufacturer, unless the respective information items are covered by the following tests
3.2	Safety-technical information (see item 4 of the foreword)	+	+	+	+	+	Requirements are met – not met
3.3	Statement of contents / void volume, respectively	+	+	+	+	+	
4	Testing of the product						5 original specimens are needed
4.1	External state	+	+	+	+	+	Organoleptic classification into the classes oil or emulsion products (solid-liquid), spray or foam products
4.2	Packaging material	+	+	+	+	+	Organoleptic classification of packaging material (tin, plastic, glass, aluminium) and type (can, bottle, tube, pressurized gas can)
4.3	Colour shade and intensity	+	+	+	+	+	Organoleptic determination: transparent – opaque – turbid
4.4	Appearance of contents	+	+	+	+	+	If applicable, surface testing on breakoff from the rim, cracks, blooming, surface irregularities. Where pressurized gas cans are concerned, the propellant is released using suitable methods until the content of the can is no longer under pressure (check!). Weigh content before and after the release of the propellant and after removing the active constituent. Calculate share of active constituent and propellant. Subsequently open the can (with valve outlet or can opener) and transfer the quantitatively the contents to a sealable bottle. Organoleptic inspection on presence of turbidities, sediments
4.5	International pressure at 50° C	-	-	-	-	+	Expressed in Pa (e.g. FEA 604) ⁽¹⁾
4.6	Odour	+	+	+	+	+	Organoleptic determination
4.7	Consistency	+	+	+	+	+	solid – pasty/cream – viscous – highly fluid
4.8	Dosing						
4.8.1	Dosing behaviour	+	+	+	+	-	Easy dosing at + 15° C and + 25° C
4.8.2	Spray rate	-	-	-	-	+	For pressurized gas cans: in g/10s (FEA 643) ⁽¹⁾ for pump sprayers and comparable packagings in g/10 strokes

CARE PRODUCTS

	Oil products		Emulsion products		Leather care products as sprays or foams	Testing
	pasty	liquid	pasty	liquid		
Properties						
4.8.3 Spray Pattern	-	-	-	-	+	Assessment of the spray coarse – fine: Spray onto an absorbent paper from a distance according to the instructions for use (2 sec). Diameter of the surface sprayed on 10-20 cm
4.8.4 Functionality testing	-	-	-	-	+	The dosage mechanism is operated in one-minute intervals every time for 10 sec (for pumps: 10 x pumped) until no further product is released from the package
4.9 Stability						
4.9.1 Pasty products	+	-	+	-	-	After 4 hour storage at +30 °C: no significant syneresis of oil or water. After cooling the sample back to +20 °C no essential change in the starting consistency (tested according to 4.7).
4.9.2 Liquid product	-	+	-	+	-	Constituents liable to sedimentation must be easily dispersible by shaking. Where necessary instructions on pack should indicate »shake before use«. Fluidity after 4 hour storage in a refrigerator (+5 °C to +7 °C). Sufficient (usable from primary pack) fluidity after adjustment to room temperature: yes/no
4.9.3 Storage stability	+	+	+	+	+	2 months storage at + 40 °C and + 20 °C (cp. also FEA 603) ⁽¹⁾
4.9.3.1 Weight loss	+	+	+	+	+	Note loss in percent by weight
4.9.3.2 Functionality testing	+	+	+	+	+	(cp 4.8) Change against start of storage
4.9.3.3 Change in respect of content	+	+	+	+	+	Organoleptic inspection: Changes in colour, turbidities, sediments
4.9.3.4 Change in respect of packaging	+	+	+	+	+	Organoleptic inspection: Attack of (pack and/or label) material outside or inside
4.9.3.5 Frost resistance	+	+	+	+	+	If not indicated otherwise on the packaging or the outer packaging, the product must be frost resistant. Testing: 1 day storage at -20 °C, unfreeze half a day. Assessment of appropriate items from 4.7 to 4.8.4.
5 Composition						
5.1 pH value	-	-	+	+	+	Recommended range 4-10 measured in original product
5.2 Non-volatile constituents	+	+	+	+	+	Determination based on the weighing boat method (Plan-Wägegläschen at 105 °C DIN 53189) ⁽²⁾ . State/Consistency and quantity (% by weight) of the dry residue (liquid, pasty, solid, sticky, not sticky). For aerosol cans, part of the active constituent from 4.4 is used.
5.3 Volatile constituents / Solvents	+	+	+	+	+	Organoleptic inspection: Colour, consistence. Type and quantity of solvent. Determination by way of gas chromatography. Separate and determine gas chromatographically. For aerosol cans, direct removal from the can using a special adapter ⁽³⁾

Assessment table: Testing of in use properties

Preliminary remarks

An objective testing of care products on leathers involves some problems. The underlying reasons are, firstly, that leather is a natural material and cannot be manufactured as homogeneously as plastics. Leather defects can never be fully excluded. There is no standard leather. Secondly, there is no 'standard care product' to be used in comparative tests, either. Consequently, tests should be repeated if there are obvious anomalies, outliers or if the results do not seem logical.

