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Liquid Crystal System for Manufacture of Personal Care Cleansing Products

THIS PRODUCT IS A CONCENTRATE. IT MUST BE DILUTED AS BELOW BEFORE USE.

The **Liquid Crystal** System provides a simple way of producing a variety of Personal Care Cleansing Products of consistent quality. The use of one **Liquid Crystal Concentrate** plus **Conditioning Additive** allows you to efficiently and cost effectively manufacture a range of cleansing products including Shower Gels, Shampoos and Foam Baths. Pearlised cleansing products can be produced by the addition of a pearliser, thereby increasing the number of possible variants.

Simply dilute the **Liquid Crystal Concentrate** with water, add perfume, colour and preservative of your choice and thicken your product by adding common salt. **Liquid Crystal Concentrate** is highly active with typical use levels of around 15-25 %. It has good clarity and low colour. Although highly active, it has a low viscosity, making it readily pourable or pumpable. Manufacturing efficiencies are readily achievable.

Liquid Crystal Concentrate is a careful blend of anionic and non-ionic surfactants with foam boosters and stabilisers, together with skin and hair conditioning agents that have a long history of use in Personal Care Cleansing Products. It is balanced to neutral pH and will produce copious amounts of dense, creamy lather that can be rinsed away easily and completely.

By adjusting the quantity of **Liquid Crystal Concentrate** and the addition of **Conditioning Additive** and a pearliser, at various percentages, several different products can be produced with different characteristics and levels of cost effectiveness.

T +44 (0) 113 205 0900
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Liquid Crystal Concentrate Ingredient Listing

INCI Name	% w/w	Function
Aqua	25 – 50	Water (diluent)
Sodium Laureth Sulfate	25 - 50	Surfactant for cleansing and foaming
Propylene glycol	1 - 5	Humectant and modifying viscosity.
Sodium chloride	1 - 5	Modifying viscosity
Cocamine oxide	1 - 5	Surfactant for modifying lather and conditioning.
Cocamidopropyl betaine	1 - 5	Surfactant for modifying lather and mildness.
Citric acid	0.1 – 1.0	For modifying the pH
Tetrasodium EDTA	0.1 – 1.0	Chelating ingredient
Polyquaternium-7	0.1–1.0	Conditioning of hair & skin
Magnesium nitrate	<0.1%	Preservative System
Magnesium chloride Methylchloroisothiazoline* Methylisothiazolinone*		

(* 9 ppm total active ingredient)

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Liquid Crystal Concentrate Typical Properties

Appearance	Clear to slightly hazy viscous liquid.
pH (Neat)	6 to 7
Colour	0.3 Red/3.0 Yellow maximum 5¼" Lovibond Cell
Viscosity	Maximum 6000 cps @ 25°C

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Formulation & Manufacturing Guidelines

The following formulations are suggested guidelines for production of quality products of medium cost effectiveness and should be tested for stability and packaging compatibility.

Standard Foam Bath

Ingredient		% w/w
1. Water		
2. **Liquid Crystal Concentrate** *Mix well between additions (See manufacturing tips).*		20
3. Preservative	(See manufacturing tips).	as required
4. Pearliser (if required)		as required
5. Perfume		1.0
Adjust pH if required	(See manufacturing tips).	
6. Colour	(See manufacturing tips).	as required
7. Salt		* as required

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Standard Shower Gel

Ingredient w/w	%
1. Water	
2. Liquid Crystal Concentrate *Mix well between additions (See manufacturing tips).*	20
3. Preservative (See manufacturing tips).	as required
4. Pearliser (if required)	as required
5. Conditioning Additive	0.1
6. Perfume	1.0
Adjust pH if required (See manufacturing tips).	
7. Colour (See manufacturing tips).	as required
8. Salt	* as required

* Common salt should be added in small amounts to increase viscosity. Trials will be needed to establish the correct amount to add. **Do not add too much salt or the product will go cloudy!**

