Batiste dry shampoo

Version 1

Intertek Consumer Goods Material Safety Data Sheet (Conforms to Reg. (EC) No 1907/2006, Reg. (EC) No 1272/2008 and their amendments)

Intertek Consumer Goods 9-46062
Print Date: 11-Mar-2013
Revision Date:8-Mar-2013
Issue Date: 8-Mar-2013

SAFETY DATA SHEET

SECTION 1: Identification of the substance / mixture and of the company / undertaking

1.1. Product Identifier

Product name:	Batiste dry shampoo
Chemical product name:	No data available
Synonyms:	Hint of Colour Range
Proper shipping name:	AEROSOLS
Chemical formula:	No data available
Other means of identification:	No data available
Index number:	No data available
ID number:	No data available
CAS number:	No data available
REACH registration number:	No data available
EC number:	Not Available

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:	Application is by spray atomisation from a hand held aerosol pack. Dry shampoo aerosol
Uses advised against:	No data available

1.3. Details of the supplier of the safety data sheet

Registered company name:	Church & Dwight UK Ltd.,
Address:	Wear Bay Road, Folkstone, Kent, England, CT19, 6PG.
Telephone:	01303 858821
Fax:	
Email:	consumer.relationsUK@churchdwight.com
Website:	~

1.4. Emergency telephone number

Association / Organisation:	
Other emergency telephone numbers:	01303 858821

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

DSD classification:	In case of mixtures, classification has been prepared by following DPD (Directive 1999/45/EC) or CLP (Regulation (EC) No 1272/2008) regulations	
DSD classification (additional):	No data available	
DPD classification:	R12	• Extremely flammable.
	R44	• Risk of explosion if heated under confinement.
CLP classification:	Flammable Liquid Category 1	
CLP classification (additional):	Not applicable	

2.2. Label elements

CLP label elements

Signal word:	DANGER	
Hazard statement(s):	H224	Extremely flammable liquid and vapour.
	Determined by Chemwatch using CLP criteria	
Additional Statement(s):	No data available	
Supplementary statement(s):	**Code**	**Phrase**
	EUH044	Risk of explosion if heated under confinement.
Precautionary statement(s):	**Prevention**	
	Code	**Phrase**
	P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

	P211	Do not spray on an open flame or other ignition source.
	P251	Pressurized container: Do not pierce or burn, even after use.
	Storage Code	**Phrase**
	P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.

DSD / DPD label elements

F+

Relevant risk statements are found in section 2.1

Indication(s) of danger:	CONSIDERED A DANGEROUS MIXTURE ACCORDING TO DIRECTIVE 1999/45/EC AND ITS AMENDMENTS.	
Safety advice:	S16	• Keep away from sources of ignition. No smoking.
	S60	• This material and its container must be disposed of as hazardous waste.

2.3. Other hazards

PBT/vPvB criteria	No data available

SECTION 3: Composition / information on ingredients

3.1. Substances

See 'Composition on ingredients' in section 3.2

3.2. Mixtures

1. CAS No **2. EC No** **3. Index No** **4. REACH No**	**%[weight]**	**Name**	**Classification according to Directive 1999/45/EC [DPD]**		**Classification according to (EC) No 1272/2008 [CLP]**
1. 106-97-8. 2. 203-448-7 3. 601-004-00-0 4. No data available	20-70%	butane	F+	R12	Flam. Gas 1 CLP classification according to Annex VI of CLP (Regulation (EC) No 1272/2008)
1. 75-28-5. 2. 200-857-2 3. 601-004-00-0 4. No data available	10-50%	iso-butane	F+	R12	Flam. Gas 1 CLP classification according to Annex VI of CLP (Regulation (EC) No 1272/2008)
1. 74-98-6 2. 200-827-9 3. 601-003-00-5 4. No data available	10-50%	propane	F+	R12	Flam. Gas 1 CLP classification according to Annex VI of CLP (Regulation (EC) No 1272/2008)
1. 9005-25-8 2. 232-679-6 3. No data available 4. No data available	0-15%	starch			According to CLP no hazard category has been assigned
1. 112-02-7 2. 203-928-6 3. No data available 4. No data available	<1%	cetyltrimethylammonium chloride	C N	R34 R50 R22 R41	• Acute Aquatic Hazard Category 1 • Acute Toxicity Category 1 • Acute Toxicity Category 4 • Metal Corrosion Category 1 • Serious Eye Damage Category 1 • Skin Corrosion/Irritation Category 1C
1. 64-17-5 2. 200-578-6 3. 603-002-00-5 4. No data available	0-15%	alcohol, denatured	F	R11	Flam. Liq. 2 CLP classification according to Annex VI of CLP (Regulation (EC) No 1272/2008)
1. 68002-59-5 2. 268-072-8, 295-835-2 3. No data available 4. No data available	<1%	di-C14-18-alkyldimethylammonium chloride	Xn N	R22 R50/53 R38 R41	• Acute Toxicity Category 4 • Chronic Aquatic Hazard Category 1 • Serious Eye Damage Category 1 • Skin Corrosion/Irritation Category 2

SECTION 4: First aid measures

4.1. Description of first aid measures

General: No data available

Ingestion:

- Not considered a normal route of entry.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
- Avoid giving milk or oils.
- Avoid giving alcohol.

P211	Do not spray on an open flame or other ignition source.
P251	Pressurized container: Do not pierce or burn, even after use.

Storage

Code	Phrase
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.

DSD / DPD label elements

F+

Relevant risk statements are found in section 2.1

Indication(s) of danger: CONSIDERED A DANGEROUS MIXTURE ACCORDING TO DIRECTIVE 1999/45/EC AND ITS AMENDMENTS.

Safety advice:

S16	• Keep away from sources of ignition. No smoking.
S60	• This material and its container must be disposed of as hazardous waste.

2.3. Other hazards

PBT/vPvB criteria No data available

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See 'Composition on Ingredients' in section 3.2

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General: No data available

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- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
- Avoid giving milk or oils.
- Avoid giving alcohol.

Eye Contact:	If aerosols come in contact with the eyes: • Immediately hold the eyelids apart and flush the eye with fresh running water. • Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. • Seek medical attention without delay; if pain persists or recurs seek medical attention. • Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact:	If solids or aerosol mists are deposited upon the skin: • Flush skin and hair with running water (and soap if available). • Remove any adhering solids with industrial skin cleansing cream. • **DO NOT** use solvents. • Seek medical attention in the event of irritation.
Inhalation:	If aerosols, fumes or combustion products are inhaled: • Remove to fresh air. • Lay patient down. Keep warm and rested. • Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. • If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. • Transport to hospital, or doctor.

4.2. Most important symptoms and effects, both acute and delayed

Inhaled:	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. No health effects were seen in humans exposed at 1,000 ppm isobutane for up to 8 hours or 500 ppm for 8 hours/day for 10 days. Isobutane can have anaesthetic and asphyxiant effects at high concentrations, well above the lower explosion limit of 1.8% (18,000 ppm). Butane is a simple asphyxiant and is mildly anaesthetic at high concentrations (20-25%). 10000 ppm for 10 minutes causes drowsiness. Narcotic effects may be accompanied by exhilaration, dizziness, headache, nausea, confusion, incoordination and unconsciousness in severe cases The paraffin gases C1-4 are practically nontoxic below the lower flammability limit, 18,000 to 50,000 ppm; above this, low to moderate incidental effects such as CNS depression and irritation occur, but are completely reversible upon cessation of the exposure. The vapour is discomforting **WARNING:** Intentional misuse by concentrating/inhaling contents may be lethal. Acute effects from inhalation of high concentrations of vapour are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterised by headache and dizziness, increased reaction time, fatigue and loss of co-ordination Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal. Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.
Ingestion:	Starch has such a low oral acute toxicity that rats given 10-20% of their body weight, show only minimal effects. This may not be true of modified starches but given their use in foods as stabilisers and thickeners, there is probably little cause for concern. An abnormal craving for starch (amylophagia), during pregnancy, is recognised as a common form of eating disorder in certain localities. In one study the incidence was as high as 35%. Some women retain the habit for years and may ingest several kilograms of starch daily. Since starch, in such "addicts", accounts for the bulk of the diet, the commonly observed *iron-deficiency anaemia* is probably the result of the practice and not its cause. Less common complications include parotid gland enlargement and partial intestinal obstruction due to starch concretions (gastroliths). Withdrawal reverse these sequelae. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments Rats given isoparaffinic hydrocarbons (after 18-24 hours fasting) showed lethargy and/or general weakness, ataxia and diarrhoea. Symptoms disappeared within 24-28 hours.
Skin Contact:	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Spray mist may produce discomfort Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye:	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..
Chronic:	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Some workers may develop chronic occupational dermatitis (generally mild) through the handling of starch products. When starch is used as a lubricant in surgical gloves, small amounts, released into the patient during the course of surgery, have resulted in granulomas and peritonitis. Principal route of occupational exposure to the gas is by inhalation. Long-term exposure to ethanol may result in progressive liver damage with fibrosis or may exacerbate liver injury caused by other agents. Repeated ingestion of ethanol by pregnant women may adversely affect the central nervous system of the developing foetus, producing effects collectively described as foetal alcohol syndrome. These include mental and physical retardation, learning disturbances, motor and language deficiency, behavioural disorders and reduced head size. Consumption of ethanol (in alcoholic beverages) may be linked to the development of Type I hypersensitivities in a small number of individuals. Symptoms, which may appear immediately after consumption, include conjunctivitis, angioedema, dyspnoea, and urticarial rashes. The causative agent may be acetic acid, a metabolite (1). (1) Boehncke W.H., & H.Gall, Clinical & Experimental Allergy, 26, 1089-1091, 1996

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.
For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 50 mm Hg) should be intubated.
- Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors

should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5: Firefighting measures

5.1. Extinguishing media

SMALL FIRE:

- Water spray, dry chemical or CO_2

LARGE FIRE:

- Water spray or fog.

