

Safety Data Sheet

1. IDENTIFICATION

Product Name:	Ethanol 99 %
Other Name:	Ethyl Alcohol
Recommended Use:	Solvent for resin, lacquers, wax, printing ink, adhesives, plastics and polishes agent. Raw material for used in the chemical industry such as paints, rubbers, plastic, cosmetics, pharmaceuticals, and dehydrate agents.
Supplier:	Global Chemie ASCC Limited
Street Address:	88/123 Moo 2 Bangpoo Industrial Estate (North), Phraek Sa Mai, Mueang Samutprakan, Samutprakan 10280
Telephone:	+66 2324 6888
Fax:	+66 2324 6898-99
Emergency phone:	+668 1928 5826
All other inquiries:	+66 2324 6888 ext.320

2. HAZARDS IDENTIFICATION

Hazardous Nature

This product is classified as hazardous under GHS criteria

Hazardous Classification

Flammability Category 2

Serious eye damage/eye irritation category 2

Acute toxicity category 4

Hazardous Statement

Highly Flammable liquid and vapor

GHS Pictograms



Hazard Statements

H225 : Highly Flammable liquid and vapor

H319 : Causes serious eye irritation

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking

P233: Keep container tightly closed.

P240: Ground/Bond container and receiving equipment.

P241: Use explosion-proof electrical/ventilating/lighting/equipment.

P242: Use only non-sparking tools.

P243: Take precautionary measure against static discharge.

Response Statements

If on skin

P303+P361+P353: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P370+P378: In case of fire: Use manufacturer/supplier or the competent authority to specify appropriate media for extinction.

If in eye

P305+P351+P338: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313: If eye irritation persists: Get medical advice/attention.

Storage Statements

P403+P235: Store in a well-ventilated place. Keep cool.

Disposal Statements

P501: Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

Signal Word Danger

3. COMPOSITION: Information on Ingredients

Chemical Ingredient	CAS No.	UN No.	Proportion (%v/v)
Ethanol	64-17-5	1170	>99

Molecular formula: C₂H₆O

Molecular Weight: 46.1 g/mol

4. FIRST AID MEASURES

For advice, contact Ramathibodi Poison Centre (Phone: 1367) or a doctor.

Ingestion

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness, i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

Eye Contact

If this product comes in contact with the eyes:

- Wash out immediately with fresh running water.
- 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 skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

Inhalation

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prosthesis such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures

- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

Indication of any immediate medical attention and special treatment needed

For acute or short-term repeated exposures to ethanol:

- Acute ingestion in non-tolerant patients usually responds to supportive care with special attention to prevention of aspiration, replacement of fluid and correction of nutritional deficiencies (magnesium, thiamine pyridoxine, Vitamins C and K).
- Give 50% dextrose (50-100 ml) IV to bounded patients following blood draw for glucose determination.
- Comatose patients should be treated with initial attention to airway, breathing, circulation and drugs of immediate importance (glucose, thiamine). Decontamination is probably unnecessary more than 1 hour after a single observed ingestion. Cathartics and charcoal may be given but are probably not effective in single ingestions.
- Fructose administration is contra-indicated due to side effects.

5. FIRE FIGHTING MEASURES

Shut off product that may 'fuel' a fire if safe to do so. Allow trained personnel to attend a fire in progress, providing firefighters with this Safety Data Sheet. Prevent extinguishing media from escaping to drains and waterways.

Suitable extinguishing media

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog – Large fires only.

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

Special protective equipment for fire-fighters

Fire Fighting

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves in the event of a fire.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control the fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- 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.

Fire/Explosion Hazard

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

Combustion products include:

carbon dioxide (CO₂)

other pyrolysis products typical of burning organic material.

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SHE-FM-959 (SHE-910)
Rev.00

6. ACCIDENTAL RELEASE MEASURES**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up**Minor Spills**

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.

Major Spills

- Collect residues in a flammable waste container.
- 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 course.
- Consider evacuation (or protect in place). 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.
- Contain spill with sand, earth or vermiculite.
- use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

7. HANDLING AND STORAGE**Precautions for safe handling****Hygiene measures**

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on safe handling

- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
- DO NOT allow clothing wet with material to stay in contact with skin
- 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, heat or ignition sources.
- When handling, DO NOT eat, drink or smoke.
- Vapour may ignite on pumping or pouring due to static electricity.
- Safe handling
- DO NOT use plastic buckets.
- Earth and secure metal containers when dispensing or pouring product.
- Use spark-free tools when handling.