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Standard Shampoo

Ingredient		% w/w
1. Water		
2. Liquid Crystal Concentrate *Mix well between additions (See manufacturing tips).*		20
3. Preservative	(See manufacturing tips).	as required
4. Pearliser (if required)		as required
5. Conditioning Additive		0.2
6. Perfume		1.0
Adjust pH if required	(See manufacturing tips).	
7. Colour	(See manufacturing tips).	as required
8. Salt		* as required

* Common salt should be added in small amounts to increase viscosity. Trials will be needed to establish the correct amount to add. **Do not add too much salt or the product will go cloudy!**

Note: Liquid Crystal Concentrate is not designed to be used undiluted. It should be diluted as per our guidelines, otherwise in its undiluted form it is may cause skin irritation.

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SUGGESTED PERCENTAGES TABLE

Ingredient % w/w	*CLEAR FOAM BATH*			*PEARLY FOAM BATH*		
	Luxury	Standard	Economy	Luxury	Standard	Economy
Other ingredients to 100%						
Liquid Crystal Concentrate	25	20	15	25	20	15
Conditioning Additive	0	0	0	0	0	0

Ingredient % w/w	*CLEAR SHAMPOO*			*PEARLY SHAMPOO*		
	Luxury	Standard	Economy	Luxury	Standard	Economy
Other ingredients to 100%						
Liquid Crystal Concentrate	25	20	15	25	20	15
Conditioning Additive	0.5 – 1.0	0.2	0.1	0.5 – 1.0	0.2	0.1

Ingredient % w/w	*CLEAR SHOWER GEL*			*PEARLY SHOWER GEL*		
	Luxury	Standard	Economy	Luxury	Standard	Economy
Other ingredients to 100%						

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Liquid Crystal Concentrate	25	20	15	25	20	15
Conditioning Additive	0.2 – 0.5	0.1	0	0.2 – 0.5	0.1	0

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Manufacturing Tips

Stephenson will be pleased to discuss any specific questions but here are some tips in answer to some frequently asked questions.

Adding & Mixing the Liquid Crystal Concentrate and Other Ingredients

Charge the water into the manufacturing vessel and turn on your stirrers. Whilst stirring pour in slowly the **Liquid Crystal Concentrate** and mix until it completely dissolves. Take a sample and check it is free from gel-like lumps and looks clear. **Conditioning Additive,** pearliser, colour and perfume should be added before thickening with salt. Ensure you mix well between additions.
If warm water is available then use at 30° to 40°C to speed up manufacture, by enabling the **Liquid Crystal Concentrate** and other ingredients such as fragrance to dissolve and clear faster.
Take care with the speed of stirring as it should be sufficient to thoroughly dissolve the liquid crystal concentrate and other ingredients but not too quick to produce copious amounts of froth.

Preservation

Liquid Crystal Concentrate contains a preservative to protect it from microbial contamination, however once diluted this may not be sufficient. All products made from Liquid Crystal Concentrate should incorporate additional suitable preservative. See suppliers below who should be able to provide preservatives and information.

All water based personal care cleansers including Shower Gels, Shampoos and Foam Baths are susceptible to microbial contamination, due to the types of ingredients used and the large amount of water that is added to the formulation. Many natural ingredients have a high microbial count or can be a source for microbial growth once incorporated into your formulation, so it is suggested that their concentration is kept as low as possible and/or extra preservative is added.

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The amount of Preservative to be added needs only to be calculated for the amount of extras being added, and not for the LCC. (see table 1)
It is advisable to add the preservative early on in the manufacturing process. Some preservatives, however, are sensitive to pH and if this is the case then add preservative after pH adjustment.

High standards of hygiene and good manufacturing practice should be used. It is suggested that purified water is used to help reduce the risk of microbial contamination. If a water purification system is not available it is suggested that the water be boiled first and allowed to cool to 50°C before use.

