

euxyl™ pe 9010 preservative

a cosmetic preservative blend that is an ideal solution for transparent gels

product description

Euxyl™ PE 9010 preservative is a liquid cosmetic preservative based on phenoxyethanol and ethylhexylglycerin. The addition of ethylhexylglycerin affects the interfacial tension at the cell membrane of microorganisms, improving the preservative activity of phenoxyethanol.

Euxyl™ PE 9010 preservative has a broad, balanced spectrum of effect against bacteria, yeasts and mold fungi.

INCI declaration

Phenoxyethanol

Ethylhexylglycerin*

* stabilized with synthetic alpha Tocopherol

key features and benefits

- strong broad spectrum efficacy
- mild, liquid blend
- ideal solution for transparent gels
- stable to hydrolysis, temperature and pH
- microbiome gentle



microbiological efficacy

Euxyl™ PE 9010 preservative is equally effective against bacteria, yeasts and mold fungi. For euxyl™ pe 9010 preservative to perform effectively in destroying organisms in products already contaminated a minimum contact time of 48 hours is necessary.

Good production hygiene as well as the use of raw materials with low microorganism levels as a result of correct raw material control are of course vital prerequisites for the production of microbiologically faultless finished products.

MIC values

Determination of the minimum inhibitory concentration in serial dilution tests produced the following values:

species	ATCC-No.	euxyl™ pe 9010 preservative [%]	phenoxy-ethanol [%]
gram-negative:			
<i>Enterobacter gergoviae</i>	33028	0.5	0.5
<i>Escherichia coli</i>	11229	0.5	0.5
<i>Klebsiella pneumoniae</i>	4352	0.25	0.5
<i>Pseudomonas aeruginosa</i>	15442	0.5	0.5
<i>Pseudomonas fluorescens</i>	17397	0.25	0.5
<i>Pseudomonas putida</i>	12633	0.5	0.5
gram-positive:			
<i>Staphylococcus aureus</i>	6538	0.5	1.0
<i>Staphylococcus epidermidis</i>	12228	0.5	1.0
mold fungi			
<i>Aspergillus niger</i>	6275	0.25	0.5
<i>Penicillium funiculosum</i>	36839	0.25	0.25
yeasts			
<i>Candida albicans</i>	10231	0.25	0.5

Euxyl™ PE 9010 preservative is proven to have better efficacy against many microorganisms than phenoxyethanol alone.

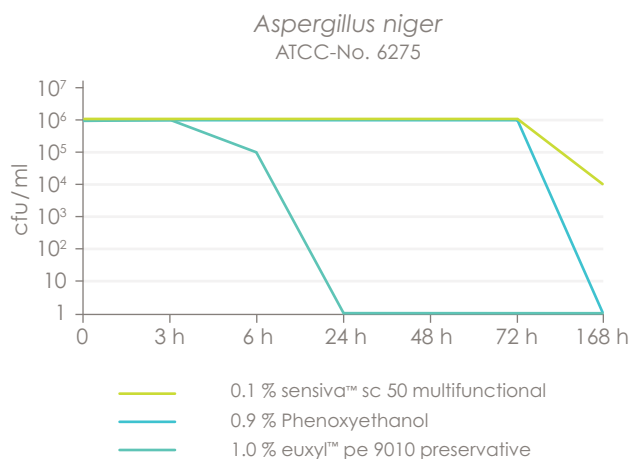
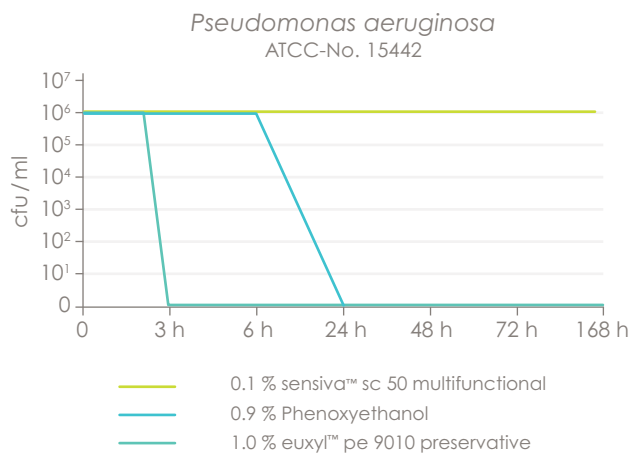
germ count reduction test

Dilutions of euxyl™ pe 9010 preservative are prepared with sterile tap water. 50 ml portions of the end solutions are each inoculated with 0.5 ml microorganism suspension (initial microorganism count approx. 10^8 cfu/ml) and stirred.

test organisms	ATCC-No.
<i>Pseudomonas aeruginosa</i>	15442
<i>Escherichia coli</i>	11229
<i>Candida albicans</i>	10231
<i>Aspergillus niger</i>	6275

These solutions are streaked out onto tryptone soya agar or Sabouraud-dextrose 4 % agar after 3, 6, 24, 48, 72 and 168 hours depending on the test organism. The cultures are incubated for 48 hours at 37 °C, except for *Aspergillus niger*, which is incubated for 72 hours at 25 – 27 °C.