5.2. Special hazards arising from the substrate or mixture

Fire Incompatibility:

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

5.3. Advice for firefighters

Fire Fighting:

FOR FIRES INVOLVING MANY GAS CYLINDERS:

- To stop the flow of gas, specifically trained personnel may inert the atmosphere to reduce oxygen levels thus allowing the capping of leaking container(s).
- Reduce the rate of flow and inject an inert gas, if possible, before completely stopping the flow to prevent flashback.
- **DO NOT extinguish the fire until the supply is shut off** otherwise an explosive re-ignition may occur.
- If the fire is extinguished and the flow of gas continues, used increased ventilation to prevent build-up, of explosive atmosphere.
- Use non-sparking tools to close container valves.
- Be CAUTIOUS of a Boiling Liquid Evaporating Vapour Explosion, *BLEVE*, if fire is impinging on surrounding containers.
- Direct 2500 litre/min (500 gpm) water stream onto containers above liquid level with the assistance remote monitors.

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- **DO NOT** approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

Fire/Explosion Hazard:

For starch/ air mixtures
Starch is a class St1 dust at normal moisture level:
Minimum Ignition Temperature (MIE): >30 mJ at normal moisture level
Pmax 9.5 Bar
Kst 170 bar.m/s
Layer Ignition Temperature: >450 deg C
Autoignition Temperature: 170 deg C (above this temperature starch will self-heat)

Dust Explosion Hazard Class 1

Dusts fall into one of three Kst* classes. Class 1 dusts; Kst 1-200 m3/sec; Class 2 dusts; 201-299 m3/sec. Class 3 dusts; Kst 300 or more. Most agricultural dusts (grains, flour etc.) are Class 1; pharmaceuticals and other speciality chemicals are typically Class 1 or 2; most unoxidised metallic dusts are Class 3. The higher the Kst, the more energetically the dust will burn and the greater is the explosion risk and the greater is the speed of the explosion..
Standard test conditions, used to derive the Kst, are representative of industrial conditions, but do not represent and absolute worst case. Increased levels of turbulence increase the speed of the explosion dramatically.

* Kst - a normalised expression of the burning dust pressure rise rate over time.
Dusts with Minimum Ignition Energies (MIEs) ranging between 20 and 100 mJ may be sensitive to ignition. They require that:

- plant is grounded
- personnel might also need to be grounded
- the use of high resistivity materials (such as plastics) should be restricted or avoided during handling or in packaging

The majority of ignition accidents occur within or below this range.

Quoted values for MIE generally are only representative Characteristics may change depending upon the process and conditions of use or any changes made to the dust during use, including further grinding or mixing with other products. In order to obtain more specific data for dust, as used, it is recommended that further characterisation testing.is performed.

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat or flame.
- Vapour forms an explosive mixture with air.
- Severe explosion hazard, in the form of vapour, when exposed to flame or spark.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition with violent container rupture.
- Aerosol cans may explode on exposure to naked flames.
- Rupturing containers may rocket and scatter burning materials.
- Hazards may not be restricted to pressure effects.
- May emit acrid, poisonous or corrosive fumes.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

Combustion products include:
carbon monoxide (CO)
carbon dioxide (CO_2)
other pyrolysis products typical of burning organic material

Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal Protective Equipment: Breathing apparatus.Gas tight chemical resistant suit.Limit exposure duration to 1 BA set 30 mins.

Minor Spills:

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Wear protective clothing, impervious gloves and safety glasses.
- Shut off all possible sources of ignition and increase ventilation.
- Wipe up.
- If safe, damaged cans should be placed in a container outdoors, away from all ignition sources, until pressure has dissipated.
- Undamaged cans should be gathered and stowed safely.

Major Spills:

- Remove leaking cylinders to a safe place.
- Fit vent pipes. Release pressure under safe, controlled conditions
- Burn issuing gas at vent pipes.
- **DO NOT** exert excessive pressure on valve; **DO NOT** attempt to operate damaged valve.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse / absorb vapour.
- Absorb or cover spill with sand, earth, inert materials or vermiculite.
- If safe, damaged cans should be placed in a container outdoors, away from ignition sources, until pressure has dissipated.
- Undamaged cans should be gathered and stowed safely.
- Collect residues and seal in labelled drums for disposal.

6.2. Environmental precautions

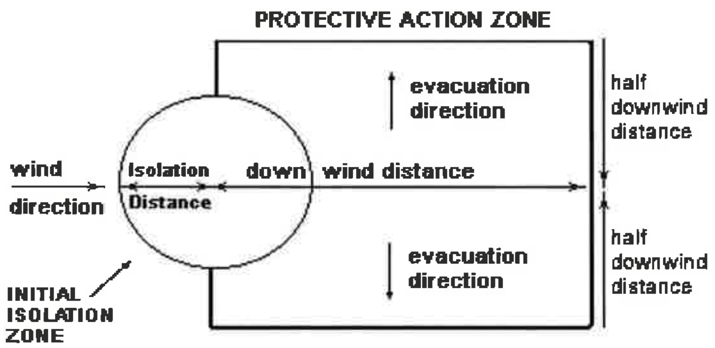
See section 12

6.3. Methods and material for containment and cleaning up

is taken from the US DOT emergency response guide book

6 IERG information is derived from CANUTEC - Transport Canada.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)
Isolation Distance -
Downwind Protection Distance 8 metres
IERG Number 49

FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills".

LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5

From US Emergency Response Guide 2000 Guide 126

6.4. Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the MSDS

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe handling

Natural gases contain a contaminant, radon-222, a naturally occurring radioactive gas. During subsequent processing, radon tends to concentrate in liquefied petroleum streams and in product streams having similar boiling points. Industry experience indicates that the commercial product may contain small amounts of radon-222 and its radioactive decay products (radon daughters). The actual concentration of radon-222 and radioactive daughters in process equipment (IE lines, filters, pumps and reactor units) may reach significant levels and produce potentially damaging levels of gamma radiation. A potential external radiation hazard exists at or near any pipe, valve or vessel containing a radon enriched stream or containing internal deposits of radioactive material. Field studies, however, have not shown that conditions exist that expose the worker to cumulative exposures in excess of general population limits. Equipment containing gamma-emitting decay products should be presumed to be internally contaminated with alpha-emitting decay products which may be hazardous if inhaled or ingested. During maintenance operations that require the opening of contaminated process equipment, the flow of gas should be stopped and a four hour delay enforced to allow gamma-radiation to drop to background levels. Protective equipment (including high efficiency particulate respirators (P3) suitable for radionucleotides or supplied air) should be worn by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination or inhalation of any residue containing alpha-radiation. Airborne contamination may be minimised by handling scale and/or contaminated materials in a wet state. [*TEXACO*]

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- **DO NOT** enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, **DO NOT** eat, drink or smoke.
- **DO NOT** incinerate or puncture aerosol cans.
- **DO NOT** spray directly on humans, exposed food or food utensils.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Fire and explosion protection

See section 5

Other information

- Keep dry to avoid corrosion of cans. Corrosion may result in container perforation and internal pressure may eject contents of can
- Store in original containers in approved flammable liquid storage area.
- **DO NOT** store in pits, depressions, basements or areas where vapours may be trapped.
- No smoking, naked lights, heat or ignition sources.
- Keep containers securely sealed. Contents under pressure.
- Store away from incompatible materials.
- Store in a cool, dry, well ventilated area.
- Avoid storage at temperatures higher than 40 deg C.
- Store in an upright position.
- Protect containers against physical damage.
- Check regularly for spills and leaks.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.

< 50Â°C

Not applicable

7.2. Conditions for safe storage, including any incompatibilities

Suitable container:

- Aerosol dispenser.
- Check that containers are clearly labelled.

Storage incompatibility:

Low molecular weight alkanes:

- May react violently with strong oxidisers, chlorine, chlorine dioxide, dioxygenyl tetrafluoroborate.
- May react with oxidising materials, nickel carbonyl in the presence of oxygen, heat.
- Are incompatible with nitronium tetrafluoroborate(1-), halogens and interhalogens
- may generate electrostatic charges, due to low conductivity, on flow or agitation.
- Avoid flame and ignition sources

Interaction between chlorine and ethane over activated carbon at 350 deg C has caused explosions, but added carbon dioxide reduces the risk. The violent interaction of liquid chlorine injected into ethane at 80 deg C/10 bar becomes very violent if ethylene is also present A mixture prepared at -196 deg C with either methane or ethane exploded when the temp was raised to -78 deg C.
Addition of nickel carbonyl to an n-butane-oxygen mixture causes an explosion at 20-40 deg C.
Butane/ isobutane

- reacts violently with strong oxidisers
- reacts with acetylene, halogens and nitrous oxides
- is incompatible with chlorine dioxide, conc. nitric acid and some plastics
- may generate electrostatic charges, due to low conductivity, in flow or when agitated - these may ignite the vapour.

