

schülke -+

sensiva® SC 50

Multifunctional cosmetic ingredient



the plus of pure
performance

sensiva® SC 50

- multifunctional cosmetic ingredient
- skin care additive
- medium spreading emollient
- improves skin feel of cosmetic formulations
- effective against odour causing Gram positive bacteria
- booster of cosmetic alcohols and glycols
- enhancer for traditional preservative systems

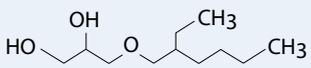
Use / Use-concentrations

Skin care additive and deodorant active: 0.3 – 1.0 %

Product description

sensiva® SC 50 is a globally approved, versatile and multifunctional additive, as well as a very effective deodorant active. As an emollient and mild humectant, it improves the skin feel of cosmetic formulations. sensiva® SC 50 reliably inhibits the growth and multiplication of odour-causing bacteria, while at the same time not affecting the beneficial skin flora. Additionally, it can boost the efficacy of traditional preservatives and act as antimicrobial stabiliser in combination with other cosmetic ingredients.

Composition

Ethylhexylglycerin	
	$C_{11}H_{24}O_3$ 204.31 g/mol
CAS no.:	70445-33-9
CAS name:	3-[(2-Ethylhexyl)oxy]-1,2-propanediol
CTFA name:	Ethylhexylglycerin
ELINCS name:	sensiva SC 50
ELINCS no.:	408-080-2

EU / US-INCI-declaration

Ethylhexylglycerin

Origin

sensiva® SC 50 is a synthetic representative of the 1-alkyl glycerin ethers with a high degree of purity. Substances with a similar structure occur in nature. These alkoxy lipids are widely distributed in human and animal tissue. A differentiation is made between neutral and ionic alkoxy lipids.

High levels of the neutral alkoxy lipids are present in the liver of cartilaginous fish. Batyl alcohol and selachyl alcohol have been isolated from the non-saponifiable proportions of liver oils of sharks and rays. Chimyl alcohol has been found in the liver of the sea rat (*Chimaera monstrosa*). All of these are 1-alkyl glycerin ethers, namely octadecyl-, hexadecyl- and 9-octadecenyl glycerol.

sensiva® SC 50 is the result of the systematic study of substances in the 1-alkyl glycerin ether class of compounds.

Skin care properties

Medium spreading emollient

The selection of emollients is critical to the character of a cosmetic product. High contents of fast spreading emollients lead to light creams with a smooth skin feel. High contents of slow spreading emollients are used in rich creams with refatting properties. Medium spreading emollients close the gap between fast and slow spreading emollients, improving the refatting properties and extending the smooth skin feel of cosmetic formulations. To achieve a long lasting soft and smooth skin feel, a combination of fast, medium and slow spreading emollients is necessary.

sensiva® SC 50 is a medium spreading emollient with a spreading coefficient of about 700 mm²/10 min¹⁾. The spreading properties are similar to those of dodecyl oleate, hexyldecanol or cetearyl isononanoate.

Sensory Assessment

Moisturising properties play an important role in determining the overall aesthetics of an emulsion. The most frequently used moisturiser in cosmetic formulations is glycerin. However, higher use concentrations of glycerin may lead to some disadvantages in the skin feel of cosmetic formulations, such as slow penetration, tackiness or soaping (whitening during application). A sensory assessment test²⁾ has been performed on a glycerin-containing oil-in-water emulsion to determine if sensiva® SC 50 can compensate some well-known disadvantages of these formulas. The following formulations were tested:

INCI Name	Cream A	Cream B
Phase A		
Arachidyl alcohol, behenyl alcohol, arachidyl glucoside	5.0	5.0
Cetearyl ethylhexanoate	20.0	20.0
Ethylhexylglycerin (sensiva® SC 50)	–	1.0
Phase B		
Polyacrylate 13, polyisobutene, polysorbate 20	0.2	0.2
Phase C		
Aqua	ad 100	ad 100
Glycerin	8.0	8.0
Phase D		
Preservative	q.s.	q.s.