The evaluation is made on the basis of semi-quantitative assessment of the microbial growth of the streaks.



cfu = colony forming units

challenge tests

repeated challenge test (Ashland Koko test)

This method is used to determine the preservative effect of chemical preservatives in cosmetic formulations, e.g. creams, lotions and shampoos. For this in various test series the preservative to be tested is added in different concentrations to unpreserved samples. A constant microorganism load is achieved by means of periodic inoculation (inoculation cycles) of the test preparations. Immediately before inoculation samples of the individual preparations are streaked out onto nutrient media.

The preservative effect is evaluated on the basis of the micro-organism growth on the nutrient media. The longer the time before the occurrence of the first microbial growth, the more effective is the preservative. Experience has shown that a well preserved product should remain growth-free for six inoculation cycles in order to ensure the shelf-life in the original packaging required in practice (30 months).

Different leave-on and rinse-off systems are proved to be well protected with euxyl™ pe 9010 preservative.

test material / product	inoculation cycles							assessment
carbomer gel	0	1	2	3	4	5	6	
unpreserved	-	+++ B,Y,M	+++ B,Y,M	./.				failed
+ 0.6% Phenoxyethanol	-	+++ B,Y	+++ B,Y,M	+++ B,Y,M	./.			failed
+ 0.8% Phenoxyethanol	-	-	++ B	++ B	++ B	++ B	++ B	failed
+ 0.6% euxyl™ pe 9010 preservative	-	-	-	-	-	-	-	A

test material / product	inoculation cycles							assessment
moisturizing soothing balm	0	1	2	3	4	5	6	
unpreserved	-	+++ B,Y,M	+++ B,Y,M	./.				failed
+ 0.1% sensiva™ sc 50 multifunctional	-	+++ B, M	+++ B, M	./.				failed
+ 0.9% Phenoxyethanol	-	+ B	++ B	++ B	+++ B	+++ B	./.	failed
+ 0.5% euxyl™ pe 9010 preservative	-	++ B	++ B, M	++ B, M	++ B, M	+++ B, M	./.	failed
+ 1.0% euxyl™ pe 9010 preservative	-	-	-	-	-	-	-	A

0 = sterility control
B = bacteria
Y = yeast
M = mold

- = free of microbial growth
+ = slight growth
++ = moderate growth
+++ = massive growth
./. = cancelled

assessment:

A = free of growth during 6 inoculation cycles
B = slight (+) growth during 6 inoculation cycles

global approvals

	leave-on	rinse-off
Ashland recommendation	0.50 – 1.00%	0.50 – 1.00%
EU Cosmetics Regulation	max. 1.11%	max. 1.11%
CIR (USA)	max. 1.11%	max. 1.11%
ASEAN Cosmetic Directive	max. 1.11%	max. 1.11%
TSSC 2015 (China)	max. 1.11%	max. 1.11%
MERCOSUR	max. 1.11%	max. 1.11%

For approvals in further countries please contact your local sales representative.

The individual use concentration is dependent on the sensitivity of the product to microbial contamination, the choice of raw materials and production hygiene.

For the determination of the optimum dosage we recommend a preservation test, as the efficacy is highly influenced by the other ingredients of a finished formulation. The staff of Ashland's microbiological laboratories will be pleased to give customers the appropriate support.

indications for use

general

Euxyl™ PE 9010 preservative is stable to hydrolysis, temperature and pH. As a result of the good solubility of euxyl™ pe 9010 preservative an easy dispersion in the various systems even at low temperature is possible. Good preservation results have been achieved with 0.5 – 1.0% euxyl™ pe 9010 preservative. Euxyl™ PE 9010 preservative is effective in pH-ranges up to 12.

applications

Euxyl™ PE 9010 preservative is a liquid cosmetic preservative and suitable for leave-on, rinse-off and wet wipes applications. Euxyl™ PE 9010 preservative is clearly soluble in solutions. It can tolerate high salt content. A high load of surfactants can result in a loss of efficacy.

