

MG Chemicals UK Limited

Version No: A-1.04 Safety Data Sheet (Conforms to Regulation (EU) No 2015/830)

Issue Date:26/10/2018 Revision Date: 18/03/2020 L.REACH.GBR.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

1.1. Product Identifier

Product name	Product name 843WB	
Synonyms	SDS Code: 843WB-Liquid; 843WB-15ML, 843WB-150ML, 843WB-850ML, 843WB-3.78L, 843WB-18.9L	
Other means of identification	Super Shield Water Based Silver Coated Copper Conductive Paint	

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

Relevant identified uses	electrically conductive coating
Uses advised against	Not Applicable

1.3. Details of the supplier of the safety data sheet

Registered company name	MG Chemicals UK Limited	MG Chemicals (Head office)
Address	Hearne House, 23 Bilston Street, Sedgely Dudley DY3 1JA United Kingdom	9347 - 193 Street Surrey V4N 4E7 British Columbia Canada
Telephone	+(44) 1663 362888	+(1) 800-201-8822
Fax	Not Available	+(1) 800-708-9888
Website	Not Available	www.mgchemicals.com
Email	sales@mgchemicals.com	Info@mgchemicals.com

1.4. Emergency telephone number

Association / Organisation	Verisk 3E (Access code: 335388)	Not Available
Emergency telephone numbers	+(44) 20 35147487	Not Available
Other emergency telephone numbers	+(0) 800 680 0425	Not Available

SECTION 2 HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification according to regulation (EC) No 1272/2008 [CLP] ^[1]	H410 - Chronic Aquatic Hazard Category 1
Legend:	1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

2.2. Label elements

Hazard pictogram(s)	
SIGNAL WORD	WARNING
Hazard statement(s)	

H410	Very toxic to aquatic life with long lasting effects.
0	

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

P273 Avoid release to the environment.

Precautionary statement(s) Storage

P391

Not Applicable

Precautionary statement(s) Disposal

P501 Dispose of contents/container in accordance with local regulations.

2.3. Other hazards

Inhalation may produce health damage*.

Cumulative effects may result following exposure*.

May produce discomfort of the eyes, respiratory tract and skin*.

REACh - Art.57-59: The mixture does not contain Substances of Very High Concern (SVHC) at the SDS print date.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Collect spillage.

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 regulation (EC) No 1272/2008 [CLP]
1.7440-50-8 2.231-159-6 3.Not Available 4.01-2119480184-39- XXXX 01-2119475516-31- XXXX 01-2119480154-42-XXXX	22	<u>copper</u>	EUH210 ^[1]
1.7440-22-4 2.231-131-3 3.Not Available 4.01-2119555669-21- XXXX 01-2119513211-60-XXXX	4	<u>silver</u> <u>*</u>	EUH210 ^[1]
1.121-44-8 2.204-469-4 3.612-004-00-5 4.01-2119475467-26- XXXX 01-2120133755-55-XXXX	0.8	triethylamine <u>*</u>	Flammable Liquid Category 2, Acute Toxicity (Inhalation) Category 4, Skin Corrosion/Irritation Category 1A, Acute Toxicity (Oral) Category 4, Acute Toxicity (Dermal) Category 4; H225, H332, H314, H302, H312 ^[2]
1.14807-96-6 2.238-877-9 3.Not Available 4.01-2120140278-58-XXXX	0.5	talc	Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation), Acute Toxicity (Inhalation) Category 4; H335, H332 ^[1]
Legend:	1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L * EU IOELVs available		

SECTION 4 FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact	 If this product comes in contact with the eyes: Wash out immediately 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 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, aerosols or combustion products are inhaled remove from contaminated area. Other measures are usually unnecessary.
Ingestion	 Immediately give a glass of water. First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11

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

Treat symptomatically. for copper intoxication:

Unless extensive vomiting has occurred empty the stomach by lavage with water, milk, sodium bicarbonate solution or a 0.1% solution of potassium ferrocyanide (the resulting copper ferrocyanide is insoluble).

Administer egg white and other demulcents.

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843WB Super Shield Water Based Silver Coated Copper Conductive Paint

- Maintain electrolyte and fluid balances.
- Morphine or meperidine (Demerol) may be necessary for control of pain. Þ.
- If symptoms persist or intensify (especially circulatory collapse or cerebral disturbances, try BAL intramuscularly or penicillamine in accordance with the supplier's recommendations. ÷
- Treat shock vigorously with blood transfusions and perhaps vasopressor amines.
- F If intravascular haemolysis becomes evident protect the kidneys by maintaining a diuresis with mannitol and perhaps by alkalinising the urine with sodium bicarbonate.
- + It is unlikely that methylene blue would be effective against the occassional methaemoglobinemia and it might exacerbate the subsequent haemolytic episode
- Institute measures for impending renal and hepatic failure.
 - [GOSSELIN, SMITH & HODGE: Commercial Toxicology of Commercial Products]
- A role for activated for charcoals or emesis is, as yet, unproven.
- In severe poisoning CaNa2EDTA has been proposed.

53ag

[ELLENHORN & BARCELOUX: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

5.1. Extinguishing media

Metal dust fires need to be smothered with sand, inert dry powders.

- DO NOT USE WATER, CO2 or FOAM
 - Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.
 - · Confining or smothering material is preferable to applying water as chemical reaction may produce flammable and explosive hydrogen gas.
- Chemical reaction with CO2 may produce flammable and explosive methane.
- ▶ If impossible to extinguish, withdraw, protect surroundings and allow fire to burn itself out.
- DO NOT use halogenated fire extinguishing agents.

.2. Special hazards arising from the substrate or mixture					
Fire Incompatibility	 Reacts with acids producing flammable / explosive hydrogen (H2) gas 				
5.3. Advice for firefighters	.3. Advice for firefighters				
Fire Fighting	 Alert Fire Brigade and tell them location and nature of hazard. Wear breathing apparatus plus protective gloves in the event of a fire. Prevent, by any means available, spillage from entering drains or water courses. Use fire fighting procedures suitable for surrounding 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	 DO NOT disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal. DO NOT use water or foam as generation of explosive hydrogen may result. With the exception of the metals that burn in contact with air or water (for example, sodium), masses of combustible metals do not represent unusual fire risks because they have the ability to conduct heat away from hot spots so efficiently that the heat of combustion cannot be maintained - this means that it will require a lot of heat to ignite a mass of combustible metal. Generally, metal fire risks exist when sawdust, machine shavings and other metal 'fines' are present. Metal powders, while generally regarded as non-combustible: May burn when metal is finely divided and energy input is high. May neact explosively with water. May neact explosively with water. May REIGNITE after fire is extinguished. Will burn with intense heat. Note: Metal dust fires are slow moving but intense and difficult to extinguish. Containers may explode on heating. Dusts or fumes may form explosive mixtures with air. Gases generated in fire may be poisonous, corrosive or irritating. Hot or burning metals may react violently upon contact with other materials, such as oxidising agents and extinguishing agents used on fires involving ordinary combustibles or flammable liquids. Some metals can continue to burn in carbon dioxide, nitrogen, water, or steam atmospheres in which ordinary combustibles or flammable liquids would be incapable of burning. 				