The sensory assessment test has been carried out on twenty trained subjects using the test material on the inner forearm on a 3 x 3 cm test area. Different aspects such as tackiness, penetration, greasiness, soaping or the overall impression have been evaluated by a ranking of 0 – 10.

¹⁾ spreading coefficient has been determined by Cognis GmbH & Co. KG, Düsseldorf, Germany.

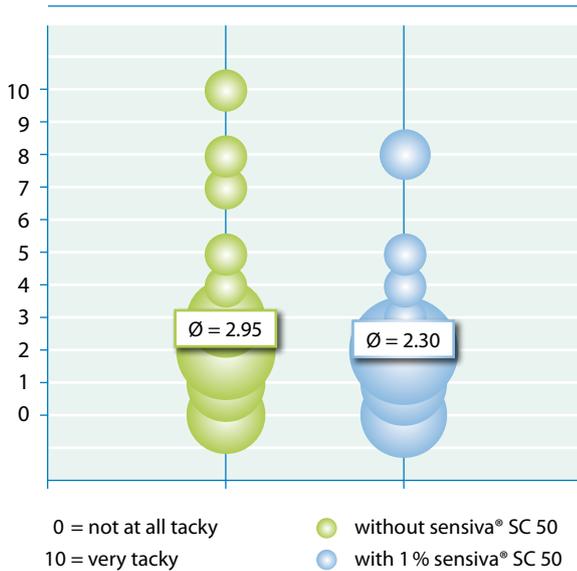
²⁾ sensory assessment test has been carried out at proDerm Institut für Angewandte Dermatologische Forschung, Hamburg, Germany.

sensiva[®] SC 50

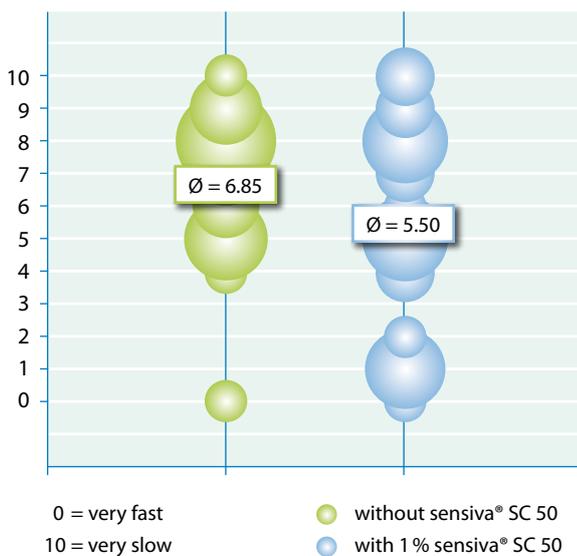
The test results are summarised in the following diagrams. The size of the balls corresponds to the number of subjects at each rating point. The results that follow show that sensiva[®] SC 50 is able to reduce the tackiness and increase the speed of absorption of glycerin-containing emulsions significantly ($p \leq 0.05$). In addition, sensiva[®] SC 50 is shown to reduce the greasiness and soaping and improve the overall impression of those formulations.

sensiva[®] SC 50 can compensate some well-known disadvantages of glycerin-containing emulsions.