Moreover, a comparative assessment of care products is not simple. Comparative tests of different care products must be carried out by one and the same laboratory technician. This minimizes deviations attributable to staff potentially occurring e.g. in the application procedure or in subjective assessments.

The general statement can be made that the tested product does not comply with the IKW recommendations if the information provided on the packaging does not reflect the facts or if treated leather has less favourable properties than untreated leather.

1 Test leather

The following materials are used:

- a. Finished boxcalf leather⁽⁴⁾ (polymer finish with nitrocellulose top coat) in the colour suitable for the product (if colourless: medium brown) for the tests 3-8 and 13, 14.
- b. Glazed kidskin (casein finish) in the colour suitable for the product (if colourless: medium brown) for the tests specified under a)
- c. LEFA leather fibre material⁽⁶⁾ article no. 15801 'Universal natur', glazed on one side, 0.8 mm. Apply product on the bulged darker side (outside of the material roll up) for tests 9.1, 9.2 and 10
- d. Finished light coloured leather⁽⁴⁾ (any) for tests 9.1, 11, 12, 13
- e. Calf suede leather⁽⁴⁾ in the colour suitable for the product (if colourless: medium brown), for tests 2-5, 7, 14.

As shoes with leather combinations are frequent, special products for suede/nubuck -, patent - and reptile leather are tested on the corresponding material. In addition these products are also tested on the »standard« leathers above. For each of the tests 3, 4, 5, 6, 7, 8, 11, 12, 13, 14 two leather pieces sized 10 x 12 cm² are needed. For tests 9.1 and 10: 5 x 13 cm², for test 9.2: 15 x 15 cm². In each test an untreated reference specimen is needed for the purpose of comparison. The leather pieces should be taken from one skin from the right and the left of the mediane and climatized (DIN 53303/1)⁽²⁾.

2 Application procedure

- a. *Standard application* oil- and emulsion product:
Application quantity for non-absorbent leather ca. 0.1 g per 100 cm², for absorbent leather 0.2 to 0.3 g per 100 cm². Application procedure: The intended quantity is placed in a piston or, for liquids, in a pipette. This quantity is applied to the leather and evenly distributed with the finger in the 'cross stroke'. This treatment is carried out altogether three times, always with 24 hour intervals to one leather piece of each leather type, the other one is not treated.
- b. *Standard application* leather care product as spray or foam:
Quantity: Aerosol can with a liquid propellant 19+0.5g / A4 or 3.04 g per 100 cm²; aerosol can with compressed propellant; pump trigger spray, foams 9.5+0.5g / A4 or 1.52 g per 100 cm². The care product is applied once to one leather piece of each leather type. The reference specimen is not treated. In each application the care product is sprayed on crosswise or, for foams, evenly applied with a moist wet flannel cloth. To ensure a homogeneous application of spray products, the test specimens are fixed in the middle of a DIN A4 sheet (15 x 15 cm, 15 x 12 cm one piece each A4, 10 x 12 two pieces each A4 and 5 x 13 cm six pieces each A4. The sheet is affixed at an angle of 45°, the spray can is held in parallel to that, also at an angle of 45° (always referred to the horizontal surface) at a 20 cm distance (**Fig. A**). The necessary quantity of impregnating product is evenly sprayed crosswise onto the entire DIN A4 surface – drop formation is to be avoided. The spraying process takes place in a laboratory exhaust which should be half-closed. The exact quantity is determined by again weighing the aerosol can.