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

See section 8

6.2. Environmental precautions

See section 12

6.3. Methods and material for containment and cleaning up

Minor Spills	 Environmental hazard - contain spillage. 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 spill with sand, earth, inert material or vermiculite. Wipe up. Place in a suitable, labelled container for waste disposal.
Major Spills	Environmental hazard - contain spillage.

Minor hazard.
Clear area of personnel.
Alert Fire Brigade and tell them location and nature of hazard.
Control personal contact with the substance, by using protective equipment as required.
Prevent spillage from entering drains or water ways.
 Contain spill with sand, earth or vermiculite.
 Collect recoverable product into labelled containers for recycling.
Absorb remaining product with sand, earth or vermiculite and place in appropriate containers for disposal.
Wash area and prevent runoff into drains or waterways.
If contamination of drains or waterways occurs, advise emergency services.

6.4. Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

7.1. Precautions for safe handling

Safe handling	 Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Avoid contact with moisture. Avoid contact with incompatible materials. When handling, DO NOT eat, drink or smoke. Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with scap and water after handling. Work clothes should be laundered separately. Launder contaminated clothing before re-use. 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 are maintained. DO NOT allow clothing wet with material to stay in contact with skin
Fire and explosion protection	See section 5
Other information	 Store in original containers. Keep containers securely sealed. Store in a cool, dry, well-ventilated area. Store away from incompatible materials and foodstuff containers. Protect containers against physical damage and check regularly for leaks. Observe manufacturer's storage and handling recommendations contained within this SDS.

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	 Polyethylene or polypropylene container. Packing as recommended by manufacturer. Check all containers are clearly labelled and free from leaks.
Storage incompatibility	 WARNING: Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. The pi-complexes formed between chronium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive. Avoid reaction with borohydrides or cyanoborohydrides Silver or silver salts readily form explosive silver fulrninate in the presence of both nitric acid and ethanol. The resulting fulrninate is much more sensitive and a more powerful detonator than mercuric fulrninate. Silver and its compounds and salts may also form explosive compounds in the presence of acetylene and nitromethane. Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid. Metals exhibit varying degrees of activity. Reaction is reduced in the massive form (sheet, rod, or drop), compared with finely divided forms. The less active metals will not burn in air but: can react exothermically with oxidising acids to form noxious gases. catalyse polymerisation and other reactions, particularly when finely divided react with halogenated hydrocarbons (for example, copper dissolves when heated in carbon tetrachloride), sometimes forming explosive compounds. Finely divided metal powders develop pyrophoricity when a critical specific surface area is exceeded; this is ascribed to high heat of oxide formation on exposure to air. Several pyrophoric metals, stored in glass bottles have ignited when the container is broken on impact. Storage of these materials moist and in metal containers is recommended. The reaction residues from various metal syntheses (involving vacuum evaporation and co-deposition with a ligand) are often pyrophoric. Factors influencing the pyrophori

7.3. Specific end use(s)

See section 1.2

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Not Available

PREDICTED NO EFFECT LEVEL (PNEC)

Not Available

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
UK Workplace Exposure Limits (WELs)	copper	Copper fume	0.2 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	copper	Copper dusts and mists (as Cu)	1 mg/m3	2 mg/m3	Not Available	Not Available
European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)	silver	Silver, metallic	0,1 mg/m3	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	silver	Silver, metallic	0.1 mg/m3	Not Available	Not Available	Not Available
European Union (EU) Commission Directive 2006/15/EC establishing a second list of indicative occupational exposure limit values (IOELVs)	silver	Silver (soluble compounds as Ag)	0,01 mg/m3	Not Available	Not Available	Not Available
European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)	triethylamine	Triethylamine	2 ppm / 8,4 mg/m3	12,6 mg/m3 / 3 ppm	Not Available	Skin
UK Workplace Exposure Limits (WELs)	triethylamine	Triethylamine	2 ppm / 8 mg/m3	17 mg/m3 / 4 ppm	Not Available	Sk
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	triethylamine	Triethylamine	2 ppm / 8.4 mg/m3	12.6 mg/m3 / 3 ppm	Not Available	Skin
UK Workplace Exposure Limits (WELs)	talc	Talc, respirable dust	1 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3	
copper	Copper	3 mg/m3	33 mg/m3	200 mg/m3	
silver	Silver	0.3 mg/m3	170 mg/m3	990 mg/m3	
triethylamine	Triethylamine	1 ppm	170 ppm	1,000 ppm	
talc	Talc	6 mg/m3	66 mg/m3	400 mg/m3	
Ingredient	Original IDLH		Revised IDLH		
copper	100 mg/m3		Not Available		
silver	10 mg/m3		Not Available		
triethylamine	200 ppm		Not Available		
talc	1000 mg/m3		Not Available		

MATERIAL DATA

For talc (a form of magnesium silicate):

Most health problems associated with occupational exposure to talcs appear to evolve mostly from the nonplatiform content of the talc being mined or milled (being the asbestos-like amphiboles, serpentines (asbestiformes) and other minerals in the form of acicular, prismatic and fibrous crystals including, possibly, asbestos).

Because of severe health effects associated with exposures to asbestos, regulatory agencies tend to regard all elongate mineral crystal particles, whether prismatic, acicular, fibrous, as asbestos - the only provision is the particles have an aspect ratio (length to diameter) of 3:1 or greater.

Consideration is also given to their respirability, their width being less than or equal to 3 um. Only limited data, however, exists on the health effects of elongate mineral particles having prismatic, acicular or fibrous (non-asbestos) forms. Experimental evidence indicates that the carcinogen potential of mineral fibres is related to the size class with diameter of 8 um with shorter, thicker particles having little biological activity.

Dust of nonfibrous talc, consisting entirely of platiform talc crystals and containing no asbestos poses a relatively small respiratory hazard.

Difficulties exist, however, in the determination of asbestos as cleavage fragments of prismatic or acicular crystals, nonasbestos fibres and asbestos fibres are very similar.

Subject to an accurate determination of asbestos and crystalline silica, exposure at or below the recommended TLV-TWA, is thought to protect workers from the significant risk of nonmalignant respiratory effects associated with talc dusts.