Euxyl™ PE 9010 preservative shows no interaction with sulphite ions or pigments such as TiO₂.

natural products

Formulas containing natural raw materials have a higher risk for microbial contamination. Microorganisms introduced by this pathway are quickly eliminated by euxyl™ pe 9010 preservative.

discoloration

In general euxyl™ pe 9010 preservative displays good compatibility with the ingredients of cosmetics. No discolorations have been detected.

product-specific properties

material compatibility

concentrate

In the material compatibility tests with the concentrate of euxyl™ pe 9010 preservative stainless steel, brass, copper, zinc and aluminium as well as polyethylene (PE), polyoxymethylene (POM), polyamide (PA) and hard polyvinyl chloride (hard PVC) proved to be suitable materials for handling the undiluted product. Other non-metallic materials should be checked for their suitability. Polycarbonate (PC), polymethylmethacrylate (PMMA), polyethyleneterephthalate (PET) and acrylnitrilbutadienestyrolcopolymer (ABS) should not be used. As sealing material when handling undiluted euxyl™ pe 9010 preservative fluorine rubber or ethylene-propylene terpolymers (EPDM) or polytetrafluorethylene (PTFE) should be preferred. Other sealing materials can show swelling or lead to pronounced discoloration of euxyl™ pe 9010 preservative.

dilutions

The behavior of euxyl™ pe 9010 preservative in 1.0% aqueous solution with regard to material compatibility was not significantly different from that of the tap water used for the dilution. No incompatibilities with plastics have been observed with products preserved with euxyl™ pe 9010 preservative.

effect on surface tension

The surface tension of water is significantly reduced by the addition of euxyl™ pe 9010 preservative. A 1.0% solution in water is 32.1 mN/m (water: 72.6 mN/m).

foaming behavior

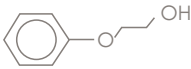
In the foaming test in accordance with DIN 53 902, a 1.0% solution of euxyl™ pe 9010 preservative in demineralized water proved to be non-foaming.

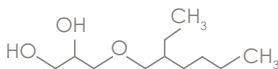
solubility

Euxyl™ PE 9010 preservative exhibits limited solubility in water. 100 g of water at 20°C dissolves 1.0 g of euxyl™ pe 9010 preservative. In polar solvents such as 1,2-propylene glycol, propanol or acetone, euxyl™ pe 9010 preservative is readily soluble. In polyalcohols such as glycerol and sorbitol, euxyl™ pe 9010 preservative is moderately soluble. In aliphatic hydrocarbons with hydrophilic groups such as 2-octyldecanol and isopropyl myristate, euxyl™ pe 9010 preservative exhibits limited solubility. In pure aliphatic solvents it is slightly soluble.

general information

description of individual substances

phenoxyethanol	
	$C_8H_{10}O_2$ 138.17 g/mol
CAS no.:	122-99-6
INCI name:	Phenoxyethanol
name according to EC 1223/2009:	2-Phenoxyethanol
No. according to EC 1223/2009:	29
EINECS name:	2-Phenoxyethanol
EINECS no.:	204-589-7

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
INCI name	Ethylhexylglycerin
ELINCS name	Sensiva SC 50
ELINCS no.	408-080-2

physical-chemical data	
appearance	clear, colorless – nearly colorless liquid
color index (Hazen)	<50
odor	characteristic
refractive index (20 °C)	1.522 - 1.534
density (20 °C)	1.087 - 1.092 g/ml
vapour pressure (20 °C)	< 1 hPa
flash point (ISO 2719)	> 100 °C
flow time (DIN 53 211/20 °C)	< 15 DIN seconds
viscosity (Rheo WIN RS 600 -)	28 mPa*s
water solubility (20 °C)	approx. 10 g/l (at 60 °C approx. 15 g/l)

storage

We recommend storing in the original container at room temperature.