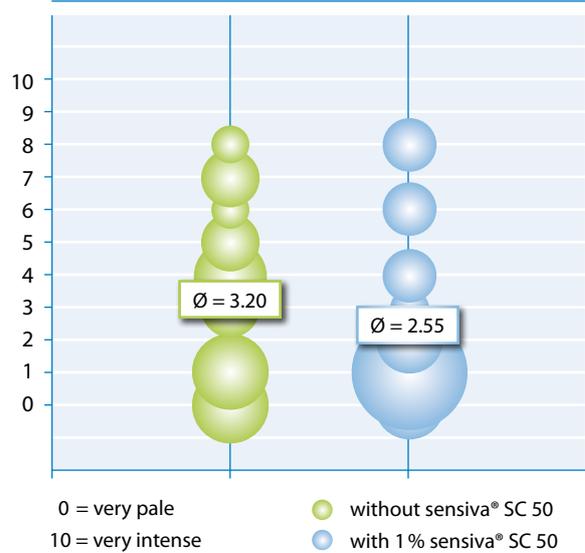
Tackiness



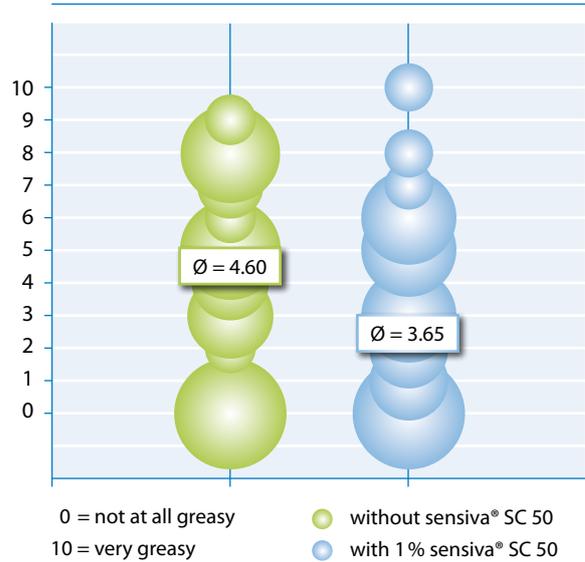
Penetration



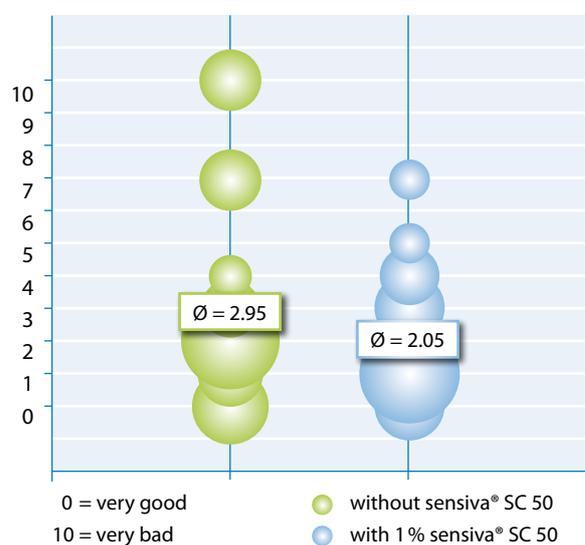
Soaping



Greasiness



Overall impression



Deodorising efficacy

Body odour arises when sweat, odourless itself, is decomposed by micro-organisms. Gram positive bacteria form substances which have unpleasant odour from the sweat contents; the sebum and the skin cells.

sensiva® SC 50 inhibits the growth and multiplication of odour-causing bacteria, while at the same time not significantly impacting natural skin flora. A sniff test was conducted to evaluate the efficacy of sensiva® SC 50 in underarm deodorants under practical conditions.

Sniff test

A sniff test performed in accordance with the method of Prof. Heiss of the Heidberg Hospital in Hamburg as described in „dragoco report“ 6/76³⁾, is a study reflecting conditions encountered in practice. It determines the smell-inhibiting effect of the test products by directly sniffing the armpits of test subjects. The test conditions are listed in the table below:

Test panel	20 volunteers
Sex	female, male
Age	> 18 years
Test area	armpits
Preliminary phase	10 days
Duration and frequency of application	twice a day (5 days)
Discontinuation of application before rating the initial value	approx. 6 hours after the last wash
Discontinuation of application before rating the final value	approx. 6, 16 and 24 hours after the last application of the product
Testers	3

In a sniff test, the deodorising activity of 0.3% sensiva® SC 50 (Deodorant B) was compared with 0.1% triclosan (Deodorant A) as bench mark and also with the basic alcohol/water formulation (Deodorant C) as well. Two sniff tests were performed: Deodorant A versus Deodorant B and Deodorant B versus Deodorant C.