Segregate from nickel carbonyl in the presence of oxygen, heat (20-40 C)
Propane:

- reacts violently with strong oxidisers, barium peroxide, chlorine dioxide, dichlorine oxide, fluorine etc.
- liquid attacks some plastics, rubber and coatings
- may accumulate static charges which may ignite its vapours
- Avoid reaction with oxidising agents
- Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

Package Material Incompatibilities: No data available

7.3. Specific end use(s)

See section 1.2

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Derived No Effect Level (DNEL)

Exposure Pattern	Workers	General Population	Exposure Pattern	Workers	General Population
Long term - dermal, systemic effects	No data available	No data available	**Short term - dermal, systemic effects**	No data available	No data available
Long term - inhalation, systemic effects	No data available	No data available	**Short term - inhalation, systemic effects**	No data available	No data available
Long term - oral, systemic effects	No data available	No data available	**Short term - oral, systemic effects**	No data available	No data available
Long term - dermal, local effects	No data available	No data available	**Short term - dermal, local effects**	No data available	No data available
Long term - inhalation, local effects	No data available	No data available	**Short term - inhalation, local effects**	No data available	No data available

Occupational Exposure Limits (OEL)

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
UK Workplace Exposure Limits (WELs)	Batiste dry shampoo (Butane)	600	1450	750	1810				Carc, (only applies if Butanecontains more than 0.1% of buta-1,3-diene)
UK Workplace Exposure Limits (WELs)	starch (Starch respirable)		4						
UK Workplace Exposure Limits (WELs)	starch (Starch total inhalable)		10						
UK Workplace Exposure Limits (WELs)	alcohol, denatured (Ethanol)	1000	1920						

The following materials had no OELs on our records

• propane:	CAS:74-98-6
• cetyltrimethylammonium chloride:	CAS:112-02-7 CAS:53023-95-3 CAS:79728-63-5 CAS:139272-33-6
• di-C14-18-alkyldimethylammonium chloride:	CAS:68002-59-5 CAS:92129-33-4

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
propane	3789	2,100 [LEL]
alcohol, denatured	5909	3,300 [LEL]

NOTES *Values marked LEL indicate that the IDLH was based on 10% of the lower explosive limit for safety considerations even though the relevant toxicological data indicated that irreversible health effects or impairment of escape existed only at higher concentrations.*

BATISTE DRY SHAMPOO: BUTANE: ISO-BUTANE:
For butane:
Odour Threshold Value: 2591 ppm (recognition)
Butane in common with other homologues in the straight chain saturated aliphatic hydrocarbon series is not characterised by its toxicity but by its narcosis-inducing effects at high concentrations. The TLV is based on analogy with pentane by comparing their lower explosive limits in air. It is concluded that this limit will protect workers against the significant risk of drowsiness and other narcotic effects.
Odour Safety Factor(OSF)
OSF=0.22 (n-BUTANE)

ALCOHOL, DENATURED: CETYLTRIMETHYLAMMONIUM CHLORIDE: DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE:
Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.
OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

ALCOHOL, DENATURED: BATISTE DRY SHAMPOO:
For ethanol:
Odour Threshold Value: 49-716 ppm (detection), 101 ppm (recognition)
Eye and respiratory tract irritation do not appear to occur at exposure levels of less than 5000 ppm and the TLV-TWA is thought to provide an adequate margin of safety against such effects. Experiments in man show that inhalation of 1000 ppm caused slight symptoms of poisoning and 5000 ppm caused strong stupor and morbid sleepiness. Subjects exposed to 5000 ppm to 10000 ppm experienced smarting of the eyes and nose and coughing. Symptoms disappeared within minutes. Inhalation also causes local irritating effects to the eyes and upper respiratory tract, headaches, sensation of heat intraocular tension, stupor, fatigue and a need to sleep. At 15000 ppm there was continuous lachrymation and coughing.

BATISTE DRY SHAMPOO: STARCH:
For starch:
The only adverse health effect associated with occupational exposure to starch is a mild dermatitis. The TLV-TWA is identical to a "nuisances-dust" value.
CETYLTRIMETHYLAMMONIUM CHLORIDE: DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE:
It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.
At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations

must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.
NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.
BATISTE DRY SHAMPOO: PROPANE:
For propane
Odour Safety Factor(OSF)
OSF=0.16 (PROPANE)
ISO-BUTANE:
May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.
CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly. It may not be appropriate to only recommend an exposure standard for simple asphyxiants rather it is essential that sufficient oxygen be maintained. Air normally has 21 percent oxygen by volume, with 18 percent regarded as minimum under normal atmospheric pressure to maintain consciousness / life. At pressures significantly higher or lower than normal atmospheric pressure, expert guidance should be sought.
Isobutane Odour Threshold Value: 1.2 ppm

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Assess operations based upon available dust explosion information to determine the suitability of preventative or protective systems as precautionary measures against possible dust explosions. If prevention is not possible, consider protection by use of containment, venting or suppression of dust handling equipment. Where explosion venting is considered to be the most appropriate method of protection, vent areas should preferably be calculated based on Kst rather than an St value. If nitrogen purging is considered as the protective system, it must operate with an oxygen level below the limiting oxygen concentration. The system should include an oxygen monitoring and shut-down facility in the event of excessive oxygen being detected.

The maximum surface temperature of enclosures potentially exposed to this material should be based on values obtained by taking 2/3 of the minimum ignition temperature (MIE) of the dust cloud. The effect of dust layers should be reviewed.

An isolated (insulated) human body can readily produce electrostatic discharges in excess of 50 mJ, but have been recorded up to 100 mJ.
Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Speed:
aerosols, (released at low velocity into zone of active generation)	0.5-1 m/s
direct spray, spray painting in shallow booths, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

8.2.2. Personal protection

No data available

Eye and face protection:

No special equipment for minor exposure i.e. when handling small quantities.
OTHERWISE: For potentially moderate or heavy exposures:

- Safety glasses with side shields.
- **NOTE:** Contact lenses pose a special hazard; soft lenses may absorb irritants and **ALL** lenses concentrate them.

Skin protection: See Hand protection: below

Hand protection:

- No special equipment needed when handling small quantities.
- **OTHERWISE:**
- For potentially moderate exposures:
- Wear general protective gloves, eg. light weight rubber gloves.
- For potentially heavy exposures:
- Wear chemical protective gloves, eg. PVC. and safety footwear.

Body protection: See Other protection: below

Other protection:

- The clothing worn by process operators insulated from earth may develop static charges far higher (up to 100 times) than the minimum ignition energies for various flammable gas-air mixtures. This holds true for a wide range of clothing materials including cotton.
- Avoid dangerous levels of charge by ensuring a low resistivity of the surface material worn outermost.

BRETHERICK: Handbook of Reactive Chemical Hazards.
No special equipment needed when handling small quantities.
OTHERWISE:

- Overalls.
- Skin cleansing cream.
- Eyewash unit.
- Do not spray on hot surfaces.

Respiratory protection:	•Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)
Thermal hazards:	No data available
Recommended material(s):	Glove selection is based on a modified presentation of the: **"Forsberg Clothing Performance Index".** The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:

Material	CPI

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

8.2.3. Environmental exposure controls

See section 12

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Slurry, beige liquid
Odour	No data available
Odour threshold	No data available
Taste	No data available
pH (1% solution)	Not Available
pH (as supplied)	Not Available
Melting point / freezing point (°C)	Not Available
Initial boiling point and boiling range (°C)	Not Available
Flash Point (°C)	Not Available
Flammability	No data available
Vapour Pressure (kPa)	Not Available
Vapour density	Not Available
Relative Density (Water = 1)	Not Available
Solubility in water (g/L)	Not Available
Partition coefficient: n-octanol / water	No data available
Auto-ignition temperature (°C)	Not Available
Critical Temperature	Not Available
Viscosity	Not Available
Explosive properties	No data available
Oxidising properties	No data available
Physical State	Liquid
Upper Explosive Limit (%)	Not Available
Lower Explosive Limit (%)	Not Available
Surface Tension	No data available
Volatile Component (%vol)	Not Available
Gas group	No data available
Molecular weight (g/mol)	Not Applicable
Evaporation Rate	Not Available
IUCLID Remarks	No data available

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1.	**Reactivity**	See section 7.2
10.2.	**Chemical stability**	; • Elevated temperatures. • Presence of open flame. • Product is considered stable. • Hazardous polymerisation will not occur.
10.3.	**Possibility of hazardous reactions**	See section 7.2
10.4.	**Conditions to avoid**	See section 7.2
10.5.	**Incompatible materials**	See section 7.2
10.6.	**Hazardous decomposition products**	See section 5.3

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Mutagenicity:	No data available

Reproductive Toxicity: No data available
Carcinogenicity: No data available
STOT - single exposure: No data available

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances
PROPANE DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE BATISTE DRY SHAMPOO:
No significant acute toxicological data identified in literature search.
DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE CETYLTRIMETHYLAMMONIUM CHLORIDE:

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
For alkyltrimethylammonium chloride (ATMAC)
Most undiluted cationic surfactants satisfy the criteria for classification as Harmful (Xn) with R22 and as Irritant (Xi) for skin and eyes with R38 and R41. In addition, certain surfactants will satisfy the criteria for classification as Corrosive with R34 in addition to the acute toxicity.
According to Centre Europeen des Agents de Surface et de leurs Intermediaires Organiques (CESIO), C8-18 alkyltrimethylammonium chloride (ATMAC) (i.e., lauryl, coco, soya, and tallow) are classified as Corrosive (C) with the risk phrases R22 (Harmful if swallowed) and R34 (Causes burns). C16 ATMAC is classified as Harmful (Xn) with the risk phrases R22 (Harmful if swallowed), R38 (Irritating to skin), and R41 (Risk of serious damage to eyes). C20-22 ATMAC are classified as Irritant (Xi) with R36/38 (Irritating to eyes and skin).
Toxokinetics and Acute Toxicity: The few available absorption studies conducted with cationic surfactants indicate that absorption occurs in small amounts through the skin. Percutaneous absorption of radiolabelled C12 alkyltrimethylammonium bromide (ATMAB) in 3% aqueous solution (applied to an 8 cm2 area with occlusion) in the rat was low and corresponded to 0.6% of the applied 14C activity in 72 hours. Most of the absorbed surfactant was excreted in the urine, i.e. 0.35% of the applied 14C activity within the first 24 hours, whereas 13.2% remained on the skin after rinsing. Cutaneous application of the surfactant without rinsing resulted in a greater degree of percutaneous absorption (3.15%) in 48 hours. In the rat elimination after parenteral administration was rapid and was effected primarily via the urine, - more than 80% of the radioactivity was eliminated within 24 hours of application. About 80% of the 14C activity was found in the gastrointestinal tract 8 hours after oral administration of 14C-labelled C16 ATMAB. Only small amounts of the applied radioactivity were found in the urine and in the blood plasma. This indicates poor intestinal absorption. Similar small amounts of 14C were found in the liver, kidneys, spleen, heart, lungs and skeletal muscles. Within 3 days of ingestion, 92% of the administrated radioactivity had been excreted in the faeces and 1% in the urine. No appreciable enterohepatic circulation of the radioactivity was found.
The acute oral toxicity of alkyltrimethylammonium salts is somewhat higher than the toxicity of anionic and nonionic surfactants. This may be due to the strongly irritating effect which cationic surfactants exhibit on the mucous membrane of the gastrointestinal tract (SFT 1991). Cationic surfactants are generally about 10 times more toxic when administrated by the intravenous route compared to oral administration.
Skin and Eye Irritation: Skin irritation depends on surfactant concentration. Regardless of the structure, cationic surfactants lead to serious destruction of the skin at high concentrations. Solutions of approximately 0.1% are rarely irritating, whereas irritation is usually pronounced at concentrations between 1.0 and 10.0% surfactant. C16 ATMAC was severely irritating to rabbit skin in a concentration of 2.5%. The surfactant was applied to intact and abraded sites and scored after 34 hours. Then the skin was rinsed and then scored again after 48 hours. The erythema and Eschar Index was 3.75 (maximum 4) and the edema Index was 2.0 (maximum 4).
With regard to eye irritation, cationic surfactants are the most irritating of the surfactants. The longer chained alkyltrimethylammonium salts are less irritating to the rabbit eye than the shorter alkyl chain homologues. C10 ATMAB, C12 ATMAB, and C16 ATMAC were tested in concentrations between 0.1 and 1.0% in water and were found to be significantly irritating or injurious to the rabbit eye. A 5% solution of C18 ATMAC was instilled into the eyes of guinea pigs, and this concentration was very irritating with a total PII (The Primary Irritation Index) score of 96 (maximum 110).
A homologous series of ATMAB produced very little swelling of the stratum corneum and some homologues produced a shrinkage of the stratum corneum after prolonged exposure.
Many proteins in the skin are considerably more resistant to the denaturating effects of cationic surfactants compared to those of anionic surfactants. As cationic surfactants frequently have a lower critical micelle concentration than the anionic surfactants, a saturation of the surfactant/protein complex is prevented by the formation of micelles.
Compared to a representative anionic surfactant, the cooperative binding with subsequent protein denaturation requires about a tenfold higher concentration of a cationic surfactant. Contrary to the irreversible denaturating effect of sodium dodecyl sulfate, the adverse effects of some cationic surfactants on proteins may be reversible. Cationic surfactants can interact with proteins or peptides by polar and hydrophobic binding. Polar interactions result in electrostatic bonds between the negatively charged groups of the protein molecule and the positively charged surfactant molecule.
Sensitisation: A repeated insult patch test of C16 ATMAC was conducted with 114 volunteers. Seventeen days after the last induction of 0.25% surfactant, a challenge patch of 0.25% was applied. No sensitization was observed.
Sub-chronic toxicity: C16 ATMAB was administered at concentrations of 10, 20, and 45 mg/kg/day via the drinking water to rats for one year. The only effect observed was a decrease in body weight gain in the 45 mg/day dose group.
Reproductive Toxicity: No embryo toxic effects were seen, when C18 ATMAC was applied dermally to pregnant rats during the period of major organogenesis (day 6-15 of gestation). The concentrations of C18 ATMAC were 0.9, 1.5 and 2.5%. There was no increase in the incidence of fetal malformations. C16 ATMAB was not teratogenic in rats after oral doses. Mild embryonic effects were observed with 50 mg/kg/day, but these effects were attributed to maternal toxicity rather than to a primary embryonic effect. Lower doses of C16 ATMAB showed no embryo toxic or teratogenic effects.
Mutagenicity: C16 ATMAC was studied in in vitro short-term tests to detect potential mutagenic effects. Cultures of Syrian golden hamster embryo cells were used for an in vitro bioassay. No in vitro transformation of hamster embryo cells was induced, and C16 ATMAC was not mutagenic in *Salmonella typhimurium* (Inoue and Sunakawa 1980). No mutagenic effects or genetic damages were indicated in a survey of nine short-term genotoxicity tests with C16 and C18 ATMAC (Yam *et al*. 1984).
Environmental and Health Assessment of Substances in Household Detergents and Cosmetic Detergent Products, Environment Project, 615, 2001. Torben Madsen et al: Miljoministeriet (Danish Environmental Protection Agency)
For quaternary ammonium compounds (QACs):
Quaternary ammonium compounds (QACs) are cationic surfactants. They are synthetic organically tetra-substituted ammonium compounds, where the R substituents are alkyl or heterocyclic radicals. A common characteristic of these synthetic compounds is that one of the R's is a long-chain hydrophobic aliphatic residue.
The cationic surface active compounds are in general more toxic than the anionic and non-ionic surfactants. The positively-charged cationic portion is the functional part of the molecule and the local irritation effects of QACs appear to result from the quaternary ammonium cation.
Due to their relative ability to solubilise phospholipids and cholesterol in lipid membranes, QACs affect cell permeability which may lead to cell death. Further QACs denature proteins as cationic materials precipitate protein and are accompanied by generalised tissue irritation.
It has been suggested that the experimentally determined decrease in acute toxicity of QACs with chain lengths above C16 is due to decreased water solubility.
In general it appears that QACs with a single long-chain alkyl groups are more toxic and irritating than those with two such substitutions,
The straight chain aliphatic QACs have been shown to release histamine from minced guinea pig lung tissue. However, studies with benzalkonium chloride have shown that the effect on histamine release depends on the concentration of the solution. When cell suspensions (11% mast cells) from rats were exposed to low concentrations, a decrease in histamine release was seen. When exposed to high concentrations the opposite result was obtained.
In addition, QACs may show curare-like properties (specifically benzalkonium and cetylpyridinium derivatives, a muscular paralysis with no involvement of the central nervous system. This is most often associated with lethal doses. Parenteral injections in rats, rabbits and dogs have resulted in prompt but transient limb paralysis and sometimes fatal paresis of the respiratory muscles. This effect seems to be transient.
From human testing of different QACs the generalised conclusion is obtained that all the compounds investigated to date exhibit similar toxicological properties.
BATISTE DRY SHAMPOO:~OTHERISO-BUTANE:

TOXICITY	IRRITATION
Inhalation (Mouse) LC50:52 mg/kg/1h *	

*WISERSTARCH:

TOXICITY	IRRITATION
Intraperitoneal (Mouse) LD50:6600 mg/kg	Skin (human):0.3 mg/3d-I Mild

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.
CETYLTRIMETHYLAMMONIUM CHLORIDE:

TOXICITY	IRRITATION
Oral (rat) LD50:250 mg/kg	
Dermal (Rabbit) LD50:4300 mg/kg	
Oral (Rat) LD50:1300 mg/kg **	

for Fatty Nitrogen-Derived Cationics (FND Cationics):
Overall, the available data support the conclusion that, because of their closely-related structures, FND Cationics possess similar environmental fate and ecotoxicity across the category.
Environmental fate:
FND Cationics are considered to be essentially nonvolatile. Water solubility estimates varied from insoluble to slightly soluble, with higher solubility predictions tending to occur for lower molecular weight chemicals. Log Kow values less than 5 were predicted for all of the chemicals that could be modeled.
Measurement and prediction of physical/chemical properties for surfactants are complicated by their behavior in test systems and the environment, and the Kow is not an appropriate hydrophobicity parameter for reliably predicting environmental behavior. Although predictions vary, the overall data and knowledge of the chemicals support the conclusion that the FND Cationics have closely related structures and behave similarly from the perspective of physical/chemical properties.
Fugacity models predict virtually no occurrence of the FND Cationics in air. Nonetheless, modeling of these and similar substances indicates that these chemicals would be expected to degrade relatively rapidly upon exposure to light (t1/2 values ranging from approximately 2.8 to 5.9 hours).
Predicted distribution of the chemicals in the environment was to water and/or sediment compartments based on the assumption that release of the chemicals to the environment is exclusively via water. For chemicals with higher predicted water solubility (lower Kow), the water compartment was favoured. Measured biodegradation rates were variable and frequently confounded by adsorption. Overall, the FND Cationic Category chemicals are biodegradable.
Cationic substances in the environment instantaneously form complexes with naturally occurring negatively charged constituents in sewage, soils, sediments, and with dissolved humic substances in surface waters. This complexation behavior results in reduced bioavailability in actual environmental conditions that is not adequately represented by standard laboratory assays and/or predictions by various QSAR models.
Ecotoxicity:
These chemicals, by the nature of their surfactant properties, are toxic to aquatic organisms at low concentrations
Measured aquatic toxicity values indicated acute LC50 and EC50 values generally less than approximately 25 mg/l for fish, daphnid and algae . Other species may be less sensitive to the toxicity of these surfactants with acute LC50 values of 36 and > 50 mg/l recorded for shrimp and crabs, respectively. Chronic toxicity to aquatic organisms varied considerably, with NOECs ranging from 4.15 ug/l to 12.7 mg/l. These studies of aquatic toxicity, many of which were conducted in natural waters with and without added effluents, indicate that the source and composition of the test water dramatically affects the toxicity of the test substance.

NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
Changes in motor activity** Akzo* for hexadecyltrimethylammonium chlorideCetyltrimethylammonium chloride is expected to produce similar toxic effectsALCOHOL, DENATURED:

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.
DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE:
For Fatty Nitrogen-Derived Cationics:(FND Cationics):
The available data support the conclusion that, because of their closely-related structures and similar physical/chemical properties, the FND Cationics possess similar human health-related effects across the category
The differences in chain length, degree of saturation of the carbon chains, source of the natural oils, or addition of an amino group in the chain would not be expected to have an impact on the toxicity profile. This conclusion is supported by a number of studies in the FND family of chemicals (amines, cationics, and amides as separate categories) that show no differences in the length or degree of saturation of the alkyl substituents and is also supported by the limited toxicity of these long-chain substituted chemicals
Acute toxicity: Adequate acute oral LD50 studies were available throughout the category. They indicate minimal to moderate acute toxicity of the chemical class with LD50 values ranging from approximately 60 to > 16,000 mg/kg. Repeat dose toxicity studies supported the conclusion that the FND Cationics have minimal toxicity potential below acutely toxic doses.
Genotoxicity: Available *in vitro* and *in vivo* assays indicated the FND Cationics and supplemental chemicals are unlikely to have mutagenic activity. The conclusion of a lack of mutagenicity and clastogenicity for FND Cationics is supported robustly by the full complement of studies available for the three non-HPV chemicals, including a negative *in vivo* mouse micronucleus assay and a negative *in vivo* chromosomal aberration assay for related substances
Reproductive and developmental toxicity: A reproductive screening evaluation from two repeat dose toxicity studies, two reproductive toxicity studies and results from available developmental toxicity studies, indicated that the FND Cationics are unlikely to cause reproductive effects and are not developmental toxicants. The available data indicate that these chemicals are neither embryo/foetal toxicants nor teratogens

In evaluating potential toxicity of the FND Nitriles, it is also useful to review the available data for the related FND Amides and FND Amines Category chemicals. Acute oral toxicity studies (approximately 80 studies for 40 chemicals in the three categories) provide LD50 values from approximately 400 to 10,000 mg/kg with no apparent organ specific toxicity. Similarly, repeated dose toxicity studies (approximately 35 studies for 15 chemicals) provide NOAELs between 10 and 100 mg/kg/day for rats and slightly lower for dogs. More than 60 genetic toxicity studies (in vitro bacterial and mammalian cells as well as in vivo studies) indicated no mutagenic activity among more than 30 chemicals tested. For reproductive evaluations, 14 studies evaluated reproductive endpoints and/or reproductive organs for 11 chemicals, and 15 studies evaluated developmental toxicity for 13 chemicals indicating no reproductive or developmental effects for the FND group as a whole.
No specific data describing the health effects of cationic dialkyldimethylammonium (DADMA) salts are readily available. However, many of the properties described for alkyltrimethylammonium (ATMA)) salts also apply to DADMA salts, although these are generally less irritating than the corresponding ATMA salts
SKIN

alcohol, denatured	GESAMP/EHS Composite List - GESAMP Hazard Profiles	D1: skin irritation/corrosion	1

SECTION 12: Ecological information

12.1. Toxicity

Fish:	No data available
Daphnia Magna:	No data available
Algae:	No data available
Toxic to aquatic micro-organisms:	No data available

DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE: CETYLTRIMETHYLAMMONIUM CHLORIDE:
Although inorganic chloride ions are not normally considered toxic they can exist in effluents at acutely toxic levels (chloride >3000 mg/l). The resulting salinity can exceed the tolerances of most freshwater organisms.
Inorganic chlorine eventually finds its way into the aqueous compartment and as such is bioavailable. Incidental exposure to inorganic chloride may occur in occupational settings where chemicals management policies are improperly applied. The toxicity of chloride salts depends on the counter-ion (cation) present; that of chloride itself is unknown. Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism, e.g. in congestive heart failure. Healthy individuals can tolerate the intake of large quantities of chloride provided that there is a concomitant intake of fresh water.
Although excessive intake of drinking-water containing sodium chloride at concentrations above 2.5 g/litre has been reported to produce hypertension, this effect is believed to be related to the sodium ion concentration.
Chloride concentrations in excess of about 250 mg/litre can give rise to detectable taste in water, but the threshold depends upon the associated cations. Consumers can, however, become accustomed to concentrations in excess of 250 mg/litre. No health-based guideline value is proposed for chloride in drinking-water.
In humans, 88% of chloride is extracellular and contributes to the osmotic activity of body fluids. The electrolyte balance in the body is maintained by adjusting total dietary intake and by excretion via the kidneys and gastrointestinal tract. Chloride is almost completely absorbed in normal individuals, mostly from the proximal half of the small intestine. Normal fluid loss amounts to about 1.5-2 liters/day, together with about 4 g of chloride per day. Most (90 - 95%) is excreted in the urine, with minor amounts in faeces (4-8%) and sweat (2%).
Chloride increases the electrical conductivity of water and thus increases its corrosivity. In metal pipes, chloride reacts with metal ions to form soluble salts thus increasing levels of metals in drinking-water. In lead pipes, a protective oxide layer is built up, but chloride enhances galvanic corrosion. It can also increase the rate of pitting corrosion of metal pipes.
for Fatty Nitrogen-Derived Cationics (FND Cationics):
Overall, the available data support the conclusion that, because of their closely-related structures, FND Cationics possess similar environmental fate and ecotoxicity across the category.
Environmental fate:
FND Cationics are considered to be essentially nonvolatile. Water solubility estimates varied from insoluble to slightly soluble, with higher solubility predictions tending to occur for lower molecular weight chemicals. Log Kow values less than 5 were predicted for all of the chemicals that could be modeled.
Measurement and prediction of physical/chemical properties for surfactants are complicated by their behavior in test systems and the environment, and the Kow is not an appropriate hydrophobicity parameter for reliably predicting environmental behavior. Although predictions vary, the overall data and knowledge of the chemicals support the conclusion that the FND Cationics have closely related structures and behave similarly from the perspective of physical/chemical properties.
Fugacity models predict virtually no occurrence of the FND Cationics in air. Nonetheless, modeling of these and similar substances indicates that these chemicals would be expected to degrade relatively rapidly upon exposure to light (t1/2 values ranging from approximately 2.8 to 5.9 hours).
Predicted distribution of the chemicals in the environment was to water and/or sediment compartments based on the assumption that release of the chemicals to the environment is exclusively via water. For chemicals with higher predicted water solubility (lower Kow), the water compartment was favoured. Measured biodegradation rates were variable and frequently confounded by adsorption. Overall, the FND Cationic Category chemicals are biodegradable.

Cationic substances in the environment instantaneously form complexes with naturally occurring negatively charged constituents in sewage, soils, sediments, and with dissolved humic substances in surface waters. This complexation behavior results in reduced bioavailability in actual environmental conditions that is not adequately represented by standard laboratory assays and/or predictions by various QSAR models.

Ecotoxicity:

These chemicals, by the nature of their surfactant properties, are toxic to aquatic organisms at low concentrations

Measured aquatic toxicity values indicated acute LC50 and EC50 values generally less than approximately 25 mg/l for fish, daphnid and algae . Other species may be less sensitive to the toxicity of these surfactants with acute LC50 values of 36 and > 50 mg/l recorded for shrimp and crabs, respectively. Chronic toxicity to aquatic organisms varied considerably, with NOECs ranging from 4.15 ug/l to 12.7 mg/l. These studies of aquatic toxicity, many of which were conducted in natural waters with and without added effluents, indicate that the source and composition of the test water dramatically affects the toxicity of the test substance.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

ISO-BUTANE: PROPANE: STARCH: CETYLTRIMETHYLAMMONIUM CHLORIDE: ALCOHOL, DENATURED: DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE: BUTANE:

DO NOT discharge into sewer or waterways.

BUTANE:

log Kow (Sangster 1997):	2.89

For butane:
log Kow: 2.89
Koc: 450-900
BCF: 1.9

Environmental Fate

Terrestrial Fate: An estimated Koc value of 900, determined from a log Kow of 2.89 indicates that n-butane is expected to have low mobility in soil. Volatilisation of n-butane from moist soil surfaces is expected to be an important fate process given an estimated Henry's Law constant of 0.95 atm-cu m/mole, derived from its vapor pressure, 1820 mm Hg and water solubility, 61.2 mg/l. The potential for volatilisation of n-butane from dry soil surfaces may exist based upon its vapor pressure. While volatilistion from soil surfaces is expected to be the predominant fate process of n-butane released to soil, this compound is also susceptible to biodegradation. In one soil, a biodegradation rate of 1.8 mgC/day/kg dry soil was reported.

Aquatic fate: The estimated Koc value indicates that n-butane may adsorb to suspended solids and sediment. Volatilisation from water surfaces is expected based upon an estimated Henry's Law constant Using this Henry's Law constant volatilisation half-lives for a model river and model lake are estimated to be 2.2 hours and 3 days, respectively. An estimated BCF of 33 derived from the log Kow suggests the potential for bioconcentration in aquatic organisms is moderate. While volatilisation from water surfaces is expected to be the major fate process for n-butane released to water, biodegradation of this compound is also expected to occur. In a screening study, complete biodegradation was reported in 34 days. In a second study using a defined microbial culture, it was reported that n-butane was degraded to 2-butanone and 2-butanol. Photolysis or hydrolysis of n-butane in aquatic systems is not expected to be important.

Atmospheric fate: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere and the vapour pressure, n-butane, is expected to exist solely as a gas in the ambient atmosphere. Gas-phase n-butane is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 6.3 days, calculated from its rate constant of 2.54x10-12 cu cm/molecule-sec at 25 deg. Based on data for iso-octane and n-hexane, n-butane is not expected to absorb UV light in the environmentally significant range, >290 nm and probably will not undergo direct photolysis in the atmosphere. Experimental data showed that 7.7% of the n-butane fraction in a dark chamber reacted with nitrogen oxide to form the corresponding alkyl nitrate, suggesting nighttime reactions with radical species and nitrogen oxides may contribute to the atmospheric transformation of n-butane.