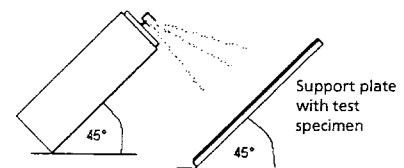


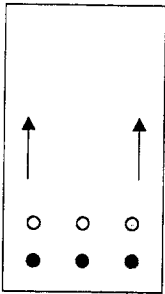
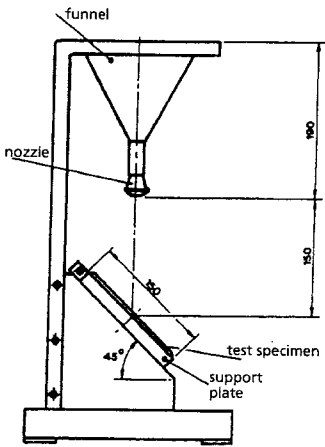
Fig A

Drying: The treated test specimens are dried at room temperature for at least 12 hours

For an overall assessment of the product, including packaging and application system, one application according to the instructions for use is additionally possible

CARE PRODUCTS

	Oil products		Emulsion products		Leather care products as sprays or foams	Testing	
	pasty	liquid	pasty	liquid			
3	Evenness/Ease of application/	+	+	+	+	+	The care product must be easy to apply evenly, it must not be sticky, its structure must be even, surfaces must not be streaky with product Application: even – uneven
4	Drying time	+	+	+	+	+	At the latest 30 minutes after application of the product it must be possible to buff the surface or for suede to raise the nap, unless stated differently in the instructions for use. A cotton cloth is used to polish (crosswise) the product until no change to the leather is visible any more. The usual suede brush is used cross wise to raise the nap. Drying at + 20 to 25 ° C Requirements are met: yes – no
5	Ease of Polishing/Raising the Nap	+	+	+	+	+	Organoleptic inspection: easy – medium – difficult
6	Gloss increase versus untreated leather (for smooth leather only)	+	+	+	+	+	After each polishing the shine is visually compared with that of untreated leather: more – the same – less
7	Change in feel compared with untreated leather	+	+	+	+	+	the feel is compared with untreated leather (finger test): smoother – the same – blunter/ sticky
8	Cracking resistance of product film	+	+	+	+	+	The treatment of the leather ends 24 hours after the 3 rd application. Now cracking effect on product film by bending leather is determined in a comparison with untreated leather. Initially the leather is cut in two halves 10 x 6 cm. Only one half is used for testing: Bend under finger pressure and roll ten times with the upper side to the inside. Visual inspection of surface damage: yes – no
9	Water Repellency						
9.1	Water Alcohol Droplet Test	+	+	+	+	+	For impregnating agents the LEFA specimens (1c), for other products covered leather (1d) are used. Testing based on the INDA Test Method IST 80.8 ⁽⁷⁾ Equipment/Materials: 11 Test liquids, maximally 1 month old (Water/ isopropanol mixtures 0-100% by weight in steps of 10); in dropper bottles 30-50 ml, with angled tip dropper pipette made of glass and rubber pipette part. Implementation: If possible, the testing should take place at a workplace where the leather surfaces are exposed neither to air drafts nor to any heat convection (window, heating, electrical heat sources). The test specimens are laid out flatly. Starting with test liquid W (distilled water), drops are carefully brought onto the test specimen in a diameter of ca. 5 mm each at three spots of the test specimen (Fig B).

		Oil products		Emulsion products		Leather care products as sprays or foams		Testing
		pasty	liquid	pasty	liquid			
 <p style="text-align: center;">Fig B</p>								<p>When placing the drops on the specimen, the pipette must not touch the specimen. The drops are observed for 15 sec. If no wetting of the liquid on the surface is noted after that time, the procedure is repeated with the next liquid. The criterion for wetting is if at least 2 drops show a full area wetting in the form of dark spots under the drops.</p> <p>The result recorded is the number of the last test liquid, which does <u>not</u> wet the test specimen within 15 sec.</p> <p>Assessment: the same – better – much better than untreated leather</p>
9.2	Rain test	-	-	-	-		+	<p>The LEFA test specimens 1c are used for this purpose. The implementation is based on AATCC 22-1996⁽⁸⁾.</p> <p>Implementation: AATCC 22 spray-tester⁽⁸⁾ with support plate (plastic or metal) instead of the holding device.</p> <p>Demineralized water (temperature ≈ 20 °C), 250 ml measuring cup, stop-watch, weighing equipment with 0.01 precision scales.</p> <p>Implementation: The entire lower rim of the test specimen is covered with ca. 5 cm broad transparent adhesive tape to prevent running down water from penetrating. For this purpose, stick on the adhesive tape ca. 1 cm on the front side and fold it over the rim to the reverse.</p> <p>The test specimens are weighed directly before the start of the test; then they are fixed on the plate with double-sided adhesive tape centrally to the spraying nozzle. The distance to the nozzle is ca. 15 cm (Fig. C).</p> <p>250 ml of water is poured in one go into the funnel. After the end of the shower, adhering water is carefully removed with compressed air from the specimen. Blow-off at a sharp angle (<20°) and with a maximum duration of 5 sec. Subsequently, wetting is assessed according to standard (AATCC Spray Testing Rating Chart)⁽⁸⁾. Only the upper part of the test specimen is included in the assessment. If the classification is unclear, also ranges can be stated. 90 sec after adding water for the first time another 250 ml are added, followed by an assessment. This procedure is repeated until the wetting has reached rate 0 or 2.5 litres of water were added (at most 10 procedures). After the final shower and the removal of the water drops, the test specimen is again weighed and the weight difference is noted down.</p> <p>Assessment: the same – better – much better compared with untreated material</p>
 <p style="text-align: center;">Fig C</p>								