	Deodorant A	Deodorant B	Deodorant C
	% w/w	% w/w	% w/w
Triclosan	0.1	–	–
sensiva® SC 50	–	0.3	–
Propylene Glycol	1.0	1.0	1.0
Alcohol denat.	40.0	40.0	40.0
Water demin.	58.9	58.7	59.0

Results of sniff test

As can be seen from figures 1 and 2, all three products lead to a clear odour reduction compared to the initial value. Based on figure 1, the Deodorant B – containing sensiva® SC 50 – shows a significantly higher odour reduction compared to the alcohol based product at three evaluation times. The significance of these data was $p < 0.001$ (16 hours after 1 application) and < 0.05 (24 hours after 1 and 12 application).

Based on figure 2, there was no significant difference between deodorants with sensiva® SC 50 and triclosan. The sniff test proves a quantitatively similar smell-inhibiting effect of both test products.

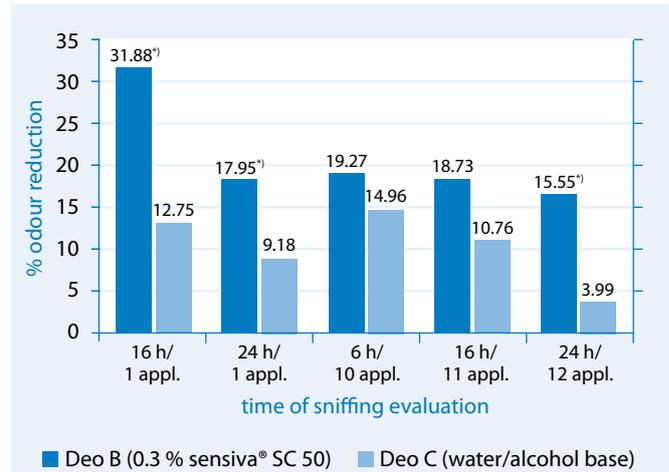


Figure 1: Sniff test results deodorant B (with sensiva® SC 50) versus deodorant C (basic formulation). Values marked with an asterisk show significant differences between both deodorants.

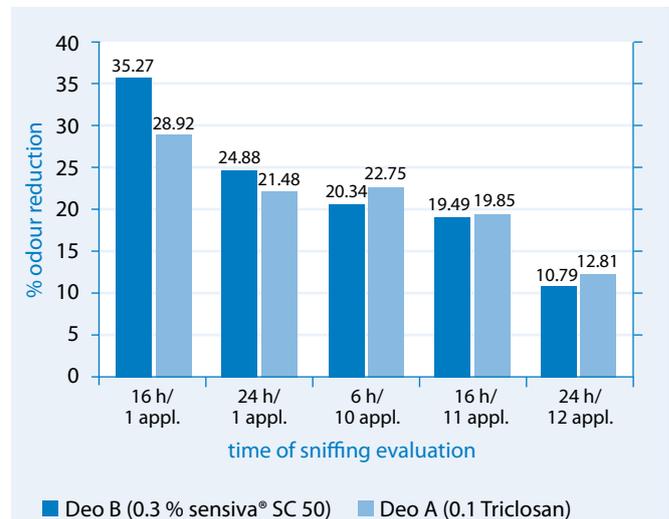


Figure 2: Sniff test results deodorant A (with triclosan) versus deodorant B (with sensiva® SC 50).

³⁾ F. Heiss, Die Bestimmung des kosmetischen Gebrauchswertes von Riechstoffen mit Hilfe des Sniffing-Tests, Dragoco Report, 1976, 23. Jahrgang, 6, 131 – 147.

sensiva® SC 50

Booster for traditional preservative actives

In response to the increasing discussion about preservative actives, there has been interest in reducing the amount of traditional preservatives in cosmetic formulations. Methods of enhancing the efficacy of traditional preservative actives, so that lower levels of these materials can be used, have become increasingly of interest.

A repeated challenge test has been performed to illustrate the use of sensiva® SC 50 to improve the efficacy of traditional cosmetic preservatives, such as phenoxyethanol, methylisothiazolinone or methylparaben. The combinations of sensiva® SC 50 with phenoxyethanol or methylisothiazolinone are protected by schülke patents. Both combinations are offered as easy-to-use blends - euxyl® PE 9010 (combination with phenoxyethanol) and euxyl® K 220 (combination with methylisothiazolinone). For more information regarding these products please contact your local representative.