- Avoid contact with incompatible materials.
- Keep containers securely sealed.
- 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 SDS.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Other information be trapped.

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- Keep containers securely sealed.
- Store away from incompatible materials in a cool, dry well ventilated area.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage**Suitable containers**

- Packing as supplied by manufacturer.
- Plastic containers may only be used if approved for flammable liquid.
- Check that containers are clearly labelled and free from leaks.
- For low viscosity materials (i): Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C)
- For manufactured product having a viscosity of at least 250 cSt. (23 deg. C) Suitable container
- Manufactured product that requires stirring before use and having a viscosity of at least 20 cSt (25 deg. C): (i)

Removable head packaging: (ii) Cans with friction closures and (iii) low pressure tubes and cartridges may be used.

- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages
- In addition, where inner packaging is glass and contain liquids of packing group I there must be sufficient inert absorbent to absorb any spillage, unless the outer packaging is a close-fitting moulded plastic box and the substances are not incompatible with the plastic.

Storage incompatibility Avoid strong bases.

- Avoid oxidising agents, acids, acid chlorides, acid anhydrides, chloroformates.
- Avoid strong bases.

8. EXPOSURE CONTROLS: PERSONAL PROTECTION**National Exposure Standards**

Occupational Exposure Limits

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	ethanol	Ethyl alcohol	1000 ppm / 1880 mg/m ³	Not Available	Not Available	Not Available
Australia Exposure Standards	Tertiary butanol	tert-Butyl alcohol	100 ppm / 303 mg/m ³	455 mg/m ³ / 150 ppm	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEFL-1	TEFL-2	TEFL-3
SHE-FM-959 (SHE-910) Rev.00				

ethanol	Ethyl alcohol; (Ethanol)	Not Available	Not Available	15000 ppm
tertiary butanol	Butyl alcohol, tert; (tert-Butanol)	150 ppm	15000 ppm	8000 ppm

Ingredient	Original IDLH	Revised IDLH
ethanol	3,300 [LEL] ppm	Not Available
tertiary butanol	1600 ppm	Not Available
denatonium benzoate	Not Available	Not Available
water	Not Available	Not Available

I MATERIAL DATA

- Exposure controls

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.

For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion resistant. 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:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, 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.

- **Eye and Face protection**

Safety glasses with side shields.

Chemical goggles.

Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury

experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation – lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 591, [AS/NZS 1336 or national equivalent]

- **Skin protection**

See Hand protection below

- **Hands/feet protection**

Wear chemical protective gloves, e.g. PVC.

Wear safety footwear or safety gumboots, e.g. Rubber

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, I-JS F739, AS/NZS 2161.1 or national equivalent).

When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.

Contaminated gloves should be replaced.

As defined in ASTM F-739-96 in any application, gloves are rated as:

- Excellent when breakthrough time > 480 min
- Good when breakthrough time > 20 min
- Fair when breakthrough time < 20 min
- Poor when glove material degrades

For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.

It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material.

SHE-FM-959 (SHE-910)
Rev.00

Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.

Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers’ technical data should always be taken into account to ensure selection of the most appropriate glove for

Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For

Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.

Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- **Body protection**

See Other protection below

- **Other protection**

Overalls.

PVC Apron.

PVC protective suit may be required if exposure severe.

Eyewash unit.

Ensure there is ready access to a safety shower.

Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.

For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).

Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms.

Conductive shoes should be stored in lockers close to the room in which they are worn. Personnel who have been issued conductive footwear should not wear them from their place of work to their homes and return.

Recommended material(s)

Glove Selection Index

“Forsberg Clothing Performance Index”.

The effect(s) of the following substance(s) are taken into account in the

computer-generated selection:

ALCOHOL, DENATURED (DENATURED ALCOHOL BITREX)

Material	CPI
BUTYL	c
NATURAL RUBBER	c
NATURAL+NEOPRENE	c
NEOPRENE	c
NITRILE	c
NITRILE+PVC	c
PE/EVAUPE	c
PVA	c
PVC	c

PVC

c

* 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 “fee” or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the “Exposure Standard” (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS / Class 1	-	A-PAPR-AUS / Class 1
up to 50 x ES	Airline**	-	-
up to 100 x ES	-	A-3	-
100+ x ES	-	Airline**	-

* - Continuous-flow; ** - Continuous-flow or positive pressure demand

A (All classes) = Organic vapours, B AUS or BI = Acid gasses, B2 = Acid

gas or hydrogen cyanide (HCN), B3 = Acid gas or hydrogen cyanide (HCN), E = Sulphur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃),

Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low

boiling point organic compounds (below 65 degC)

long-term or frequent use. A qualified practitioner should be consulted.

Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content. The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.

9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Unit of Measurement	Typical Value
Appearance	-	Colorless Liquid
Odour	-	Wine or whisky
Odour Threshold	ppm	10
pH	-	7 (10g/L, H ₂ O, 20°C)
Boiling point	°C	78.5
Melting point	°C	-117
Flash point	°C	13
Autoignition Temperature	°C	400
Decomposition Temperature	°C	No data available
Lower/Upper Flammability Limits	%V	3.3-19

SHE-FM-959 (SHE-910)
Rev.00

Property	Unit of Measurement	Typical Value
Density @ 20°C	g/cm ³	0.788-0.791
Specific Gravity @ 20°C	-	0.789-0.792
Viscosity @ 20°C	mPa.s	1.074
Vapor pressure	kPa	5.8 (20°C)
Vapor density	kPa (Air = 1)	1.6
Evaporation Rate	(n-Butyl acetate = 1)	No data available
Water Solubility	mg/l	789,000 (20°C)
Solubility in other solvents Partition coefficient	(n-octanol/water)	Log low: -0.32
Coefficient of Thermal Expansion	per Deg °C	No data available

The values listed are indicative of this product's physical and chemical properties. For a full product specification, please consult the Product Data Sheet.

10. STABILITY AND REACTIVITY

Chemical Stability

- Unstable in the presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

Conditions to avoid

See Section 7

Incompatible Materials

See Section 7

Hazardous reactions

See Section 7

Chemical Reactivity

See Section 7

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled

Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung can respond to a chemical

Inhaled insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular

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 and loss of co-ordination

Ingestion

Accidental ingestion of the material may be damaging to the health of the individual.

Ingestion of ethanol may produce nausea, vomiting, gastrointestinal bleeding, abdominal pain and diarrhoea. Systemic Effects:

- | | |
|-------------|--|
| <1.5 g/l | Mild: Impaired visual acuity, coordination and reaction time, emotional lability
Moderate: Slurred speech, confusion, ataxia, emotional lability, perceptual and sensation disturbances possible blackout spells, and in coordination with impaired objective performance in I standardised tests. |
| 1.5-3.0 g/l | Possible diplopia, flushing, tachycardia, sweating and incontinence.
Bradypnoea may occur early and tachypnoea may develop in cases of metabolic acidosis, hypoglycaemia and hypokalaemia.
CNS depression may progress to coma |
| 3-5 g/l | Severe: Cold clammy skin, hypothermia and hypotension.
Atrial fibrillation and atrioventricular block have been reported.
Respiratory depression may occur, respiratory failure may follow serious intoxication, aspiration of vomitus may result in pneumonitis and pulmonary oedema. Convulsions due to severe hypoglycaemia may also occur Acute hepatitis may develop. |

Skin Contact

The material may produce moderate skin irritation; limited evidence or practical experience suggests that the material Either:

- produces moderate inflammation of the skin in a substantial number of individuals following direct contact and/or
- produces significant, but moderate, inflammation when applied to the healthy intact skin of animals (for up to four hours), such inflammation being present twenty-four hours or more after the end of the exposure period.

Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis

Skin Contact (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.

Open cuts, abraded or irritated skin should not be exposed to this material

Entry into the bloodstream 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

Evidence exists, or practical experience predicts, that the material may cause severe eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Eye contact may cause significant inflammation with pain. Corneal injury may occur; permanent impairment of vision may result unless treatment is prompt and adequate. Repeated or prolonged exposure to irritants may cause inflammation characterised by a temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

Chronic

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

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 Chronic 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

ALCOHOL, DENATURED TOXICITY (DENATURED ALCOHOL BITREX)

Toxicity: Not Available

Irritation: Not Available

Ethanol

Toxicity

Dermal (rabbit) LD50: 17100 mg/kg^[1]

Inhalation (rat) LC50: 63926.976 mg/l/4h^[2]

Oral (rat) LD: 7060 mg/kg^[2]

Irritation

Eye (rabbit): 500 mg SEVERE

Eye (rabbit): 100 mg/24 hr-moderate

Skin (rabbit): 20 mg/24 hr-moderate

Skin (rabbit): 400 mg (open)-mild

Tertiary butanol

Toxicity Inhalation (rat): > 9988.59 mg/l/4 H^[2]

Oral (rat) LD50: 1500 mg/kg^[2]

Irritation

Not available

Denatonium benzoate

Toxicity Oral (rat) LD: 584 mg/kg^[2]

Irritation Not Available

Water

Toxicity Not Available

Irritation Not Available

Legend

1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

Ethanol

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.