The adopted TLV-TWA for silver dust and fumes is 0.1 mg/m3 and for the more toxic soluble silver compounds the adopted value is 0.01 mg/m3. Cases of argyria (a slate to blue-grey discolouration of epithelial tissues) have been recorded when workers were exposed to silver nitrate at concentrations of 0.1 mg/m3 (as silver). Exposure to very high concentrations of silver fume has caused diffuse pulmonary fibrosis. Percutaneous absorption of silver compounds is reported to have resulted in allergy. Based on a 25% retention upon inhalation and a 10 m3/day respiratory volume, exposure to 0.1 mg/m3 (TWA) would result in total deposition of no more than 1.5 gms in 25 years. For triethylamine:

Odour Threshold Value: <0.1-0.65 ppm (detection), 0.27-29.0 ppm (recognition)

NOTE: Detector tubes for triethylamine, measuring in excess of 5 ppm, are commercially available.

Exposure at or below the recommended TLV-TWA or STEL is thought to provide worker protection against acute ocular, upper respiratory tract and pulmonary irritation. Nevertheless reports of visual disturbance in workers exposed at concentrations as low as 3 ppm have been cited in literature.

Odour Safety Factor (OSF)

OSF=2.1 (TRIETHYLAMINE)

8.2. Exposure controls

controls Metal dusts must be collected at the source of generation as they are potentially explosive.	8.2.1. Appropriate engineering	
	controls	Metal dusts must be collected at the source of generation as they are potentially explosive.

 Avoid ignition sources. Good housekeeping practices must be maintained. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. Do not use compressed air to remove settled materials from floors, beams or equipment Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation. Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations. Do not allow chips, fines or dusts to contact water, particularly in enclosed areas. Metal spraying and blasting should, where possible, be conducted in separate rooms. This minimises the risk of supplying oxygen, in the form of metal oxides, to potentially reactive finely divided metals such as aluminium, zinc, magnesium or titanium. Work-shops designed for metal spraying should possess smooth walls and a minimum of obstructions, such as ledges, on which dust accumulation is possible. Wet scrubbers are preferable to dry dust collectors. Bag or filter-type collectors should be sited outside the workrooms and be fitted with explosion relief doors. Cyclones should be protected against entry of moisture as reactive metal dusts are capable of spontaneous combustion in humid or partially wetted states. Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec. Local eventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuum and electrostatic precipitators must not be used, unless specifically approved for use with flammable/ explosive dusts. 			
Type of Contaminant:		Air Speed:	
welding, brazing fumes (released at relatively low velocity into moderately still air)		0.5-1.0 m/s (100-200 f/min.)	
Within each range the appropriate value depends on:		4. mar	
Lower end or the range	upper end of	ine 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: Contamina	nts of high toxicity	
3: Intermittent, low production.	3: High produ		
4. Large nood of large all mass in motion	4. Smail 1000	Hocal control only	
Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple square of distance from the extraction point (in simple cases). Therefore the air speed at the ext reference to distance from the contaminating source. The air velocity at the extraction fan, for exa for extraction of gases discharged 2 meters distant from the extraction point. Other mechanical extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10	e extraction pipe. raction point sho mple, should be considerations, p or more when e	Velocity generally decreases with the uld be adjusted, accordingly, after a minimum of 1-2.5 m/s (200-500 f/min.) producing performance deficits within the xtraction systems are installed or used.	
 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 equipmer 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 59], [AS/NZS 1336 or national equivalent] 			
See Hand protection below			
 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 Where the chemical is a preparation of several substances, the resistance of the glove material c checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the prot choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean han 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 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, US F739, AS/NZS 2161.1 or national equivalent) is recommonded. When prolonged or frequently repeated contact may occur, a glove with a protection class of 3 or high to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommonded. Some glove polymer types are less affected by movement and this should be tal use. Contaminated gloves should be replaced. As defined in ASTIM F-739-96 in any application, gloves are rated as: Excellent when breakthrough time > 20 min Fair when breakthrough time > 20 min 	f quality which va an not be calcula ective gloves and ds. After using gl gloves include: ational equivalen ction class of 5 of mended. er (breakthrough ken into account	ary from manufacturer to manufacturer. ted in advance and has therefore to be d.has to be observed when making a final oves, hands should be washed and dried t). or higher (breakthrough time greater than n time greater than 60 minutes according when considering gloves for long-term	
	 Avoid ignition sources. Good housekeeping practices must be maintained. Dust accumutation on the floor, ledges and beams can present a risk of igniton, flame propartice hours and the floor, ledges and beams can present a risk of igniton. Flame propartice harding adopting the contract design change the used to minimum addition of the floor, ledges and beams of the separate constraints. Use non-sparking handling equipment, tools and natural bridle bruthes. Cover and researd is where a necessary to prevent a councilation of state changes during metal dust handling and the sing brain practice finely divided metals such as atuminium, zinc. magnetium of the possible. Wet standbers are prefenable to dy dust collectors. Beg or filter-type collectors should be protocle as minimum capture velocity at the furne as to collector should be protocled against entry of motisture as reactive metal dusts are capable of states. Local vehilation and vacuum systems must be designed to handle explosive dusts. Dy vacuus specifically approved for use with flammable explosive dusts. Air contaminants generated in the workplace possess varying 'escape' velocities which, in turn, required to effectively remove the contaminant. Within each range the appropriate value depends on: Lover end of the range Room air currents minimal or favourable to capture Coutaminants differ toxicity of nuisance avalue only. Intermittent, two production. Lange dood narge air mass in motion Single theory shows that air velocity lait approxement and the struction point. Other mechanical a velocities are multiplied by flactors of 10 toxics of distance areas of the struction point. Other mechanical a velocities are multiplied by flactors of 10 toxics of distance areas of the struction point. Other mechanical a divence areas of the sthould in dista struction point. Contamina	Avoid ignition sources. Avoid ignition on the fork, index and beams can present a risk of ignition, fame propagation and second the index of t	 Ander gefans example. Ander gefans example in factor, large and bears can present at list of grains, large propagtion and socrating explosions. Ander gefans example in the form grain determination from the factor in the interime data exampliation. But an example of the grain example interimed from the factor interime data exampliation. But an example interime data example of the grain example interimed from the factor interime data exampliation in the factor interime data example of the factor interimed data example of t

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	the glove will be dependent on the exact composition of the glove material. 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 the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: 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. P.V.C. apron. Barrier cream. Skin cleansing cream. Eye wash unit.