Repeated challenge test (schülke KoKo Test)

In this test, the schülke KoKo test, a mixture of bacteria, yeast and moulds is inoculated six times (once a week) into the test material with the goal of keeping the test material germ free for this period. The inoculum contains pathogenic micro-organisms as germs which are well-known for product spoilage. All species are cultivated separately and mixed directly before the addition, to ensure a constant composition and germ count of the inoculum. The total germ count of the combined inoculum is approximately 10^{8-9} cfu/ml, equivalent to a germ count of approximately 10^6 cfu/ml of each individual organism. Experience has shown that a cosmetic product without growth of micro-organisms after six inoculation cycles can be considered antimicrobially stable for thirty months, which is recommended for cosmetic products.

sensiva® SC 50 improves the antimicrobial efficacy of traditional preservative actives such as phenoxyethanol, methylisothiazolinone and methylparaben.

Carbomer Gel	Inoculation Cycles						
	0	1	2	3	4	5	6
without preservation	-	+++ B, M	+++ B, M	./.			
+ 0.1 % sensiva® SC 50	-	+++ M	+++ B, M	./.			
+ 0.9 % Phenoxyethanol	-	+++ B	+++ B, Y	./.			
+ 1.0 % euxyl® PE 9010	-	-	-	-	-	-	-
+ 100 ppm Methylisothiazolinone	-	+++ M	+++ B, M	./.			
+ 0.12 % euxyl® K 220	-	-	-	-	-	-	-
+ 0.2 % Methylparaben	-	+++ B, Y	+++ B, Y	./.			
+ 0.1 % sensiva® SC 50 0.2 % Methylparaben	-	-	-	-	-	-	-

Legend:

0 = Sterility control
 B = Bacteria
 M = Moulds
 Sp = Sporeforming bacteria
 Y = Yeasts
 - = free of microbial growth
 + = slight growth
 ++ = moderate growth
 +++ = massive growth

Booster for cosmetic alcohols and glycols

Recent discussions about traditional preservative actives has increased interest in novel ways to keep cosmetic products microbiologically stable. It is now more important than ever that preservation or microbiological stability is part of new formulation concepts. Formulators must consider various methods of preventing micro-organisms from growing at an early stage of product development.

Increasing emphasis is being put on the use of multifunctional cosmetic ingredients. These are ingredients which, beside their main benefits, have a certain antimicrobial efficacy, such as glycols, fatty esters or fragrances.

Glycols used at certain levels are known to be antimicrobial. The longer the chain length of a glycol, the lower is the level necessary to prevent micro-organisms from growing. The limitation is the water solubility, as the water solubility decreases with increasing chain length.

schülke KoKo tests of an oil-in-water lotion have shown that sensiva® SC 50 can improve the antimicrobial efficacy of glycols, such as pentylene glycol or caprylyl glycol. The combination of sensiva® SC 50 with caprylyl glycol is offered by schülke as easy-to-use blend sensiva® SC 10. For more information on this product please contact your local representative.

sensiva® SC 50 improves the antimicrobial efficacy of pentylene glycol and caprylyl glycol.

O/W Lotion	Inoculation Cycles						
	0	1	2	3	4	5	6
without antimicrobial stabilisation	-	+++ B, Y, M	+++ B, M	./.			
+ 5.0 % Pentylene glycol	-	+++ M	+++ M	./.			
+ 0.5 % sensiva® SC 50	-	+++ B, M	+++ B, M	./.			
+ 5.0 % Pentylene glycol 0.5 % sensiva® SC 50	-	-	-	-	-	-	-
+ 0.7 % Caprylyl glycol	-	+++ B, Y	+++ B, Y, M	./.			
+ 0.3 % sensiva® SC 50	-	+++ B, Y, M	+++ B, Y, M	./.			
+ 1.0 % sensiva® SC 10	-	-	-	-	-	-	-

Legend:

0 = Sterility control
 B = Bacteria
 M = Moulds
 Sp = Sporeforming bacteria
 Y = Yeasts
 - = free of microbial growth
 + = slight growth
 ++ = moderate growth
 +++ = massive growth