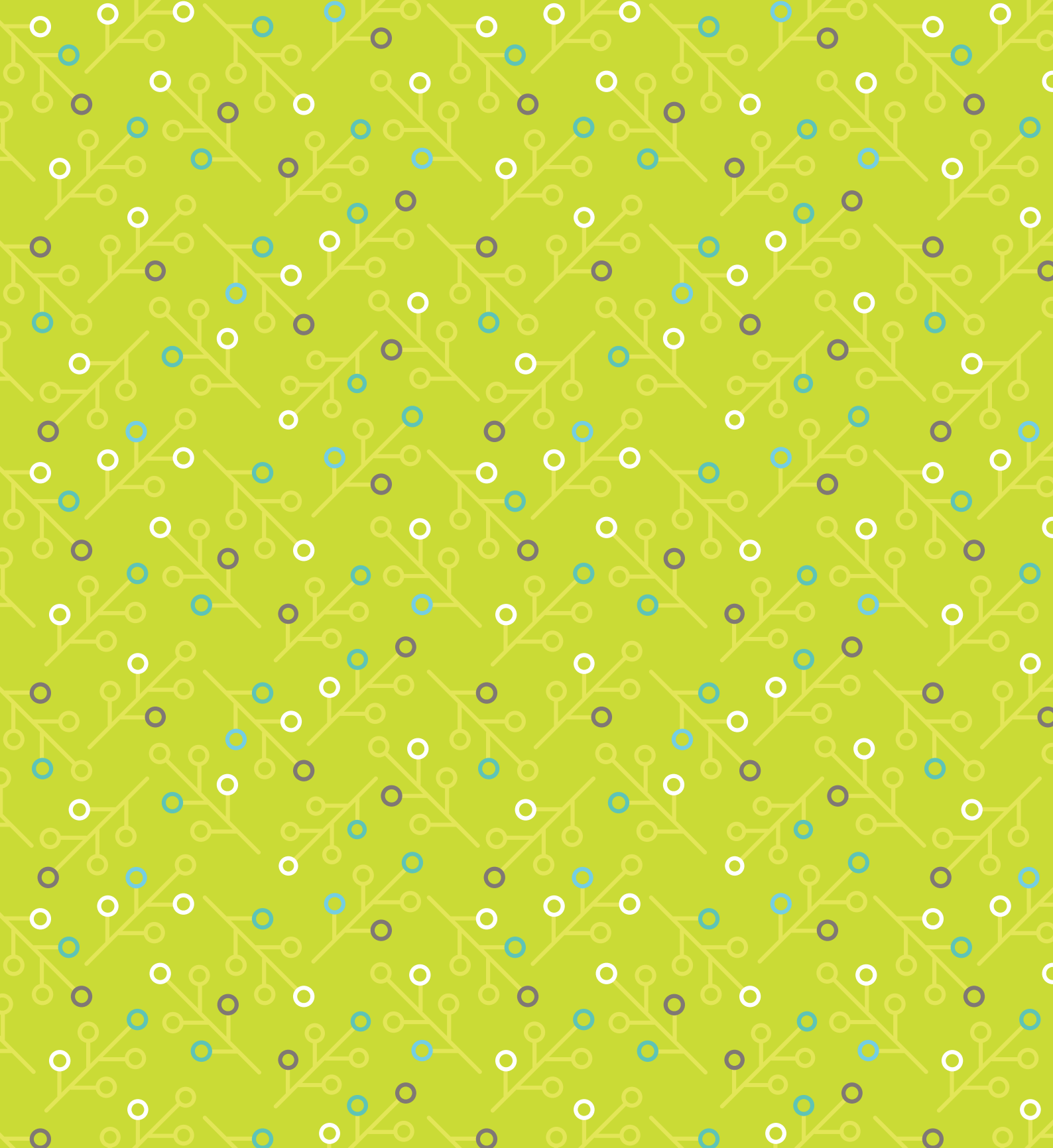
toxicology

Euxyl™ PE 9010 preservative is used as a preservative for cosmetics and toiletries. The product is used at a recommended use concentration of 0.5 – 1.0%. In accordance with the conditions stipulated in Directive 76/768/EEC euxyl™ pe 9010 preservative may be used in cosmetic preparations (leave-on and rinse-off) in a use concentration up to a maximum of 1.1%. As active substance phenoxyethanol (90 %) is used in euxyl™ pe 9010 preservative. As an auxiliary compound the formulation additionally contains ethylhexylglycerin in a concentration of 10%. Both substances have undergone extensive toxicological testing. On the basis of the results with the given upper concentration limit of 1.1% euxyl™ pe 9010 preservative can be considered safe for the preservation of cosmetics and toiletries. Furthermore, a skin tolerability study (occlusive patch test) of euxyl™ pe 9010 preservative compared to phenoxyethanol showed that there is no difference in skin tolerability between euxyl™ pe 9010 preservative and phenoxyethanol. During the entire test period no reactions to either phenoxyethanol or euxyl™ pe 9010 preservative used in the maximum use concentrations could be observed. This skin tolerability test has been carried out on Caucasian skin in Germany and on Japanese skin in Japan.

More details regarding handling, toxicity and labelling are available in the Safety Data Sheet (SDS).

always

solving™



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