Recommended material(s)

GLOVE SELECTION INDEX

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:

843WB Super Shield Water Based Silver Coated Copper Conductive Coating

Material	СРІ
NITRILE	A
SARANEX-23	A
VITON	A

* 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 Light brown metallic Physical state Liquid Relative density (Water = 1) 1.3 Partition coefficient n-octanol / Odour Not Available Not Available water Odour threshold Not Available Auto-ignition temperature (°C) Not Available Not Available Decomposition temperature pH (as supplied) Not Available Melting point / freezing point Not Available Not Available Viscosity (cSt) (°C) Initial boiling point and boiling Not Available 100 Molecular weight (g/mol) range (°C) Not Available Flash point (°C) Taste Not Available Evaporation rate Not Available Explosive properties Not Available Flammability Not Available **Oxidising properties** Not Available Surface Tension (dyn/cm or Upper Explosive Limit (%) Not Available Not Available mN/m) Lower Explosive Limit (%) Not Available Volatile Component (%vol) Not Available Vapour pressure (kPa) 1.9 Gas group Not Available Solubility in water (g/L) Partly miscible pH as a solution (1%) Not Available Vapour density (Air = 1) VOC g/L Not Available Not Available

9.2. Other information

Not Available

Respiratory protection

Type AE 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	AE-AUS	-	AE-PAPR-AUS / Class 1
up to 50 x ES	-	AE-AUS / Class 1	-
up to 100 x ES	-	AE-2	AE-PAPR-2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur 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)

SECTION 10 STABILITY AND REACTIVITY

10.1.Reactivity	See section 7.2
10.2. Chemical stability	 Unstable in the presence of incompatible materials. 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

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. Not normally a hazard due to non-volatile nature of product Copper poisoning following exposure to copper dusts and fume may result in headache, cold sweat and weak pulse. Capillary, kidney, liver and brain damage are the longer term manifestations of such poisoning. Inhalation of freshly formed metal oxide particles sized below 1.5 microns and generally between 0.02 to 0.05 microns may result in 'metal fume fever'. Symptoms may be delayed for up to 12 hours and begin with the sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalised feeling of malaise. Mild to severe headache, nausea, occasional vomiting, fever or chills, exaggerated mental activity, profuse sweating, diarrhoea, excessive urination and prostration may also occur. Tolerance to the fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours following removal from exposure.
	The material has NOT been classified by EC Directives or other classification systems as 'harmful by ingestion'. This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.
Ingestion	Numerous cases of a single oral exposure to high levels of copper have been reported. Consumption of copper-contaminated drinking water has been associated with mainly gastrointestinal symptoms including nausea, abdominal pain, vomiting and diarrhoea. A metallic taste, nausea, vomiting and epigastric burning often occur after ingestion of copper and its derivatives. The vomitus is usually green/blue and discolours contaminated skin. Acute poisonings from the ingestion of copper salts are rare due to their prompt removal by vomiting. Vomiting is due mainly to the local and astringent action of copper ion on the stomach and bowel. Emesis usually occurs within 5 to 10 minutes but may be delayed if food is present in the stomach. Should vomiting not occur, or is delayed, gradual absorption from the bowel may result in systemic poisoning with death, possibly, following within several days. Apparent recovery may be followed by lethal relapse. Systemic effects of copper resemble other heavy metal poisonings and produce wide-spread capillary damage, kidney and liver damage and central nervous system excitation followed by depression. Haemolytic anaemia (a result of red-blood cell damage) has been described in acute human poisoning. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products.]
	Other symptoms of copper poisoning include lethargy, neurotoxicity, and increased blood pressure and respiratory rates. Coma and death have followed attempted suicides using solutions of copper sulfate. Copper is an essential element and most animal tissues have measurable amounts of copper associated with them. Humans have evolved mechanisms which maintain is availability whilst limiting its toxicity (homeostasis). Copper is initially bound in the body to a blood-bome protein, serum albumin and thereafter is more firmly bound to another protein, alpha-ceruloplasmin. Such binding effectively 'inactivates' the copper, thus reducing its potential to produce toxic damage. In healthy individuals, bound copper can reach relatively high levels without producing adverse health effects. Excretion in the bile represents the major pathway by which copper is removed from the body when it reaches potentially toxic levels. Copper may also be stored in the liver and bone marrow where it is bound to another protein, metallothionein. A combination of binding and excretion ensures that the body is able to tolerate relatively high loadings of copper.
	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.
Skin Contact	Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant 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 (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. Irritation and skin reactions are possible with sensitive skin
	Exposure to copper, by skin, has come from its use in pigments, ointments, ornaments, jewellery, dental amalgams and IUDs and as an antifungal agent and an algicide. Although copper algicides are used in the treatment of water in swimming pools and reservoirs, there are no reports of toxicity from these applications. Reports of allergic contact dermatitis following contact with copper and its salts have appeared in the literature, however the exposure concentrations leading to any effect have been poorly characterised. In one study, patch testing of 1190 eczema patients found that only 13 (1.1%) cross- reacted with 2% copper sulfate in petrolatum. The investigators warned, however, that the possibility of contamination with nickel (an established contact allergen) might have been the cause of the reaction. Copper salts often produce an itching eczema in contact with skin. This is, likely, of a non-allergic nature.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. Copper salts, in contact with the eye, may produce conjunctivitis or even ulceration and turbidity of the cornea.
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. Silver is one of the most physically and physiologically cumulative of the elements. Chronic exposure to silver salts may cause argyria, a permanent ashen-grey discolouration of the skin, conjunctiva and internal organs (due to the deposit of an insoluble albuminate of silver). The respiratory tract may also be a site of local argyria (following chronic inhalation exposures) with a mild chronic bronchitis being the only obvious symptom.

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843WB Super Shield Water Based Silver Coated Copper Conductive Paint

Chronic copper poisoning is rarely recognised in man although in one instance, at least, symptoms more commonly associated with exposures to mercury, namely infantile acrodynia (pink disease), have been described. Tissue damage of mucous membranes may follow chronic dust exposure. A hazardous situation is exposure of a worker with the rare hereditary condition (Wilson's disease or hereditary hepatolenticular degeneration) to copper exposure which may cause liver, kidney, CNS, bone and sight damage and is potentially lethal. Haemolytic anaemia (a result of red-blood cell damage) is common in cows and sheep poisoned by copper derivatives. Overdosing of copper feed supplements has resulted in pigmentary cirrhosis of the liver. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products]