International Approvals	
Europe / USA:	INCI name: Ethylhexylglycerin
Australia:	listed on AICS/NICNAS (NA/966) TGA approved
Canada:	listed on DSL
Japan:	listed on ENCS (No.: 2-414) listed in JSQI [Code: 540033 (51)] listed in Japanese INCI list

Physical-chemical Data	
Appearance:	clear, colourless – nearly colourless liquid
Colour index (Hazen):	max. 30
Odour:	slight characteristic
Density (20 °C):	approx. 0.95 g/cm ³
Refractive Index (20 °C):	approx. 1.451
pH-value (1.0 g/l, 20 °C):	6 – 8
Vapour pressure (20 °C):	approx. 0.003 hPa
Boiling point	145 °C (9 hPa)
Solidification point	< -76 °C
Flashpoint (ASTM D 93)	152 °C
Water solubility (22 °C)	approx. 1.0 g/l
Viscosity (Brookfield-RVT, 20 °C, Spindle 1/20 Upm)	approx. 144 mPa s
Distribution coefficient n-octanol/ water (20 °C, OECD 107)	Log P _{ow} = 2.53

Solubility

sensiva® SC 50 has limited solubility in water (approx. 0.1 %), but is highly soluble in organic solvents, such as alcohols, glycols and glycol ethers.

The solubility of sensiva® SC 50 in selected solvents is listed below. The solubility in the single solvents depends on the whole formulation and has to be tested in individual cases.

Water	approx. 0.1 %
Ethanol	∞
Ethanol (10 % in water)	approx. 0.2 %
Propylene glycol	approx. 30 %
Propylene glycol (10 % in water)	approx. 0.2 %
Butylene glycol	> 50 %
Butylene glycol (10 % in water)	approx. 0.2 %
Paraffin oil	∞
Silicone oil	∞
Glycerin	approx. 1.0 %

Indications for Use

General remarks

sensiva® SC 50 is a clear, colourless and nearly odourless liquid. It is stable to hydrolysis, temperature and pH. As a result of its good chemical stability, it is highly compatible with all commonly used cosmetic ingredients.

Whereas glycerin esters are attacked by lipolytic enzymes, this is not the case with sensiva® SC 50 due to its glycerin ether structure.

Use concentration

sensiva® SC 50 can be used as skin care additive and deodorant active in a recommended use concentration of 0.3 – 1.0%.

Incorporation

Due to its molecular structure, sensiva® SC 50 can have an influence on stability and/or viscosity of some emulsions. It has a surfactant-like structure which can affect the hydrophilic-lipophilic-balance (HLB) of an emulsion.

The HLB value relates to the hydrophilic and lipophilic properties of an emulsifier and is a first hint of the choice of an emulsifier system. Typically, water-in-oil emulsifiers have HLB values in the range of 3 – 6 while oil-in-water emulsifier are in the range of 8 – 18. sensiva® SC 50 has a calculated HLB of approximately 7.5. This is relatively high for the use in water-in-oil emulsions and relatively low for the use in oil-in-water emulsions. Thus it can influence a given emulsifier system in the opposite direction.

Detailed information about the influence of sensiva® SC 50 in emulsions as well as possibilities to restore the stability are summarised in a formulation guideline which can be provided upon request.

Material Compatibility

In the material compatibility tests with the concentrate of sensiva® SC 50, stainless steel, brass, copper, zinc and aluminium, as well as polyethylene (PE), polyoxymethylene (POM), polyamide (PA), hard polyvinyl chloride (hard PVC), polystyrene (PS), polysulphone (PSU), polycarbonate (PC), polymethylmethacrylate (PMMA), polyethylenterephthalate (PET) and acrylnitril-butadienstyrolcopolymer (ABS) proved to be suitable materials for handling the undiluted product. Other non-metallic materials should be checked for their suitability. Polytetrafluoroethylene (PTFE), nitril rubber or isobutene-isoprene rubber or polymethylsiloxane should be preferred as sealing material when handling undiluted sensiva® SC 50. Other sealing material may show swelling or lead to pronounced discolouration of sensiva® SC 50. Compatibility has to be proved in each case.