ISO-BUTANE:

log Kow (Sangster 1997):	2.76

For isobutane:

Refrigerant Gas: Saturated Hydrocarbons have zero ozone depletion potential (ODP) and will photodegrade under atmospheric conditions. [Calor Gas]

Environmental Fate

Terrestrial fate: An estimated Koc value of 35 suggests that isobutane will have very high mobility in soil. Its very high Henry's Law constant, 4.08 atm-cu m/mole, (calculated from its vapor pressure and water solubility, high vapor pressure, 2611 mm Hg at 25 deg C, and low adsorptivity to soil indicate that volatilisation will be an important fate process from both moist and dry soil surfaces. Isobutane is biodegradable, especially under acclimated conditions, and may biodegrade in soil.

Aquatic fate: The estimated Koc value suggests that isobutane would not adsorb to sediment and particulate matter in the water column. Additional evidence that isobutane is not removed to sediment has been obtained from microcosm experiments. Isobutane will readily volatilise from water based on its estimated Henry's Law constant of 4.08 atm-cu m/mole. Estimated half-lives for a model river and model lake are 2.2 hr and 3.0 days, respectively. An estimated BCF value of 74 based on the log Kow suggests that isobutane will not bioconcentrate in aquatic organisms.

Results indicate that gas exchange is the dominant removal mechanism for isobutane gases from the water column following a hypothetical input. The volatilisation half-lives for isobutane from the water columns in natural estuaries are estimated to be 4.4 and 6.8 days at 20 and 10 deg C, respectively.

Isobutane also biodegrades in the microcosm at a rate that is slower than for n-butane and falls between propane and ethane in susceptibility. Biodegradation of isobutane initially occurs with a half-lives of 16-26 days at 20 deg C and 33-139 days at 10 deg C, significantly slower than the loss predicted by gas exchange from typical natural estuaries. However, after a lag of 2-4 weeks, the biodegradation rate increases markedly so that in the case of chronic inputs, biodegradation can become the dominant removal mechanism.

Atmospheric fate:: Isobutane is a gas at ordinary temperatures. It is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is 6.9 days, assuming a hydroxyl radical concn of 5x105 radicals per cubic cm. When isobutane was exposed to sunlight for 6 hr in a tedlar bag filled with Los Angeles air, 6% of the isobutane degraded The air contained 4529 ppb-C hydrocarbons and 870 ppb of NOX. The tropospheric loss of volatile hydrocarbons such as isobutane by wet and dry deposition are believed to be of minor importance. Indeed, isobutane assimilated into precipitation may evaporate during transport as well as being reemitted into the atmosphere after deposition. Isobutane is a contributor to the production of PAN (peroxyacyl nitrates) under photochemical smog conditions

PROPANE:

log Kow (Sangster 1997):	2.36

For propane:

Environmental Fate

Terrestrial fate:: An estimated Koc value of 460 determined from a log Kow of 2.36 indicates that propane is expected to have moderate mobility in soil. Volatilisation of propane from moist soil surfaces is expected to be an important fate process given an estimated Henry's Law constant of 7.07x10-1 atm-cu m/mole, derived from its vapor pressure, 7150 mm Hg, and water solubility, 62.4 mg/L. Propane is expected to volatilise from dry soil surfaces based upon its vapor pressure. Using cell suspensions of microorganisms isolated from soil and water, propane was oxidised to acetone within 24 hours, suggesting that biodegradation may be an important fate process in soil and sediment.

Aquatic fate: The estimated Koc value indicates that propane is expected to adsorb to suspended solids and sediment. Volatilisation from water surfaces is expected based upon an estimated Henry's Law constant. Using this Henry's Law constant volatilisation half-lives for a model river and model lake are estimated to be 41 minutes and 2.6 days, respectively. An estimated BCF of 13.1 using log Kow suggests the potential for bioconcentration in aquatic organisms is low. After 192 hr, the trace concentration of propane contained in gasoline remained unchanged for both a sterile control and a mixed culture sample collected from ground water contaminated with gasoline. This indicates that biodegradation may not be an important fate process in water.

Atmospheric fate:: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere and vapour pressure, propane is expected to exist solely as a gas in the ambient atmosphere. Gas-phase propane is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 14 days, calculated from its rate constant of 1.15x10-12 cu cm/molecule-sec at 25 deg C. Propane does not contain chromophores that absorb at wavelengths >290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight.

STARCH:

ThOD:	1.18

Sugar-based compounds (saccharides), including polysaccharides are generally easily decomposed by biodegradation. Not all polysaccharides decompose with equal rapidity, and polysaccharides are also synthesised by microorganisms during, for example, the compost maturation phases. Water-insoluble species such as cellulose take longer to decompose and those with a significant degree of branching also take longer.

ThOD: 1.18 CETYLTRIMETHYLAMMONIUM CHLORIDE:

Marine Pollutant	Yes

Very toxic to aquatic organisms.

Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5

For alkyltrimethylammonium (ATMA) salts

Environmental fate:

Although cationic surfactants will sorb onto sludge particles and eventually reach the digester during the treatment of wastewater sludge, there is very limited information about the

biodegradability of these compounds under anoxic conditions. It has been demonstrated, however, that the concentration of quaternary ammonium salts does not decrease, or only slightly decreases, in an anaerobic digester.
Very little is known about biodegradation pathways of alkyltrimethylammonium (ATMA) salts. Two potential points of attack have been proposed. The degradation may either be initiated by a fission of the C-N bond in which the alkyl chain or a methyl group is cleaved from a tertiary amine, or by an omega-oxidation in which the far end of the alkyl chain is first oxidized to a carboxylic acid. Biodegradation can then proceed via beta-oxidation.

Ecotoxicity:

Algae constitute a group of organisms which appears to be very sensitive to cationic surfactants. The toxicity of ATMAB and ATMAC (alkyltrimethylammonium bromide and chloride) to algae is characterized by EC50 values below 1 mg/l.
ATMAC are acutely toxic to aquatic invertebrates as indicated by EC/LC50 values below 1 mg/l for alkyl chain lengths of C16 exposed artificial stream mesocosms housing the freshwater clam *Corbicula fluminea* with C12 ATMAC. Minor and transient effects on length gain were observed at 43 ug/l during weeks 2-4 and 6-7, but these effects were not evident at the end of the experiment after 8 weeks. One study with the species *Idus melatonus* indicates that some ATMAC are also toxic to fish Environmental and Health Assessment of Substances in Household Detergents and Cosmetic Detergent Products, Environment Project, 615, 2001. Torben Madsen et al: Miljoministeriet (Danish Environmental Protection Agency)

For quaternary ammonium compounds (QACs):

QACs are white, crystalline powders. Low molecular weight QACs are very soluble in water, but slightly or not at all soluble in solvents such as ether, petrol and benzene. As the molecular weight and chain lengths increases, the solubility in polar solvents (e.g. water) decreases and the solubility in non-polar solvents increases.

Environmental fate

A major part of the QACs is discharged into wastewater and removed in the biological processes of sewage treatment plant. A 90% reduction of the QACs in the water phase of sludge has been reported and alkyl di-/ trimethyl ammonium and alkyl dimethyl benzyl ammonium compounds seem almost completely degraded in sewage sludge.
However, the aerobic and anaerobic biodegradability of QACs is not well investigated. Only sparse data are available concerning stability, solubility and biodegradability. In general, it seems that the biodegradability decreases with increasing numbers of alkyl chains: $R(CH3)3N+ > R2(CH3)2N+ > R3(CH3)N+$. Within each category the biodegradability seems inversely proportional to the alkyl chain length. Heterocyclic QACs are less degradable than the non-cyclic.
Investigations have shown that bioaccumulation of considerable dimensions will probably not take place.

Ecotoxicity:

Quaternary ammonium compounds and their polymers may be highly toxic to fish and other aquatic organisms. The toxicity of the quaternary ammoniums is known to be greatly reduced in the environment because of preferential binding to dissolved organics in surface water.
Prevent, by any means available, spillage from entering drains or water courses.
The material is classified as an **ecotoxin*** because the ***Fish LC50 (96 hours)*** is less than or equal to 0.1 mg/l
** Classification of Substances as Ecotoxic (Dangerous to the Environment)*
Appendix 8, Table 1
Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities

ALCOHOL, DENATURED:

When ethanol is released into the soil it readily and quickly biodegrades but may leach into ground water; most is lost by evaporation. When released into water the material readily evaporates and is biodegradable.
Ethanol does not bioaccumulate to an appreciable extent.
The material is readily degraded by reaction with photochemically produced hydroxy radicals; release into air will result in photodegradation and wet deposition.

Environmental Fate:

TERRESTRIAL FATE: An estimated Koc value of 1 indicates that ethanol is expected to have very high mobility in soil. Volatilisation of ethanol from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 5X10-6 atm-m3/mole. The potential for volatilisation of ethanol from dry soil surfaces may exist based upon an extrapolated vapor pressure of 59.3 mmHg. Biodegradation is expected to be an important fate process for ethanol based on half-lives on the order of a few days for ethanol in sandy soil/groundwater microcosms.
AQUATIC FATE: An estimated Koc value of 1 indicates that ethanol is not expected to adsorb to suspended solids and sediment. Volatilisation from water surfaces is expected based upon a Henry's Law constant of 5X10-6 atm-m3/mole. Using this Henry's Law constant and an estimation method, volatilisation half-lives for a model river and model lake are 3 and 39 days, respectively.An estimated BCF= 3, from a log Kow of -0.31 suggests bioconcentration in aquatic organisms is low. Hydrolysis and photolysis in sunlit surface waters is not expected to be an important environmental fate process for ethanol since this compound lacks functional groups that hydrolyse or absorb light under environmentally relevant conditions. Ethanol was degraded with half-lives on the order of a few days in aquatic studies conducted using microcosms constructed with a low organic sandy soil and groundwater, indicating it is unlikely to be persistent in aquatic environments(8).
ATMOSPHERIC FATE: Ethanol, which has an extrapolated vapor pressure of 59.3 mm Hg at 25 deg C, is expected to exist solely as a vapor in the ambient atmosphere. Vapour-phase ethanol is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 5 days, calculated from its rate constant of 3.3X10-12 m3/molecule-sec at 25 deg C.