843WB Super Shield Water	TOXICITY		IRRITATION		
Based Silver Coated Copper Conductive Coating	Not Available		Not Available		
	TOXICITY			IRRITATION	
copper	dermal (rat) LD50: >2000 mg/kg ^[1]			Not Available	
	Inhalation (rat) LC50: 0.733 mg/l4 h ^[1]				
	Oral (rat) LD50: 300-500 mg/kg ^[1]				
silver	TOXICITY		ITATION		
	Oral (rat) LD50: >2000 mg/kg ^[1] Not Available			Not Available	
	TOXICITY IRRITATION				
triethylamine	Dermal (rabbit) LD50: 570 mg/kg ^[2] Eye (rabbi		Eye (rabbit): 0.25 mg/24	abbit): 0.25 mg/24h SEVERE	
	Inhalation (rat) LC50: 3.61025 mg/1 h ^[1]		Eye(rabbit): 50ppm/30d int SEVERE		
	Oral (rat) LD50: 460 mg/kg ^[1]	Oral (rat) LD50: 460 mg/kg ^[1] Skin (rabbit): 365 mg open mild		en mild	
taic	ΤΟΧΙΟΙΤΥ	IRRITATION			
	Not Available	Skin (human): 0.3 mg/3d-l mild			
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified				

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

COPPER	WARNING: Inhalation of high concentrations of copper fume may cause 'metal fume fever', an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever.
TRIETHYLAMINE	 While its difficult to generalise about the full range of potential health effects posed by exposure to the many different amine compounds, characterised by those used in the manufacture of polyurethane and polyisocyanurate foams, it is agreed that overexposure to the majority of these materials may cause adverse health effects. Many amine-based compounds can induce histamine liberation, which, in turn, can trigger allergic and other physiological effects, including bronchoconstriction or bronchial asthme and rhinitis. Systemic symptoms include headache, nausea, faintness, anxiety, a decrease in blood pressure, factyncyardia (rapid heartbeat), liching, erythema (reddening of the skin), urticaria (hives), and facial edema (swelling). Systemic effects (those affecting the body) that are related to the pharmacological action of amines are usually transient. Typically, there are four routes of possible or potential exposure: inhalation, skin contact, eye contact, and ingestion. Inhalation of vapors may, depending upon the physical and chemical properties of the specific product and the degree and length of exposure, result in moderate to servere irritation of the insess of the nose and throat and can initiate the lungs. Products with higher vapour pressures have a greater potential for higher airborne concentrations. This increases the probability of worker exposure. Higher concentrations of certain amines can produce servere respiratory irritation, characterised by nasal discharge, coughing, difficulty in breathing, and chest pains. Chronic exposure via inhalation may cause headache, nausea, voriting, drowsiness, sore throat, bronchoperumonia, and possible lung damage. Also, repeated after produce and hive rental nervous system disorders in laboratory animal studies. While most polyurethane amine calalysts are not sensitisers, some certain individuals may also become sensitized to amines and receive

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	843WB Super Shield Water Based Silver Coated Copper Conduction	ve Paint
	phenomenon around lights. These symptoms are transient and usually disappear when exposure c Some individuals may experience this effect even when exposed to concentrations below doses the Ingestion: The oral toxicity of amine catalysts varies from moderately to very toxic. Some amines can cause severe irritation, ulceration, or burns of the mouth, throat, esophagus, and Material aspirated (due to vomiting) can damage the bronchial tubes and the lungs. Affected persons also may experience pain in the chest or abdomen, nausea, bleeding of the throat drowsiness, thirst, circulatory collapse, coma, and even death. Polyurethane Amine Catalysts: Guidelines for Safe Handling and Disposal; Technical Bu Alliance for Polyurethanes Industry The material may produce severe irritation to the eye causing pronounced inflammation. Repeated conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce a c often characterised by skin redness (erythema) and swelling epidermis. Histologically there may br	eases. at ordinarily cause respiratory irritation. d gastrointestinal tract. at and the gastrointestinal tract, diarrhea, dizziness, lletin June 2000 I or prolonged exposure to irritants may produce ontact dermatitis (nonallergic). This form of dermatitis is be intercellular oedema of the spongy layer (spongiosis)
	and intracellular oedema of the epidermis. Inhalation (human) TCLo: 12mg/m3/11W contin.Skin (rabbitmild	
TALC	No significant acute toxicological data identified in literature search. For talc (a form of magnesium silicate) The overuse of talc in nursing infants has resulted in pulmonary oedema, pneumonia and death wi mucous membranes of the bronchioles, disrupts pulmonary clearance, clogs smaller airways. Vic increased pulse, cyanosis, fever. Mild exposure may cause relatively minor inflammatory lung dise Long term exposure may show wheezing, weakness, productive cough, limited chest expansion, so The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.	thin hours of inhaling talcum powder.The powder dries the tims display wheezing, rapid or difficult breathing, ase. cattered rales, cyanosis.
843WB Super Shield Water Based Silver Coated Copper Conductive Coating & COPPER	for copper and its compounds (typically copper chloride): Acute toxicity: There are no reliable acute oral toxicity results available. In an acute dermal toxicit groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for were 2,000 mg/kg bw. Symptom of the hardness of skin, an exudation of hardness site, the formation of sites in all treated animals. Skin inflammation and injury were also noted. In addition, a reddish or b 1,000 mg/kg bw. Female rats appeared to be more sensitive than male based on mortality and clin No reliable skin/eye irritation studies were available. The acute dermal study with copper monochl irritation. Repeat dose toxicity: In repeated dose toxicity study performed according to OECD TG 422, co Dawley rats for 30 days to males and for 39 - 51 days to females at concentrations of 0, 1.3, 5.0, 20 mg/kg bw/day for male and female rats, respectively. No deaths were observed in male rats. One tr high dose group. Erythropoietic toxicity (anaemia) was seen in both sexes at the 80 mg/kg bw/day. forestomach was increased in a dose-dependent manner in male and female rats at all treatment of =20 mg/kg bw/day and in females at doses of =5 mg/kg bw/day doses. The observed effects are forestomach which result from oral (gavage) administration of copper monochloride. Genotoxicity: An in vitro genotoxicity study with copper monochloride showed negative results in typhimurium strains (TA 98, TA 100, TA 1535, and TA 1537) with and without S9 mix at concentrati chromosome aberration in Chinese hamster lung (CHL) cells showed that copper monochloride is concentration of 50, 70 and 100 ug/mL and significant increases of numerical aberrations were observed wircronucleus assay, all animals dosed (15 - 60 mg/kg bw) with copper monochloride exhibited si compared to those of the negative control animals. Therefore copper monochloride is not an in vivo Garcinogenicity: there was insufficient information to evaluate the carcinogenic activity of coppe	ty study (OECD TG 402), one group of 5 male rats and 5 or 24 hours. The LD50 values of copper monochloride ur females died at both 1500 and 2000 mg/kg bw, and one of scar and reddish changes were observed on application lack urine was observed in females at 2,000, 1,500 and ical signs. oride suggests that it has a potential to cause skin pper monochloride was given orally (gavage) to Sprague- , and 80 mg/kg bw/day. The NOAEL value was 5 and 1.3 eatment-related death was observed in female rats in the The frequency of squamous cell hyperplasia of the groups, and was statistically significant in males at doses or onsidered to be local, non-systemic effect on the a bacterial reverse mutation test with Salmonella ons of up to 1,000 ug/plate. An in vitro test for nduced structural and numerical aberrations at the system, significant increases of structural aberrations ed at 70 ug/mL. In an in vivo mammalian erythrocyte milar PCE/(PCE+NCE) ratios and MNPCE frequencies or mutagen. "monochloride. production/developmental toxicity screening test (OECD hales and for 39-51 days to females at concentrations of 0, ng/kg bw/day for the parental animals. No treatment- ir developmental toxicity the NOAEL was 20 mg/kg highest dose tested (80 mg/kg bw/day).
TRIETHYLAMINE & TALC	Asthma-like symptoms may continue for months or even years after exposure to the material cease reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individue within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on sp bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic infi in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infi of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a concentrations of irritating substance (often particulate in nature) and is completely reversible after dyspnea, cough and mucus production.	es. This may be due to a non-allergenic condition known as s of highly irritating compound. Key criteria for the al, with abrupt onset of persistent asthma-like symptoms birometry, with the presence of moderate to severe lammation, without eosinophilia, have also been included requent disorder with rates related to the concentration a disorder that occurs as result of exposure due to high er exposure ceases. The disorder is characterised by
Acute Toxicity	S Carcinogenicity	0
Skin Irritation/Corrosion	Reproductivity	0
Serious Eye Damage/Irritation	STOT - Single Exposure	0
Respiratory or Skin sensitisation	STOT - Repeated Exposure	\odot
Mutagenicity	S Aspiration Hazard	0
	Legend: 🗙 – L	Data available but does not fill the criteria for classification
	✓ - C	Data available to make classification Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