Storage

Store in the original container at room temperature. The product must be protected from direct sunlight. Once opened, containers should be firmly re-sealed.

Shelf life

36 month at recommended storage conditions.

Environmental information

schülke has DIN EN ISO 9001 and DIN EN 46001 certification (Reg. No. 4567-01) and has a validated environmental management system in accordance with the Eco Audit Regulation (Reg. No. DE-S-150 00003).

The 10 kg containers and 200 kg drums used by schülke are made of polyethylene (HDPE) and are labelled accordingly.

The 1000 kg containers are affiliated to a recycling system that guarantees free pick-up and sensible utilisation of used containers throughout Europe.

The labels are made of polyethylene (PE). Our packaging materials contain no PVC, and are recyclable.

Samples of our products are supplied together with extensive information and are supported by personal advice.

Toxicology

Extensive toxicological tests confirm the good tolerability of sensiva® SC 50. On oral administration and dermal application, sensiva® SC 50 proved to be non-toxic and non-irritant to the skin. The concentrate has an irritant effect on the ocular mucous membrane, but in a 5 % dilution sensiva® SC 50 does not irritate the eyes.

In a test for a possible sensitising effect, no allergic reactions were observed. In in-vitro and in-vivo tests sensiva® SC 50 proved to be non-mutagenic. No phototoxic or photosensitising effects were found.

The sensiva® SC 50 concentrate is labelled Xn-harmful (information in accordance with § 15a of the Chemicals Act). The results of all toxicological investigations are summarised in a toxicological statement which can be supplied upon request.



schülke subsidiaries in:

Belgium

S.A. Schülke&Mayr
Belgium N.V.
1830 Machelen
Phone +32-02-479 73 35
Fax +32-02-479 99 66

China

Schülke&Mayr GmbH
Shanghai Representative Office
Shanghai 200041
Phone +86-21-62 17 29 95
Fax +86-21-62 17 29 97

France

S&M France
75341 Paris Cedex 07
Phone +33-1-44-11-00-81
Fax +33-1-44-11-02-41

Italy

Schülke&Mayr Italia S.r.l.
20148 Milano
Phone +39-02-40 21 820
Fax +39-02-40 21 829

Netherlands

Schülke&Mayr Benelux B.V.
2003 LM-Haarlem
Phone +31-23-535 26 34
Fax +31-23-536 79 70

Switzerland

Schülke&Mayr AG
8003 Zurich
Phone +41-44-466 55 44
Fax +41-44-466 55 33

United Kingdom

Schülke&Mayr UK Ltd.
Sheffield S9 1AT
Phone +44-114 254 3500
Fax +44-114 254 3501

USA

schülke inc.
Mt. Arlington, NJ 07856
Phone +1-973 770 7300
Fax +1-973 770 7302

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Africa (north) · Albania · Argentina · Australia · Austria · Belarus · Bosnia-Herzegovina · Brazil · Bulgaria · Canada · Croatia · Cyprus · Czech Republic · Denmark · Egypt · Estonia · Finland · Ghana · Greece · Hong Kong · Hungary · India · Indonesia · Iran · Israel · Japan · Jordan · Kazakhstan · Korea · Kuwait · Latin America · Latvia · Lebanon · Lithuania · Malaysia · Malta · Macedonia · Mexico · Middle East · Montenegro · New Zealand · Nigeria · Norway · Pakistan · Philippines · Poland · Portugal · Puerto Rico · Romania · Russia · Serbia · Singapore · Slovakia · Slovenia · Spain · South-Africa · Sweden · Syria · Taiwan · Thailand · Turkey · Ukraine · Vietnam



Our recommendations regarding our products are based on in-depth scientific testing in our Research Department; they are given in good faith, but no liability can be derived from them. It is the responsibility of the final product manufacturer to assure that claims made for the final product are in conformance with all applicable local laws. In other respect our Conditions of Sale and Supply apply.

Schülke&Mayr GmbH

22840 Norderstedt | Germany
Phone +49-40-521 00-0 | Fax +49-40-521 00-244
www.schuelke.com | sai@schuelke.com

A company of the
Air Liquide Group