Denatonium Benzoate

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.

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 methylpyridinium 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 DENATONIUM BENZOATE exhibit similar toxicological properties.

Acute toxicity: Studies in rats have indicated poor intestinal absorption of QACs. Acute toxicity of QACs varies with the compound and, especially, the route of administration. For some substances the LD50 value is several hundreds times lower by the i.p. or i.v. than the oral route, whereas toxicities between the congeners only differ in the range of two to five times.

At least some QACs are significantly more toxic in 50% dimethyl sulfoxide than in plain water when given orally. Probably all common QAC derivatives produce similar toxic reactions, but as tested in laboratory animals the oral mean lethal dose varies with the compound.

Oral toxicity: LD50 values for QACs have been reported within the range of 250-1000 mg/kg for rats, 150-1000 mg/kg for mice, 150-300 mg/kg for guinea pigs and about 500 mg/kg b.w. for rabbits and dogs. The ranges observed reflect differences in the study designs of these rather old experiments as well as differences between the various QACs.

The oral route of administration was characterised by delayed deaths, gastrointestinal lesions and respiratory and central nervous system depression. It was also found that given into a full stomach, the QACs lead to lower mortality and fewer gastrointestinal symptoms. This supports the suggestion of an irritating effect.

Dermal toxicity: It has been concluded that the maximum concentration that did not produce irritating effect on intact skin is 0.1%. Irritation became manifest in the 1-10% range. Concentrations below 0.1% have caused irritation in persons with contact dermatitis or broken skin.

Although the absorption of QACs through normal skin probably is of less importance than by other routes, studies with excised guinea pig skin have shown that the permeability constants strongly depend on the exposure time and type of skin.

Sensitisation: Topical mucosal application of QACs may produce sensitisation. Reports on case stories and patch tests have shown that compounds such as benzalkonium chloride, cetalkonium chloride and cetrимide may possibly act as sensitisers. However, in general it is suggested that QACs have a low potential for sensitising man. It is difficult to distinguish between an allergic and an irritative skin reaction due to the inherent skin irritating effect of QACs.

Long term/repeated exposure:

Inhalation: A group of 196 farmers (with or without respiratory symptoms) were evaluated for the relationship between exposure to QACs (unspecified, exposure levels not given) and respiratory disorders by testing for lung function and bronchial responsiveness to histamine. After histamine provocation statistically significant associations were found between the prevalence of mild bronchial responsiveness (including asthma-like symptoms) and the use of QACs as disinfectant. The association seems even stronger in people without respiratory symptoms.

Genetic toxicity: QACs have been investigated for mutagenicity in microbial test systems. In Ames tests using *Salmonella typhimurium* with and without metabolic activation no signs of mutagenicity have been observed. Negative results were also obtained in *E. coli* reversion and *B. subtilis* rec assays. However, for benzalkonium chloride also positive and equivocal results were seen in the *B. subtilis* rec assays. Somnolence, tremor, ataxia recorded.

WATER

No significant acute toxicological data identified in literature search.

TERTIARY BUTANOL & DENATONIUM BENZOATE

SHE-FM-959 (SHE-910)
Rev.00

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.

Acute Toxicity	☉	Carcinogenicity	☉
Skin Irritation	☉	Reproductivity	☉
Serious Eye Damage/irritation	/	STOT - Single Exposure	☉
Respiratory or Skin sensitisation	☉	STOT - Repeated Exposure	☉
Mutagenicity	☉	Aspiration Hazard	☉

Legend: X - Date available but does not fill the criteria for classification

/ - Date available to make classification

☉ - Date Not available to make classification

12. ECOLOGICAL INFORMATION

Toxicity

Alcohol, Denatured (Denatured Alcohol Bitrex)

Endpoint:	Test Duration (HR):	Species:
Not Available	Not Available	Not Available

Ethanol

Endpoint:	Test Duration (HR):	Species:
LC50:	96	Fish
EC50:	48	Crustacea
EC50:	96	Algae or other aquatic plants
NOEC	2016	Fish

Tertiary butanol

Endpoint:	Test Duration (HR):	Species:
LC50:	96	Fish
EC50:	48	Crustacea
EC50:	72	Algae or other aquatic plants
NOEC:	120	Fish