Ecotoxicity:

log Kow: -0.31- -0.32
Half-life (hr) air: 144
Half-life (hr) H_2O surface water: 144
Henry's atm m3 /mol: 6.29E-06
BOD 5 if unstated: 0.93-1.67,63%
COD: 1.99-2.11,97%
ThOD: 2.1

DI-C14-18-ALKYLDIMETHYLAMMONIUM CHLORIDE:

Marine Pollutant	Yes

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

For dialkyldimethylammonium chlorides (DADMAC)

Environmental fate:

The ultimate biodegradability of dialkyldimethyl ammonium chlorides (DADMAC) and other salts decreases with increasing alkyl chain length. DADMAC with branched alkyl chain(s) like, e.g., decylisononyldimethylammonium chloride are expected to degrade more slowly than similar homologues with linear alkyl chains. Poor biodegradability in standard screening tests is not necessarily due to an inherent recalcitrance of DADMAC as other factors like, e.g., toxicity and a slow desorption of the cationic surfactant from surfaces may limit biodegradation.
The information on the biodegradability of cationic surfactants under anoxic conditions is scarce. One study has demonstrated that the concentration of quaternary ammonium salts did not decrease, or only slightly decreased, in an anaerobic digester.

Ecotoxicity:

Algae are very sensitive to dialkyldimethylammonium salts as also noted for the alkyltrimethylammonium salts. The toxicity of DADMAC and DADMAB to algae is characterised by EC50 values below 1 mg/l.
DADMAC with alkyl chains consisting of 16 carbons or more are acutely toxic to aquatic invertebrates and fish as the lowest EC/LC50 values are below 1 mg/l.
Environmental and Health Assessment of Substances in Household Detergents and Cosmetic Detergent Products, Environment Project, 615, 2001. Torben Madsen et al: Miljoministeriet (Danish Environmental Protection Agency)

For quaternary ammonium compounds (QACs):

QACs are white, crystalline powders. Low molecular weight QACs are very soluble in water, but slightly or not at all soluble in solvents such as ether, petrol and benzene. As the molecular weight and chain lengths increases, the solubility in polar solvents (e.g. water) decreases and the solubility in non-polar solvents increases.

Environmental fate:

A major part of the QACs is discharged into wastewater and removed in the biological processes of sewage treatment plant. A 90% reduction of the QACs in the water phase of sludge has been reported and alkyl di-/ trimethyl ammonium and alkyl dimethyl benzyl ammonium compounds seem almost completely degraded in sewage sludge.
However, the aerobic and anaerobic biodegradability of QACs is not well investigated. Only sparse data are available concerning stability, solubility and biodegradability. In general, it seems that the biodegradability decreases with increasing numbers of alkyl chains: $R(CH3)3N+ > R2(CH3)2N+ > R3(CH3)N+$. Within each category the biodegradability seems inversely proportional to the alkyl chain length. Heterocyclic QACs are less degradable than the non-cyclic.
Investigations have shown that bioaccumulation of considerable dimensions will probably not take place.

Ecotoxicity:

Quaternary ammonium compounds and their polymers may be highly toxic to fish and other aquatic organisms. The toxicity of the quaternary ammoniums is known to be greatly reduced in the environment because of preferential binding to dissolved organics in surface water.

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
Batiste dry shampoo	No Data Available	No Data Available
butane	LOW	No Data Available
iso-butane	HIGH	No Data Available

propane	LOW	No Data Available
starch	No Data Available	No Data Available
cetyltrimethylammonium chloride	No Data Available	No Data Available
alcohol, denatured	LOW	MED
di-C14-18-alkyldimethylammonium chloride	No Data Available	No Data Available

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
butane	LOW
iso-butane	LOW
propane	LOW
starch	LOW
alcohol, denatured	LOW

12.4. Mobility in soil

Ingredient	Mobility
butane	HIGH (ESTIMATED)
iso-butane	HIGH (ESTIMATED)
propane	HIGH (ESTIMATED)
alcohol, denatured	HIGH (ESTIMATED)

12.5. Results of PBT and vPvB assessment

	P	B	T
Relevant available data	No data available	No data available	No data available
PBT and vPvB Criteria fulfilled?	No data available	No data available	No data available

12.6. Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product / Packaging disposal:

- **DO NOT** allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.

- Consult State Land Waste Management Authority for disposal.
- Discharge contents of damaged aerosol cans at an approved site.
- Allow small quantities to evaporate.
- **DO NOT** incinerate or puncture aerosol cans.
- Bury residues and emptied aerosol cans at an approved site.

Waste treatment options:	No data available
Sewage disposal options:	No relevant data
Other disposal recommendations:	No data available

SECTION 14: Transport information

Labels Required: FLAMMABLE GAS

Land transport (ADR / RID / GGVSE)

14.1. UN number	1950	**14.4. Packing group**	None	
14.2. UN proper shipping name	Shipping name: AEROSOLS	**14.5. Environmental hazard**	No relevant data	
14.3. Transport hazard class(es)	2.1	**14.6. Special precautions for user**	Hazard identification (Kemler)	None
			Classification Code	5A
			Hazard Label	2.2
			Special provisions	190 327 344 625
			Add limited quantity	1 L

Air transport (ICAO-IATA / DGR)

14.1. UN number	1950	**14.4. Packing group**	None
14.2. UN proper shipping name	Shipping name:AEROSOLS	**14.5. Environmental hazard**	No relevant data
14.3. Transport hazard class(es)	ICAO/IATA Class: 2.1 ICAO/IATA Subrisk: None ERG Code 10L	**14.6. Special precautions for user**	

Special provisions	A145
Cargo Only Packing Instructions	203
Cargo Only Maximum Qty / Pack	150 kg
Passenger and Cargo Packing Instructions	203
Passenger and Cargo Maximum Qty / Pack	75 kg
Passenger and Cargo Limited Quantity Packing Instructions	Y203
Passenger and Cargo Maximum Qty / Pack	30 kg G

Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1950	**14.4. Packing group**	None
14.2. UN proper shipping name	Shipping name:AEROSOLS	**14.5. Environmental hazard**	No relevant data
14.3. Transport hazard class(es)	2.1 **IMDG Subrisk** SP63	**14.6. Special precautions for user**	EMS Number: F-D,S-U Special provisions: 63 190 277 327 344 959 Limited Quantities: See SP277

Inland waterways transport (ADNR / River Rhine)

14.1. UN number	1950	**14.4. Packing group**	None
14.2. UN proper shipping name	Shipping name:AEROSOLS	**14.5. Environmental hazard**	No relevant data
14.3. Transport hazard class(es)	2.1 **ADNR Label** 2.2	**14.6. Special precautions for user**	Classification code: 5A Limited quantity: LQ2 Equipment required: No data available Fire cones number: 0

14.7. Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

No data available

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations / legislation specific for the substance or mixture

Batiste dry shampoo (CAS:) is found on the following regulatory lists;

"EU Cosmetic Directive 76/768/EEC Annex II: List of Substances which must not form part of the Composition of Cosmetic Products (English)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1) Carcinogens: category 1A (Table 3.1)/category 1 (Table 3.2)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4) Mutagens: category 1B (Table 3.1)/category 2 (Table 3.2)", "Europe Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food - Annex I: Substances", "Europe ECHA Registered Substances - Classification and Labelling - DSD-DPD", "Europe ECHA Registered Substances - Classification and Labelling - GHS", "Europe European Chemicals Agency (ECHA) List of Registered Phase-in Substances", "Europe European Chemicals Agency (ECHA) List of Registered Substances", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "Europe Substances Listed in EU Directives on Plastics in Contact with Food", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Carcinogenic Substances", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Mutagenic Substances", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Numbering System for Food Additives", "OECD List of High Production Volume (HPV) Chemicals", "UK Workplace Exposure Limits (WELs)"

Regulations for ingredients

butane (CAS: 106-97-8) is found on the following regulatory lists;

"Acros Transport Information", "EU Cosmetic Directive 76/768/EEC Annex II: List of Substances which must not form part of the Composition of Cosmetic Products (English)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1) Carcinogens: category 1A (Table 3.1)/category 1 (Table 3.2)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4) Mutagens: category 1B (Table 3.1)/category 2 (Table 3.2)", "Europe Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food - Annex I: Substances", "Europe ECHA Registered Substances - Classification and Labelling - DSD-DPD", "Europe ECHA Registered Substances - Classification and Labelling - GHS", "Europe European Chemicals Agency (ECHA) List of Registered Phase-in Substances", "Europe European Chemicals Agency (ECHA) List of Registered Substances", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "Europe Substances Listed in EU Directives on Plastics in Contact with Food", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Customs Inventory of Chemical Substances (English)", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Carcinogenic Substances", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Mutagenic Substances", "European Union (EU) Directive 2008/1/EC concerning integrated pollution prevention and control, Annex III", "European Union (EU) Directive 2012/18/EU of 4 July 2012 on the control of major-accident hazards involving dangerous substances", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "International Numbering System for Food Additives", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information", "UK The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Release into Land Prescribed Substances", "UK Workplace Exposure Limits (WELs)"

iso-butane (CAS: 75-28-5) is found on the following regulatory lists;