CARE PRODUCTS

	Öil products		Emulsion products		Leahter care products as sprays or foams	Testing
	pasty	flüssig	pasty	liquid		
10 Oleophobic properties	+	+	+	+	+	<p>For impregnating agents the LEFA specimens (1c), for other products finished leather (1d) are used. Testing based on AATCC 118-1997⁽⁸⁾</p> <p><i>Oleophobic value</i></p> <p>1.- nujol (paraffin oil, Saybolt - viscosity 360/390 at 38 °C)</p> <p>2 - 65 parts nujol, 35 parts n-hexadecan (in terms of volume at 2 l)</p> <p>3 - n-hexadecan</p> <p>4 - tetradecan</p> <p>5 - n-dodecan</p> <p>6 - n-decan</p> <p>7 - n-octane</p> <p>8 - n-heptane</p> <p>in dropper bottles 30-50 ml, with angled tip dropper pipette made of glass and rubber pipette peat.</p> <p>Implementation: The test specimens are laid out flatly. Starting with test liquid 1, drops are carefully brought onto the test specimen in a diameter of ca. 5 mm each at three spots of the test specimen (Fig. B). When placing the drops on the specimen, the pipette must not touch the specimen. The drops are observed for 15 sec. If no wetting of the liquid on the surface is noted after that time, the procedure is repeated with the next liquid. The criterion for wetting is if at least 2 drops show a full area wetting in the form of dark spots under the drops.</p> <p>The result recorded is the number of the last test liquid, which does <u>not</u> wet the test specimen within 15 sec.</p> <p>Assessment: the same - better - much better than untreated material</p>
11 Covering power	+	+	+	+	+	<p>Assessment on light-coloured leather (according to 1d) strong - medium - weak</p>
12 Cleaning effect (only if claimed to be a product characteristic)	+	+	+	+	+	<p>1.0 g of liquid test soil is applied to one half of the untreated light-coloured leather according to 1d and immediately spread evenly with a paintbrush. Excess is wiped off with a brush or a paintbrush after 24 hours drying at room temperature. Apply the product and polish first on the clean side and then on the soiled side according to the instructions for use; The cleaning efficacy is assessed by comparison between the soiled and the unsoiled leather sides.</p>