Denatonium benzoate

Endpoint:	Test Duration (HR):	Species:
Not available	Not available	Not available

Water

Endpoint:	Test Duration (HR):	Species:
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Not available	Not available	Not available
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Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) Bioconcentration Data 8. Vendor Data

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
tertiary butanol	HIGH (Half-life = 360 days)	LOW (Half-life = 24.58 days)
water	LOW	LOW

Bio-accumulative potential

Ingredient	Bioaccumulation
ethanol	LOW (Log KOW = -0.31)
tertiary butanol	LOW (BCF = 1.09)
water	LOW (Log KOW = -1.38)

Mobility in soil

Ingredient	Mobility
ethanol	HIGH (KOC = 1)
tertiary butanol	HIGH (KOC = 1.471)
water	LOW (KOC = 14.3)

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Product / packaging disposal

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means.

Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may

Product I Package change in use, and recycling or reuse may not always be appropriate. disposal to enter drains.

- DO NOT allow wash water from cleaning or process equipment
- 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.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.

- Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

14. TRANSPORT INFORMATION

Road and Rail Transport		Marine Transport		Air Transport	
UN. Number	1170	UN. Number	1170	UN. Number	1170
Class/Item	3	Class/Item	3	Class/Item	3
Hazard Symbol	Flammable Liquid	Hazard Symbol	Flammable Liquid	Hazard Symbol	Flammable Liquid
Proper Shipping Name	ETHANOL	Proper Shipping Name	ETHANOL	Proper Shipping Name	ETHANOL
Packing Group	II	Packing Group	II	Packing Group	II
		Marine Pollutant	No		

15. REGULATORY INFORMATION**Safety, health and environmental regulations I legislation specific for the substance or mixture****ETHANOL (64-17-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards	Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix B (Part 3)
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals	Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)
Australia Inventory of Chemical Substances (AICS)	Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

TERTIARY BUTANOL (75-65-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards	Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Chemical Information System (HCIS) – Hazardous Chemicals	

DENATONIUM BENZOATE (3734-33-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)	Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)	Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

WATER(7732-18-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

National Inventory Status

National Inventory	Status
Australia - ACS	Y
Canada - DSL	Y
Canada - NDSL	N (ethanol; tertiary butanol; water, denatonium benzoate)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (denatonium benzoate)
Korea - KECI	Y
New Zealand - NZIoC	Y

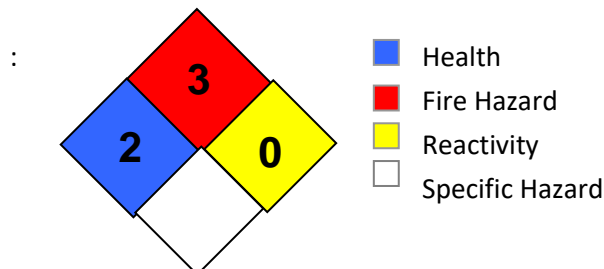
SHE-FM-959 (SHE-910)
Rev.00

Philippines - PICCS	Y
USA - TSCA	Y

Legend: Y = All ingredients are on the inventory
 N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

16. OTHER INFORMATION

National Fire Protection Association (USA)



MSDS Distribution : The information in this document should be made available to all who may handle the product.

Prepared By : Quality Control Department.
Global Chemie ASCC Limited

MSDS Distribution : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty of guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Abbreviations:

AICS: Australian Inventory of Chemical Substances

CAS Number: Chemical Abstracts Number

IARC: International Agency for Research on Cancer

N/A: not available

NOHSC: National Occupational Health and Safety

Council GHS: Global Harmonized System

References:

- Supplier Material Safety Data Sheets
- <http://chem.sis.nlm.nih.gov/chemidplus> (October 18)
- <http://hsis.ascc.gov.au/SearchHS.aspx> (October 18)
- Ecotoxicology data: http://cfpub.epa.gov/ecotox/quick_query.htm (October 18)
- *Sax's Dangerous Properties of Industrial Materials*, Richard J. Lewis Snr., pub. Canada (2000)

The information sourced for the preparation of this document was correct and complete at the time of writing to the best of the writer's knowledge. The document represents the commitment to the company's responsibilities surrounding the supply of this product, undertaken in good faith. This document should be taken as a safety guide for the product and its recommended uses but is in no way an absolute authority. Please consult the relevant legislation and regulations governing the use and storage of this type of product. No warranty and guarantee are expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product for further information, please contact Global Chemie ASCC Limited.