12.1. Toxicity

843WB Super Shield Water					
Based Silver Coated Copper	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Conductive Coating					

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843WB Super Shield Water Based Silver Coated Copper Conductive Paint

	Not Available		Not Available		Not Ava	ailable	Not A	vailable	Not Av	ailable
								1		1
	ENDPOINT	TES	ST DURATION (HR)	SPECIES				VALUE		SOURCE
	LC50	96		Fish	Fish		0.0028mg/L		2	
	EC50	48		Crustacea	Crustacea		0.001mg/L		5	
copper	EC50	72		Algae or c	other aqua	atic plants		0.013335mg/L		4
	BCF	960		Fish				200mg/L		4
	EC25	6		Algae or o	other aqua	atic plants		0.00150495mg/L		4
	NOEC	96		Crustacea	a			0.0008mg/L		4
	ENDPOINT	TES	ST DURATION (HR)	SPECIES				VALUE		SOURCE
	LC50	96		Fish	Fish		0.00148mg/L		2	
silvor	EC50	48		Crustacea	Crustacea			0.00024mg/L		4
Silver	EC50	96		Algae or of	Algae or other aquatic plants			0.001628837mg/L		4
	BCF	336		Crustacea				0.02mg/L		4
	NOEC	480	480					0.00031mg/L		2
	ENDPOINT		TEST DURATION (HR)			SPECIES		VALUE	SOL	JRCE
triethvlamine	LC50		96			Fish		36mg/L	2	
	EC50		48			Crustacea		17mg/L	2	
	NOEC		168 Crustacea		7.1mg/L		2			
	ENDROINT				SPECI	ES	VALL	IE	SOUR	PCF
talc	Not Available		Not Available		Not Ava	ailable	Not A	Available Not Ava		vailable

(Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Toxic to aquatic organisms

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.

Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms. Microbiological processes may also transform insoluble metals to more soluble forms. Such ionic species may bind to dissolved ligands or sorb to solid particles in aquatic or aqueous media. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms. When released to dry soil most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or

melt ice. Environmental processes may also be important in changing solubilities. Even though many metals show few toxic effects at physiological pHs, transformation may introduce new or magnified effects.

A metal ion is considered infinitely persistent because it cannot degrade further.

The current state of science does not allow for an unambiguous interpretation of various measures of bioaccumulation

The counter-ion may also create health and environmental concerns once isolated from the metal. Under normal physiological conditions the counter-ion may be essentially insoluble and may not be bioavailable.

Environmental processes may enhance bioavailability.

Copper is unlikely to accumulate in the atmosphere due to a short residence time for airborne copper aerosols. Airborne coppers, however, may be transported over large distances. Copper accumulates significantly in the food chain.

Drinking Water Standards:

3000 ug/l (UK max)

2000 ug/l (WHO provisional Guideline)

1000 ug/l (WHO level where individuals complain)

Soil Guidelines: Dutch Criteria

36 mg/kg (target)

190 mg/kg (intervention)

Air Quality Standards: no data available.

The toxic effect of copper in the aquatic biota depends on the bio-availability of copper in water which, in turn, depends on its physico-chemical form (ie.speciation). Bioavailability is decreased by complexation and adsorption of copper by natural organic matter, iron and manganese hydrated oxides, and chelating agents excreted by algae and other aquatic organisms. Toxicity is also affected by pH and hardness. Total copper is rarely useful as a predictor of toxicity. In natural sea water, more than 98% of copper is organically bound and in river waters a high percentage is often organically bound, but the actual percentage depends on the river water and its pH.

Copper exhibits significant toxicity in some aquatic organisms. Some algal species are very sensitive to copper with EC50 (96 hour) values as low as 47 ug/litre dissolved copper whilst for other algal species EC50 values of up to 481 ug/litre have been reported. However many of the reportedly high EC50 values may arise in experiments conducted with a culture media containing coppercomplexing agents such as silicate, iron, manganese and EDTA which reduce bioavailability.

Toxic effects arising following exposure by aquatic species to copper are typically

Algae EC50 (96 h)	Daphnia magna LC50 (48-96 h)	Amphipods LC50 (48-96 h)	Gastropods LC50 (48-96 h)	Crab larvae LC50 (48-96 h)
47-481 *	7-54 *	37-183 *	58-112 *	50-100 *

* ug/litre

Exposure to concentrations ranging from one to a few hundred micrograms per litre has led to sublethal effects and effects on long-term survival. For high bioavailability waters, effect concentrations for several sensitive species may be below 10 ug Cu/litre.

In fish, the acute lethal concentration of copper ranges from a few ug/litre to several mg/litre, depending both on test species and exposure conditions. Where the value is less than 50 ug Cu/litre,

test waters generally have a low dissolved organic carbon (DOC) level, low hardness and neutral to slightly acidic pH. Exposure to concentrations ranging from one to a few hundred micrograms per litre has led to sublethal effects and effects on long-term survival. Lower effect concentrations are generally associated with test waters of high bioavailability.

