



CROTHIX LIQUID

DS-131R-1

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PERSONAL CARE

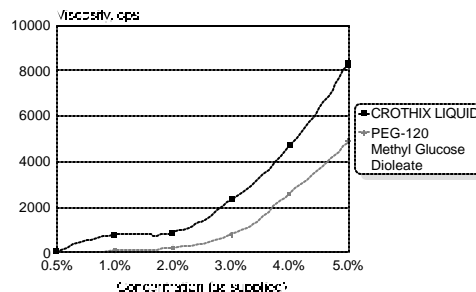
CROTHIX LIQUID

INCI Name: PEG-150 Pentaerythrityl Tetrastearate (and) PEG-6 Caprylic/Capric Glycerides (and) Water

CROTHIX LIQUID* is a 45% active liquid version of CROTHIX, our high performance thickener for aqueous surfactant systems. As an easier-to-use liquid, **CROTHIX LIQUID** works especially well in cold mix systems and provides formulators with the thickening efficiency to create shampoos, body washes, shower gels and liquid soaps or other soap based-products that are economical, as well as rheologically appealing. Like CROTHIX, **CROTHIX LIQUID** requires no neutralization, forms no nitrosamine byproducts, and often contributes to a 'conditioned' feel in rinse-off products.

***CROTHIX LIQUID** is approved for use in Japan, listed as "Polyoxyethylene Pentaerythritol Tetrastearate (150EO), Polyoxyethylene Caprylic/Capric Glycerides (6EO), Water", and is suitable for shampoo products to be marketed globally.*

Comparative Viscosity CROTHIX LIQUID vs. PEG-120 Thickener



As shown in the graph above, **CROTHIX LIQUID** produces higher viscosity from an ALS shampoo base than PEG-120 Methyl Glucose Dioleate, and at concentrations of 1-2%, provides significantly higher viscosity than this conventional thickener. Such performance allows **CROTHIX LIQUID** to be used at levels lower than the PEG-120 product, and demonstrates both its efficacy and economy as a thickener.

** The use of CROTHIX LIQUID in cosmetic and other formulations is covered under U.S. Patent # 5,192,462 assigned to Croda Inc.*

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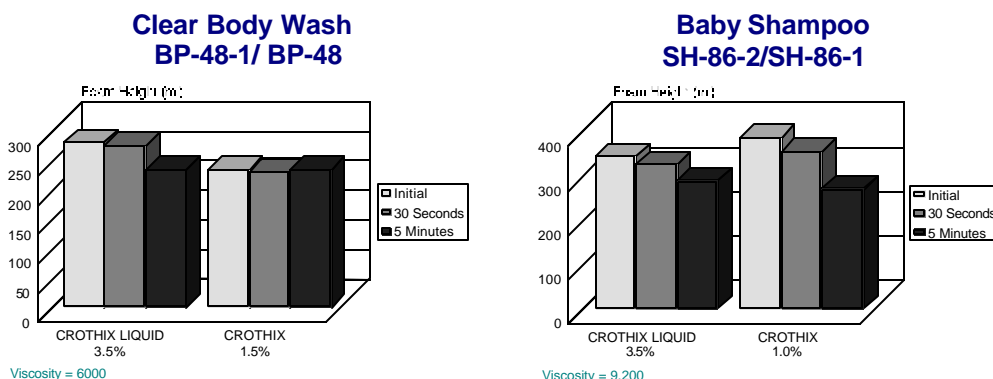
Non-Warranty: All information contained herein is intended primarily to demonstrate the utility of **Croda** products. We assume no liability in the presentation of this data, nor should this information be construed as granting license to practice any methods or compositions of matter covered by U.S. or foreign patents.

CROTHIX LIQUID

CROTHIX LIQUID can be used to thicken products like shampoos, bath gels, or liquid soaps, simply by preheating the material to a temperature above 50°C and then adding it to the cold surfactant base with mixing. In most instances, the resultant blend is clear, provided the pH is 5.0 or higher. However, it is best to check each individual formulation, since some systems may become hazy if mixed this way. If desired, formulations that are quite viscous can be heated and made easier to stir. Emulsion-type products like body washes, conditioners and lotions can be easily formulated by incorporating **CROTHIX LIQUID** into the oil phase and heating the mixture to a temperature above 50°C before forming the emulsion.

In-house evaluations of a clear body wash and a baby shampoo, each using **CROTHIX LIQUID** at 3.5% in place of CROTHIX, found the **CROTHIX LIQUID** products to be essentially the same and to exhibit similar wash-off and feel characteristics. These products also produce similar foam—namely, small bubble size initially and larger sized bubbles on a second wetting. The results of foam height testing are shown below.