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Table 1

Amount of LCC	Preservative (legal limit)	Percentage of preservative to add to total product.
25%	Phenoxyethanol (1.0%)	0.75% (99.25 product to every 0.75 preservative)
25%	Benzoic Acid (2.5%)	1.875% (98.125 Product to every 1.875 of preservative)
20%	Phenoxyethanol (1.0%)	0.80% (99.2 product to every 0.8 preservative)
20%	Benzoic Acid (2.5%)	2.0% (98.0 Product to every 2.0 preservative)

Suppliers:
Thor Specialities (UK) Ltd Tel: +44 (0) 1606 818800 www.thor.com
ISP International Speciality Products Tel : +44 (0) 207 519 5054 www.ispcorp.com

Clariant GmbH Tel : +49 61 96 757 8143 www.clariant-personalcare.com

Perfumes

When adding perfume ensure that the perfume is completely dissolved and the product is clear before adding colour or salt. It is much easier to dissolve high concentrations of perfume if warm water is used for the dilutions.
Your choice of perfume can affect your product in several ways and can cause instability problems. It is suggested that you tell your perfume supplier that it is to be used in a shower gel, so that only suitable perfumes are selected.
Perfumes may affect the viscosity of the finished product. Many perfumes may thicken the finished product but some may cause thinning. Perfumes can also cause discolouration immediately or over time.

Small trial batches should be made to evaluate different formulations and using different concentrations of perfume, or contact your fragrance supplier.

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Colours

Colour should be added once the perfume has been added and your product clears. Once your colour has been thoroughly stirred in and your product is homogenous then the salt can be added. It is easier to evenly distribute your colour throughout your shower gel before thickening with salt.
Water soluble dyes approved for use in cosmetic formulations should be used.

Suppliers:
Univar Colour 44 (0) 1268 594400 www.univarcolour.com/personal-care.php
Ciba Speciality Chemicals (UK) PLC Tel +44(0)1625 617878 www.cibasc.com
Warner Jenkinson Europe Ltd Tel +44 (0) 1553 669444 www.sensient-tech.com

Adjusting pH

Liquid Crystal Concentrate is supplied at around neutral pH and adjustment of pH to your diluted product is not required. **If you wish to adjust the pH of your diluted product then first carry out laboratory trials.**

To lower the pH use citric acid - a 20% solution in water may be more convenient . To raise the pH use a 10% Sodium Hydroxide solution. Please stir thoroughly until homogeneous.

Please note that modifying the pH can modify the viscosity so adjust pH before thickening by salt addition.

Thickening Your Cleansing Product

Sodium chloride (common salt) should be used to thicken your diluted cleansing product. **Laboratory trials are needed to establish how much is required for each formulation as different ingredients such as perfumes will affect the viscosity.** It is suggested that you take a 500 gram sample of your diluted shower gel and stir in a small amount of salt e.g. 0.5 to 1 gram and and keep

adding e.g. 0.5 to 1 gram until it thickens sufficiently. Wait for the air bubbles to rise to the surface before checking the viscosity. Deaeration can be speeded up using an ultrasonic bath. The higher the temperature the lower the viscosity will be. **Adding too much salt will make your shower gel thin and cloudy!**

If adding salt does not sufficiently thicken your shower gel then thicker products can be made using more Liquid Crystal Concentrate in your formulation. If more Liquid Crystal Concentrate is used less salt will be needed to thicken the final product.

Thickening An Over Salted Cleansing Product

If too much salt is added accidentally and a thin cloudy product has resulted the product can be recovered as follows:

Add more water to the cloudy product a little at a time stirring between additions until the product clears.

Now add small amounts of Liquid Crystal Concentrate until the required thickness is achieved.

Stability Testing

The formulations suggested are only guidelines. Stephenson cannot accept responsibility for your diluted formulations. To ensure the integrity of the product for the duration of its shelf life your formulated products should be tested for stability, packaging compatibility and preservative challenge test.

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