In summary:

Responses expected for high concentration ranges of copper * Total dissolved Cu concentration

range (ug/litre)	Effects of high availability in water
1 40	Significant effects are expected for diatoms and sensitive invertebrates, notably cladocerans.
1-10	Effects on fish could be significant in freshwaters with low pH and hardness.
10-100	Significant effects are expected on various species of microalgae, some species of macroalgae, and a range of invertebrates, including crustaceans,
10-100	gastropods and sea urchins. Survival of sensitive fish will be affected and a variety of fish show sublethal effects.
100-1000	Most taxonomic groups of macroalgae and invertebrates will be severely affected. Lethal levels for most fish species will be reached.
>1000	Lethal concentrations for most tolerant organisms are reached.

* Sites chosen have moderate to high bioavailability similar to water used in most toxicity tests.

In soil, copper levels are raised by application of fertiliser, fungicides, from deposition of highway dusts and from urban, mining and industrial sources. Generally, vegetation rooted in soils reflects the soil copper levels in its foliage. This is dependent upon the bioavailability of copper and the physiological requirements of species concerned.

Typical foliar levels of copper are:		
Uncontaminated soils (0.3-250 mg/kg)	Contaminated soils (150-450 mg/kg)	Mining/smelting soils
6.1-25 mg/kg	80 mg/kg	300 mg/kg

Plants rarely show symptoms of toxicity or of adverse growth effects at normal soil concentrations of copper. Crops are often more sensitive to copper than the native flora, so protection levels for agricultural crops range from 25 mg Cu/kg to several hundred mg/kg, depending on country. Chronic and or acute effects on sensitive species occur at copper levels occurring in some soils as a result of human activities such as copper fertiliser addition, and addition of sludge.

When soil levels exceed 150 mg Cu/kg, native and agricultural species show chronic effects. Soils in the range 500-1000 mg Cu/kg act in a strongly selective fashion allowing the survival of only copper-tolerant species and strains. At 2000 Cu mg/kg most species cannot survive. By 3500 mg Cu/kg areas are largely devoid of vegetation cover. The organic content of the soil appears to be a key factor affecting the bioavailability of copper.

On normal forest soils, non-rooted plants such as mosses and lichens show higher copper concentrations. The fruiting bodies and mycorrhizal sheaths of soil fungi associated with higher plants in forests often accumulate copper to much higher levels than plants at the same site. International Programme on Chemical Safety (IPCS): Environmental Health Criteria 200 For silver and its compounds:

Environmental fate:

Silver is a rare but naturally occurring metal, often found deposited as a mineral ore in association with other elements. Emissions from smelling operations, manufacture and disposal of certain photographic and electrical supplies, coal combustion, and cloud seeding are some of the anthropogenic sources of silver in the biosphere. The global biogeochemical movements of silver are characterized by releases to the atmosphere, water, and land by natural and anthropogenic sources, long-range transport of fine particles in the atmosphere, wet and dry deposition, and sorption to soils and sediments.

In general, accumulation of silver by terrestrial plants from soils is low, even if the soil is amended with silver-containing sewage sludge or the plants are grown on tailings from silver mines, where silver accumulates mainly in the root systems.

The ability to accumulate dissolved silver varies widely between species. Some reported bioconcentration factors for marine organisms (calculated as milligrams of silver per kilogram fresh weight organism divided by milligrams of silver per litre of medium) are 210 in diatoms, 240 in brown algae, 330 in mussels, 2300 in scallops, and 18 700 in oysters, whereas bioconcentration factors for freshwater organisms have been reported to range from negligible in bluegills (*Lepomis macrochirus*) to 60 in daphnids; these values represent uptake of bioavailable silver in laboratory experiments. Laboratory studies with the less toxic silver compounds, such as silver sulfide and silver chloride, reveal that accumulation of silver does not necessarily lead to adverse effects. At concentrations normally encountered in the environment, food-chain biomagnification of silver in aquatic systems is unlikely. Elevated silver concentrations in biota occur in the vicinities of sewage outfalls, electroplating plants, mine waste sites, and silver eseed areas. Maximum concentrations recorded in field collections, in milligrams total silver per kilogram dry weight (tissue), were 1.5 in marine mammals (liver) (except Alaskan beluga whales *Delphinapterus leucas*, which had concentrations 2 orders of magnitude higher than those of other marine mammals), 6 in fish (bone), 14 in plants (whole), 30 in annelid worms (whole), 44 in birds (liver), 110 in mushrooms (whole), 185 in bivalve molluscs (soft parts), and 320 in gastropods (whole).

In general, silver ion was less toxic to freshwater aquatic organisms under conditions of low dissolved silver ion concentration and increasing water pH, hardness, sulfides, and dissolved and particulate organic loadings; under static test conditions, compared with flow-through regimens; and when animals were adequately nourished instead of being starved. Silver ions are very toxic to microorganisms. However, there is generally no strong inhibitory effect on microbial activity in sewage treatment plants because of reduced bioavailability due to rapid complexation and adsorption. Free silver ion was lethal to representative species of sensitive aquatic plants, invertebrates, and teleosts at nominal water concentrations of 1-5 ug/litre. Adverse effects occur on development of trout at concentrations as low as 0.17 ug/litre and on phytoplankton species composition and succession at 0.3-0.6 ug/litre.

A knowledge of the speciation of silver and its consequent bioavailability is crucial to understanding the potential risk of the metal. Measurement of free ionic silver is the only direct method that can be used to assess the likely proportion of the total silver measured that is bioavailable to organisms. Speciation models can be used to assess the likely proportion of the total silver measured that is bioavailable to organisms. Unlike some other metals, background freshwater concentrations in pristine and most urban areas are well below concentrations causing toxic effects. Levels in most industrialized areas border on the effect concentration, assuming that conditions favour bioavailability. On the basis of available toxicity test results, it is unlikely that bioavailable free silver ions would ever be at sufficiently high concentrations to cause toxicity in marine environments.

No data were found on effects of silver on wild birds or mammals. Silver was harmful to poultry (tested as silver nitrate) at concentrations as low as 100 mg total silver/litre in drinking-water or 200 mg total silver/kg in diets. Sensitive laboratory mammals were adversely affected at total silver concentrations (added as silver nitrate) as low as 250 ug/litre in drinking-water (brain histopathology), 6 mg/kg in diet (high accumulations in kidneys and liver), or 13.9 mg/kg body weight (lethality).