Comparative Foam Heights CROTHIX LIQUID vs. CROTHIX



*Please note: The level of PEG-6 Caprylic/Capric Glycerides in the Clear Body Wash formula was decreased to account for the content of this material in **CROTHIX LIQUID**.*

Like CROTHIX, **CROTHIX LIQUID** is best used at a pH between 5.0 and 9.0, tolerates salt well, and unlike carbomers, does not need to be neutralized. The material is freely soluble in anionic, nonionic and amphoteric surfactant systems and is compatible with cationic salts. **CROTHIX LIQUID** has been found to work successfully as the thickening component of a series of DEA-free surfactant blends that Croda developed using CRODASINIC LS-30 (Sodium Lauroyl Sarcosinate) with either ALES, ALS, SLES, or SLS as the primary surfactant. *(Please refer to the CRODASINIC LS-30 data sheet (DS-71R-1) for foaming and viscosity data and precise use levels.)*

Typical use levels: 1-8%

CROTHIX LIQUID

CROTHIX/CROTHIX LIQUID Equivalents

As a liquid thickener, **CROTHIX LIQUID** is economical as well as efficient; however, at 45% active, it does require a higher concentration than CROTHIX and may need to be used at a level up to 2½ times higher to produce the same viscosity. We have developed a set of **CROTHIX/CROTHIX LIQUID equivalents** to aid formulators who may be using CROTHIX and wish to substitute our new **CROTHIX LIQUID** product in its place or who may be responsible for formulating cold-mix systems.

These functional equivalents are given as four separate sets of **CROTHIX/CROTHIX LIQUID** formulations and are shown in a series of easy-to-follow tables that begin on the next page. Each **CROTHIX LIQUID** formulation has been laboratory tested and found equivalent in both activity (% solids) and performance to its respective CROTHIX version. The formulations are duplicates of basic shampoo systems based on ALES, ALS, SLES, or SLS and contain either 1% CROTHIX or the equivalent concentration of **CROTHIX LIQUID** and an adjusted level of surfactant. Equivalency was determined by measuring viscosity (cps) and foam height (ml). The values appear below the ingredients listed for each of the CROTHIX and **CROTHIX LIQUID** formulas. Precise use levels are given for each ingredient, enabling formulators to easily calculate the concentration of **CROTHIX LIQUID** according to their own formula or make what adjustments are necessary should a surfactant blend be used.

As always, our applications chemists are available and can provide you with formulating assistance or answer any questions you may have. You may contact the Applications Laboratory at our North American Technical Center at (732) 417-0800.

Typical Analysis

APPEARANCE	Clear to hazy liquid
ODOR	Mild, characteristic
ACID VALUE	5.0 max.
SAPONIFICATION VALUE	35-43

CROTHIX LIQUID

Ammonium Laureth Sulfate (ALES) (2 mol, 25% Active)				
CROTHIX Formula	% W/W		CROTHIX LIQUID Formula	% W/W
ALES	33.6		ALES	33.6
CROSULTAINE C-50	7.0		CROSULTAINE C-50	7.0
CROTHIX	1.0		CROTHIX LIQUID	4.0
Germaben II	1.0		Germaben II	1.0
Deionized Water	57.4		Deionized Water	54.4
*Viscosity, cps	38,500		*Viscosity, cps	34,000
†Foam Height, ml	680/620		†Foam Height, ml	580/530

* RVT Spindle #TC, 10 rpm, @ 25°C

† Values represent foam height at initial reading and at 5 minutes.

Ammonium Lauryl Sulfate (ALS) (28% Active)				
CROTHIX Formula	% W/W		CROTHIX LIQUID Formula	% W/W
ALS	30.0		ALS	30.0
CROSULTAINE C-50	7.0		CROSULTAINE C-50	7.0
CROTHIX	1.0		CROTHIX LIQUID	1.5
Germaben II	1.0		Germaben II	1.0
Deionized Water	61.0		Deionized Water	60.5
*Viscosity, cps	225		*Viscosity, cps	215
†Foam Height, ml	725/680		†Foam Height, ml	750/700

* RVT Spindle #3, 20 rpm, @ 25°C

† Values represent foam height at initial reading and at 5 minutes.