CARE PRODUCTS

	Oil products		Emulsion products		Leather care products as sprays or foams	Testing												
	pasty	liquid	pasty	liquid														
						<p>Assessment: no residues – few residues – considerable residues</p> <p><i>Liquid test soiling:</i></p> <table> <tr> <td>Kaolin⁽⁹⁾</td> <td>30.0 %</td> </tr> <tr> <td>Oxide black 316⁽¹⁰⁾</td> <td>2.0 %</td> </tr> <tr> <td>Vaseline PH EUR. 9</td> <td>6.0 %</td> </tr> <tr> <td>Crystal oil K 21⁽¹¹⁾</td> <td>62.0 %</td> </tr> <tr> <td></td> <td style="border-top: 1px solid black;">100.0 %</td> </tr> </table> <p><i>Manufacture:</i> Warm vaseline and dissolve in crystal oil, admix other constituents and homogenize</p>	Kaolin ⁽⁹⁾	30.0 %	Oxide black 316 ⁽¹⁰⁾	2.0 %	Vaseline PH EUR. 9	6.0 %	Crystal oil K 21 ⁽¹¹⁾	62.0 %		100.0 %		
Kaolin ⁽⁹⁾	30.0 %																	
Oxide black 316 ⁽¹⁰⁾	2.0 %																	
Vaseline PH EUR. 9	6.0 %																	
Crystal oil K 21 ⁽¹¹⁾	62.0 %																	
	100.0 %																	
13 Soiling behaviour	+	+	+	+	+	<p>Test soil in the composition as described below is densely strewn on the leather pieces, followed by a visual assessment after a slight knocking off. A comparison is made with untreated leather pieces.</p> <p>Assessment: hardly any adhesion – little adhesion – strong adhesion</p> <p><i>Test soiling:</i></p> <table> <tr> <td>Polishing alumina, finest P 10⁽¹²⁾</td> <td>55.4 %</td> </tr> <tr> <td>Bayferrox 420 (yellow)⁽¹³⁾</td> <td>1.0 %</td> </tr> <tr> <td>Bayferrox 306 (black)⁽¹³⁾</td> <td>2.0 %</td> </tr> <tr> <td>Gas black FW2⁽¹⁴⁾</td> <td>1.6 %</td> </tr> <tr> <td>Kaolin⁽⁹⁾</td> <td>40.0 %</td> </tr> <tr> <td></td> <td style="border-top: 1px solid black;">100.0 %</td> </tr> </table> <p><i>Manufacture:</i> Weigh the constituents in a ball mill and crush them for 30 minutes (swing mill, vibraton or roller block), then pass through a 65-µm-sieve.</p>	Polishing alumina, finest P 10 ⁽¹²⁾	55.4 %	Bayferrox 420 (yellow) ⁽¹³⁾	1.0 %	Bayferrox 306 (black) ⁽¹³⁾	2.0 %	Gas black FW2 ⁽¹⁴⁾	1.6 %	Kaolin ⁽⁹⁾	40.0 %		100.0 %
Polishing alumina, finest P 10 ⁽¹²⁾	55.4 %																	
Bayferrox 420 (yellow) ⁽¹³⁾	1.0 %																	
Bayferrox 306 (black) ⁽¹³⁾	2.0 %																	
Gas black FW2 ⁽¹⁴⁾	1.6 %																	
Kaolin ⁽⁹⁾	40.0 %																	
	100.0 %																	

Suppliers / Literature

(1) **FEA-Vorschriften** (FEA rules) are available from: Industrie-Gemeinschaft Aerosole e.V. Karlstr. 21 60329 Frankfurt/Main, Germany

(2) **DIN-Vorschriften** (German standardization rules) are available from: Beuth-Verlag Burggrafenstr. 4-10 10787 Berlin, Germany

(3) Special adapter for gas chromatography described in »Die Analyse der Inhaltsstoffe in Aerosol-Packungen« (Analysis of constituents in aerosol packages) by B. Kolb Bodenseewerk Perkin-Elmer & Co 88662 Ueberlingen, Germany

(4) **Leather for testing according to 6.1 a / 6.1 d and 6.1. e**
Cari Freudenberg
Geschäftsbereich Leder
Postfach 13 69
69469 Weinheim/Bergstr., Germany

(5) **Leather for testing according to 6.1. b**
Lamparter GmbH
77933 Lahr, Germany

(6) **Material for testing according to 6.1. c**
LEFA Lederfasermaterial Art.Nr. 15801
»Universal Natur« einseitig geglast 0,8 mm
Salamander Industrie-Produkte GmbH
Jakob-Sigle-Straße 58
86842 Türkheim, Germany
Tel. +49 8245 52-0
Fax +49 8245 52-180
<http://www.sip.de>

(7) **INDA Test Method IST 80.8 (01), Alcohol Repellency Test of Non Woven Fabrics**
INDA-test method is available from:
INDA, Association of the Non-Wovens Fabrics Industry
P.O. Box 1288
Cary, NC 27512-1288
USA
Tel. +1 919 233 1210
Fax +1 919 233-1282
Internet: www.inda.org

(8) **AATCC Test Method 22-1996, Water Repellancy: Spray Test**
AATCC Test Method 118-1997, Oil Repellancy: Hydrocarbon Resistance Test
AATCC 22 Spray Tester order Number 8385
AATCC-Vorschriften/Geräte zu beziehen über:
AATCC
P.O. Box 12215
Research Triangle Park N.C. 27709-2215
USA
e-mail: orders@aatcc.org
Internet: <http://www.aatcc.org>

(9) C.H. Erbslöh, Postfach 90 05, 47747 Krefeld, Germany

(10) Simon und werner, 65439 Floersheim, Germany

(11) Deutsche Shell Chemie GmbH, Kölner Straße 6, 65760 Eschborn, Germany

(12) Alcoa Chemie GmbH, Giulinistraße 2, 67065 Ludwigshafen, Germany

(13) Harold Scholz & Co GmbH, Postfach 30 05 93, 51415 Bergisch Gladbach, Germany

(14) Degussa AG, Weißfrauenstraße 9, 60311 Frankfurt am Main, Germany