Silver and Silver Compounds; Concise International Chemical Assessment Document (CICAD) 44 IPCS InChem (WHO)

The transport of silver through estuarine and coastal marine systems is dependent on biological uptake and incorporation. Uptake by phytoplankton is rapid, in proportion to silver concentration and inversely proportional to salinity. In contrast to studies performed with other toxic metals, sliver availability appears to be controlled by both the free silver in concentration and the concentration of other silver complexes. Silver incorporated by phytoplankton is not lost as salinity increase; as a result silver associated with cellular material is largely retained within the estuary. Phytoplankton exhibit a variable sensitivity to silver. Sensitive species exhibit a marked delay in the onset of growth in response to silver at low concentrations, even though maximum growth rates are similar to controls. A delay in the onset of growth reduces the ability of a population to respond to short-term favourable conditions and to succeed within th community. James G. Saunders and George R Abbe: Aquatic Toxicology and Environmental Fate; ASTM STP 1007, 1989, pp 5-18

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
triethylamine	HIGH	HIGH

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
triethylamine	LOW (BCF = 7.45)

Ingredient	Mobility
triethylamine	LOW (KOC = 107.2)

12.5.Results of PBT and vPvB assessment

	Р	В	т
Relevant available data	Not Available	Not Available	Not Available
PBT Criteria fulfilled?	Not Available	Not Available	Not Available

12.6. Other adverse effects

No data available

SECTION 13 DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Recycle wnerever possible or consult manufacturer for recycling options. Consult State Land Waste Management Authority for disposal. Bury residue in an authorised landfill. Recycle containers if possible, or dispose of in an authorised landfill.
waste treatment options II Not Available

SECTION 14 TRANSPORT INFORMATION

Labels Required

For 843WB-15ML, 843WB-150ML, 843WB-850ML, 843WB-3.78L NOT REGULATED by Ground ADR Special Provision 375 NOT REGULATED by Air IATA Special Provision A197 NOT REGULATED by Sea IMDG per 2.10.2.7 NOT REGULATED by ADN Special Provision 274 (The provision of 3.1.2.8 apply)

Land transport (ADR)

14.1. UN number	3082	
14.2. UN proper shipping name	ENVIRONMENTALLY HAZARDO	JUS SUBSTANCE, LIQUID, N.O.S. (contains silver and copper)
14.3. Transport hazard class(es)	Class 9 Subrisk Not Applicable	
14.4. Packing group	III	
14.5. Environmental hazard	Environmentally hazardous	
14.6. Special precautions for user	Hazard identification (Kemler) Classification code Hazard Label Special provisions Limited quantity	90 M6 9 274 335 375 601 5 L

Air transport (ICAO-IATA / DGR)

14.1. UN number	3082
14.2. UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. * (contains silver and copper)

	ICAO/IATA Class 9			
14.3. Transport hazard class(es)	ICAO / IATA Subrisk Not Applicable	ICAO / IATA Subrisk Not Applicable		
01400(00)	ERG Code 9L			
14.4. Packing group	Ш			
14.5. Environmental hazard	Environmentally hazardous			
14.6. Special precautions for user	Special provisions	A97 A158 A197		
	Cargo Only Packing Instructions	964		
	Cargo Only Maximum Qty / Pack	450 L		
	Passenger and Cargo Packing Instructions	964		
	Passenger and Cargo Maximum Qty / Pack	450 L		
	Passenger and Cargo Limited Quantity Packing Instruct	tions Y964		
	Passenger and Cargo Limited Maximum Qty / Pack	30 kg G		

Sea transport (IMDG-Code / GGVSee)

14.1. UN number	3082	
14.2. UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains silver and copper)	
14.3. Transport hazard class(es)	IMDG Class 9 IMDG Subrisk Not Applicable	
14.4. Packing group	III	
14.5. Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS NumberF-A , S-FSpecial provisions274 335 969Limited Quantities5 L	

Inland waterways transport (ADN)

	-	
14.1. UN number	3082	
14.2. UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains silver and copper)	
14.3. Transport hazard class(es)	9 Not Applicable	
14.4. Packing group	Ш	
14.5. Environmental hazard	Environmentally hazardous	
14.6. Special precautions for user	Classification codeM6Special provisions274; 335; 375; 601Limited quantity5 LEquipment requiredPPFire cones number0	

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

Not Applicable

SECTION 15 REGULATORY INFORMATION

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

COPPER(7440-50-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

European Customs Inventory of Chemical Substances ECICS (English) European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

UK Workplace Exposure Limits (WELs)

SILVER(7440-22-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Commission Directive 2006/15/EC establishing a second list of indicative occupational exposure limit values (IOELVs) (Spanish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Bulgarian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Czech)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Danish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Dutch)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Estonian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Finnish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (French)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (German)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Greek)

TRIETHYLAMINE(121-44-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

European Customs Inventory of Chemical Substances ECICS (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) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Bulgarian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Czech)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Danish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Dutch)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Estonian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Finnish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (French)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (German)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Greek)

TALC(14807-96-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2015/830; Regulation (EC) No 1272/2008 as updated through ATPs.

15.2. Chemical safety assessment

For further information please look at the Chemical Safety Assessment and Exposure Scenarios prepared by your Supply Chain if available.

National Inventory Status

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (talc; triethylamine; copper; silver)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (copper; silver)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Hungarian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Italian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Latvian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Lithuanian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Maltese)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Polish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Portuguese)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Romanian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Slovak)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Slovenian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Spanish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Swedish)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs)

UK Workplace Exposure Limits (WELs)

(Hungarian)

European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Italian) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Latvian) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Lithuanian) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Maltese) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Polish) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Portuguese) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Romanian) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Slovak) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Slovenian) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Spanish) European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (Swedish) European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI UK Workplace Exposure Limits (WELs)

Continued...

UK Workplace Exposure Limits (WELs)

Korea - KECI	Υ
New Zealand - NZIoC	Υ
Philippines - PICCS	Υ
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)

SECTION 16 OTHER INFORMATION

Revision Date	18/03/2020
Initial Date	10/07/2018

Full text Risk and Hazard codes

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Other information

Ingredients with multiple cas numbers

Name	CAS No
copper	7440-50-8, 133353-46-5, 133353-47-6, 195161-80-9, 65555-90-0, 72514-83-1

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.

The 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 166 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

Definitions and abbreviations

PC-TWA: Permissible Concentration-Time Weighted Average

- PC-STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists

STEL: Short Term Exposure Limit

TEEL: Temporary Emergency Exposure Limit。

IDLH: Immediately Dangerous to Life or Health Concentrations

OSF: Odour Safety Factor NOAEL :No Observed Adverse Effect Level

LOAEL: Lowest Observed Adverse Effect Level

TLV: Threshold Limit Value

LOD: Limit Of Detection

- OTV: Odour Threshold Value
- BCF: BioConcentration Factors
- BEI: Biological Exposure Index

Reason for Change

A-1.04 - Update to the emergency phone number information.