"EU Cosmetic Directive 76/768/EEC Annex II: List of Substances which must not form part of the Composition of Cosmetic Products (English)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1) Carcinogens: category 1A (Table 3.1)/category 1 (Table 3.2)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4) Mutagens: category 1B (Table 3.1)/category 2 (Table 3.2)", "Europe Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food - Annex I: Substances", "Europe ECHA Registered Substances - Classification and Labelling - DSD-DPD", "Europe ECHA Registered Substances - Classification and Labelling - GHS", "Europe European Chemicals Agency (ECHA) List of Registered Phase-in Substances", "Europe European Chemicals Agency (ECHA) List of Registered Substances", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "Europe Substances Listed in EU Directives on Plastics in Contact with Food", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Customs Inventory of Chemical Substances (English)", "European Trade Union Confederation (ETUC) Priority List for REACH Authorisation", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Carcinogenic Substances", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Mutagenic Substances", "European Union (EU) Directive 2008/1/EC concerning integrated pollution prevention and control, Annex III", "European Union (EU) Directive 2012/18/EU of 4 July 2012 on the control of major-accident hazards involving dangerous substances", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "International Numbering System for Food Additives", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information", "UK The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Release into Land Prescribed Substances", "UK Workplace Exposure Limits (WELs)"

propane (CAS: 74-98-6) is found on the following regulatory lists;

"CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP", "EU Cosmetic Directive 76/768/EEC Annex II: List of Substances which must not form part of the Composition of Cosmetic Products (English)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 1) Carcinogens: category 1A (Table 3.1)/category 1 (Table 3.2)", "EU REACH Regulation (EC) No 1907/2006 - Annex XVII (Appendix 4) Mutagens: category 1B (Table 3.1)/category 2 (Table 3.2)", "Europe ECHA Registered Substances - Classification and Labelling - DSD-DPD", "Europe ECHA Registered Substances - Classification and Labelling - GHS", "Europe European Chemicals Agency (ECHA) List of Registered Phase-in Substances", "Europe European Chemicals Agency (ECHA) List of Registered Substances", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Customs Inventory of Chemical Substances (English)", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Carcinogenic Substances", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances (updated by ATP: 31) - Mutagenic Substances", "European Union (EU) Directive 2008/1/EC concerning integrated pollution prevention and control, Annex III", "European Union (EU) Directive 2012/18/EU of 4 July 2012 on the control of major-accident hazards involving dangerous substances", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "International Numbering System for Food Additives", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information", "UK The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Release into Land Prescribed Substances"

starch (CAS: 9005-25-8) is found on the following regulatory lists;

"EU REACH Regulation (EC) No 1907/2006 - Annex IV - Exemptions from the Obligation to Register in Accordance with Article 2(7)(a) (English)", "Europe Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food - Annex I: Substances", "Europe Substances Listed in EU Directives on Plastics in Contact with Food", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "FisherTransport Information", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-AldrichTransport Information", "UK Workplace Exposure Limits (WELs)"

cetyltrimethylammonium chloride (CAS: 112-02-7, 53023-95-3, 79728-63-5, 139272-33-6) is found on the following regulatory lists;

"Chemwatch Candidate List of Very High Concern - List of Substance Subject to Authorization", "EU Cosmetic Directive 76/768/EEC Annex VI Part 1 List of Preservatives Allowed (English)", "EU Directive 2002/46/EC on the approximation of the laws of the Member States relating to food supplements - Annex I: Vitamins and minerals which may be used in the manufacture of food supplements", "EU Regulation (EC) No 1925/2006 on the addition of vitamins and minerals and of certain other substances to foods - Annex I: Vitamins and Minerals which may be added to foods.", "Europe ECHA Substances identified by industry to be registered by 31 May 2013", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Customs Inventory of Chemical Substances (English)", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Directive 2008/1/EC concerning integrated pollution prevention and control, Annex III", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "FisherTransport Information", "OECD List of High Production Volume (HPV) Chemicals", "OSPAR National List of Candidates for Substitution – Norway", "OSPAR National List of Candidates for Substitution – United Kingdom", "Scotland Pollution Inventory", "Sigma-AldrichTransport Information", "UK The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Release into Air Prescribed Substances", "WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established"

alcohol, denatured (CAS: 64-17-5) is found on the following regulatory lists;

"Acros Transport Information", "Europe Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food - Annex I: Substances", "Europe ECHA Registered Substances - Classification and Labelling - DSD-DPD", "Europe ECHA Registered Substances - Classification and Labelling - GHS", "Europe European Chemicals Agency (ECHA) List of Registered Phase-in Substances", "Europe European Chemicals Agency (ECHA) List of Registered Substances", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "Europe European Commission Database of flavouring substances", "Europe SCCNFP First Update of the Inventory of Ingredients Employed in Cosmetic Products - Section II: Perfume and Aromatic Raw Materials", "Europe Substances Listed in EU Directives on Plastics in Contact with Food", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Customs Inventory of Chemical Substances (English)", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31", "European Union (EU) Directive 2008/1/EC concerning integrated pollution prevention and control, Annex III", "European Union (EU) Directive 2012/18/EU of 4 July 2012 on the control of major-accident hazards involving dangerous substances", "European Union (EU) Inventory of Fragrance Ingredients (Perfume and Aromatic Raw Materials)", "European Union (EU) Inventory of Ingredients used in Cosmetic Products", "European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI", "FEMA Generally Recognized as Safe (GRAS) Flavoring Substances 23 - Examples of FEMA GRAS Substances with Non-Flavor Functions", "FisherTransport Information", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances", "IMO Provisional Categorization of Liquid Substances - List 2: Pollutant only mixtures containing at least 99% by weight of components already assessed by IMO", "International Air Transport Association (IATA) Dangerous Goods Regulations", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD List of High Production Volume (HPV) Chemicals", "OSPAR National List of Candidates for Substitution – Norway", "Scotland Pollution Inventory", "Sigma-AldrichTransport Information", "UK The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Release into Land Prescribed Substances", "UK Workplace Exposure Limits (WELs)", "World Anti-Doping Agency - The 2009 Prohibited List World Anti-Doping Code - Substances Prohibited in Competition (German)", "World Anti-Doping Agency - The 2009 Prohibited List World Anti-Doping Code - Substances Prohibited in Particular Sports (French)", "World Anti-Doping Agency - The 2009 Prohibited List World Anti-Doping Code - Substances Prohibited in Particular Sports (Korean)", "World Anti-Doping Agency - The 2012 Prohibited List World Anti-Doping Code - Substances Prohibited in Particular Sports"

di-C14-18-alkyldimethylammonium chloride (CAS: 68002-59-5, 92129-33-4) is found on the following regulatory lists;

"EU Directive 2002/46/EC on the approximation of the laws of the Member States relating to food supplements - Annex I: Vitamins and minerals which may be used in the manufacture of food supplements", "EU Regulation (EC) No 1925/2006 on the addition of vitamins and minerals and of certain other substances to foods - Annex I: Vitamins and Minerals which may be added to foods.", "Europe ECHA Registered Substances - Classification and Labelling - DSD-DPD", "Europe ECHA Registered Substances - Classification and Labelling - GHS", "Europe European Chemicals Agency (ECHA) List of Registered Phase-in Substances", "Europe European Chemicals Agency (ECHA) List of substances identified for registration in 2010", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Chemwatch Harmonised classification", "European Chemical Agency (ECHA) Classification & Labelling Inventory - Notified classification and labelling according to CLP criteria", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "European Union (EU) Directive 2008/1/EC concerning integrated pollution prevention and control, Annex III", "OECD List of High Production Volume (HPV) Chemicals", "OSPAR National List of Candidates for Substitution – Norway", "OSPAR National List of Candidates for Substitution – United Kingdom", "Scotland Pollution Inventory", "UK The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Release into Air Prescribed Substances", "WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established"

This safety data sheet is in compliance with the following EU legislation and its adaptations – as far as applicable - : 67/548/EEC, 1999/45/EC, 98/24/EC, 92/85/EEC, 94/33/EC, 91/689/EEC, 1999/13/EC, Regulation (EU) No 453/2010, Regulation (EC) No 1907/2006, Regulation (EC) No 1272/2008, and their amendments as well as the following British legislation:

- The Control of Substances Hazardous to Health Regulations (COSHH) 2002
- COSHH Essentials
- The Management of Health and Safety at Work Regulations 1999

15.2. Chemical safety assessment

ANNEX 1

butane	**601-004-00-0**
butane	601-004-01-8
iso-butane	601-004-00-0
iso-butane	601-004-01-8
propane	601-003-00-5
alcohol, denatured	603-002-00-5

Annex VI

Flammable Liquid Category 1

RISK

Risk Codes	**Risk Phrases**
R12	Extremely flammable.
R44	Risk of explosion if heated under confinement.

SECTION 16: Other information

ANNEX 2: Indications of Danger

C	Corrosive
F	Highly Flammable
F+	Extremely flammable
N	Dangerous for the environment
Xn	Harmful

Substance	**CAS**	**Suggested codes**
cetyltrimethylammonium chloride	112-02-7	N;R50

Denmark Advisory list for selfclassification of dangerous substances

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
cetyltrimethylammonium chloride	112-02-7, 53023-95-3, 79728-63-5, 139272-33-6
di-C14-18-alkyldimethylammonium chloride	68002-59-5, 92129-33-4

OTHER

- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

- For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:
EN 16 Personal eye-protection
EN 340 Protective clothing
EN 374 Protective gloves against chemicals and micro-organisms
EN 13832 Footwear protecting against chemicals
EN 133 Respiratory protective devices

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