CROTHIX LIQUID

Sodium Laureth Sulfate (SLES) (3 mol, 30% Active)				
CROTHIX Formula	% W/W		CROTHIX LIQUID Formula	% W/W
SLES	28.0		SLES	28.0
CROSULTAINE C-50	7.0		CROSULTAINE C-50	7.0
CROTHIX	1.0		CROTHIX LIQUID	2.2
Germaben II	1.0		Germaben II	1.0
Deionized Water	63.0		Deionized Water	61.8
*Viscosity, cps	29		*Viscosity, cps	29
†Foam Height, ml	650/570		†Foam Height, ml	625/580

* RVT Spindle #2, 50 rpm, @ 25°C

† Values represent foam height at initial reading and at 5 minutes.

Sodium Lauryl Sulfate (SLS) (29% Active)				
CROTHIX Formula	% W/W		CROTHIX LIQUID Formula	% W/W
SLS	29.0		SLS	29.0
CROSULTAINE C-50	7.0		CROSULTAINE C-50	7.0
CROTHIX	1.0		CROTHIX LIQUID	2.2
Germaben II	1.0		Germaben II	1.0
Deionized Water	62.0		Deionized Water	60.8
*Viscosity, cps	31		*Viscosity, cps	34
†Foam Height, ml	815/710		†Foam Height, ml	810/735

* RVT Spindle #2, 50 rpm, @ 25°C

† Values represent foam height at initial reading and at 5 minutes.

CROSULTAINE C-50: Cocamidopropyl Hydroxysultaine

CROTHIX LIQUID

CLEAR BODY WASH BP-48-1

Due to the incorporation of GLYCEROX 767, this clear body wash imparts emollient effects that give a refreshingly clean, yet lubricious feel, doing so without leaving an overly oily afterfeel. CROTEIN C-50 is used to provide conditioning. **CROTHIX LIQUID** is the thickener.

<u>Ingredients</u>	<u>%(W/W)</u>
<u>PART A</u>	
Deionized Water	54.4
SLES (3mol)	20.0
CROSULTAINE C-50 (Cocamidopropyl Hydroxysultaine)	12.0
Disodium EDTA	0.1
<u>PART B</u>	
INCROMIDE CA (Cocamide DEA)	3.0
GLYCEROX 767 (PEG-6 Capric/Caprylic Triglycerides)	2.0
CROTHIX LIQUID (PEG-150 Pentaerythrityl Tetrastearate (and) PEG-6 Caprylic/Capric Glycerides (and) Water)	3.5
<u>PART B</u>	
CROTEIN C-50 (Hydrolyzed Collagen)	1.0
INCROMEANT LAMEA (Acetamide MEA (and) Lactamide MEA)	1.0
10% Citric Acid Solution	1.0
Propylene Glycol (and) Diazolidinyl Urea (and) Methyl Paraben (and) Propyl Paraben (1)	1.0

PROCEDURE

Combine ingredients of Part A with mixing. Combine ingredients of Part B with mixing and heat to 50°C. Slowly add Part B to Part A with mixing. Add ingredients of Part C to Part A individually with mixing. Mix until uniform.

pH=5.5±0.5

Viscosity =6,000±10% (RVT Spindle #3, 10rpm, 25°C)

(1) Germaben II (ISP/Sutton Labs)

CROTHIX LIQUID**BABY SHAMPOO****SH-86-2**

This baby shampoo features CROVOL A-70 and CROSULTAINE C-50, naturally derived surfactants which give this formula its mildness. Besides its ability to reduce the irritation of surfactant/shampoo systems, CROVOL A-70 is also used here as a wetting agent and fragrance solubilizer. CROSULTAINE C-50 is a mild foam booster, producing a creamy lather. **CROTHIX LIQUID** is used to thicken the formula.

Ingredients**%(W/W)****PART A**

SLES (3mol)	20.0
CROSULTAINE C-50 (Cocamidopropyl Hydroxysultaine)	12.0
Deionized Water	48.5

PART B

CROVOL A-70 (PEG-60 Almond Glycerides)	15.0
CROTHIX LIQUID (PEG-150 Pentaerythrityl Tetrastearate (and) PEG-6 Caprylic/Capric Glycerides (and) Water)	3.5

PART C

Propylene Glycol (and) Diazolidinyl Urea (and) Methyl Paraben (and) Propyl Paraben (1)	1.0
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PROCEDURE

Combine the ingredients of Part A with mixing. Combine the ingredients of Part B with mixing and heat to 50°C. Add Part B to Part A with mixing. Add the ingredients of Part C individually with mixing. Adjust pH if needed with a 10% aqueous solution of HCl. Cool with mixing to desired fill temperature.

pH=6.22 ±0.5

Viscosity=9,200cps ±10% (RVT Spindle #4, 10rpm, @ 25°C)

(1) Germaben II (ISP/Sutton Labs)