



## 838AR-Liquid Total Ground Carbon Conductive Coating

MG Chemicals UK Limited

Version No: 1.3

Safety Data Sheet (Conforms to Regulations (EC) No 2015/830)

Chemwatch Hazard Alert Code: 3

Issue Date: 07/11/2015

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L.REACH.GBR.EN

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

#### 1.1. Product Identifier

Product name	838AR-Liquid Total Ground Carbon Conductive Coating
Synonyms	SDS Code: 838AR-Liquid; Related Number 838AR-15ML, 838AR-150ML, 838AR-900ML, 838AR-3.78L
Proper shipping name	PAINT or PAINT RELATED MATERIAL
Other means of identification	Not Available

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

Relevant identified uses	Electrically conductive coating and EMI/RFI shield
Uses advised against	Not Applicable

#### 1.3. Details of the supplier of the safety data sheet

Registered company name	MG Chemicals UK Limited
Address	Heame House, 23 Bilston Street, Sedgely Dudley DY3 1JA United Kingdom
Telephone	+44 1663 362888
Fax	Not Available
Website	Not Available
Email	sales@mgchemicals.com

#### 1.4. Emergency telephone number

Association / Organisation	CHEMTREC
Emergency telephone numbers	+(44)-870-8200418
Other emergency telephone numbers	+(1) 703-527-3887




### SECTION 2 HAZARDS IDENTIFICATION

#### 2.1. Classification of the substance or mixture

Considered a dangerous mixture according to Directive 1999/45/EC, Reg. (EC) No 1272/2008 (if applicable) and their amendments. Classified as Dangerous Goods for transport purposes.

Classification according to regulation (EC) No 1272/2008 [CLP] [1]	Eye Irritation Category 2, STOT - SE (Narcosis) Category 3, Carcinogen Category 2, Flammable Liquid Category 2
Legend:	1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI

#### 2.2. Label elements

CLP label elements	  
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SIGNAL WORD DANGER

#### Hazard statement(s)

H319	Causes serious eye irritation
H336	May cause drowsiness or dizziness
H351	Suspected of causing cancer
H225	Highly flammable liquid and vapour

Continued...

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## Supplementary statement(s)

<b>EUH066</b>	Repeated exposure may cause skin dryness or cracking
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## Precautionary statement(s) Prevention

<b>P201</b>	Obtain special instructions before use.
<b>P210</b>	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
<b>P271</b>	Use only outdoors or in a well-ventilated area.
<b>P280</b>	Wear protective gloves/protective clothing/eye protection/face protection.
<b>P240</b>	Ground/bond container and receiving equipment.
<b>P241</b>	Use explosion-proof electrical/ventilating/lighting/.../equipment.
<b>P242</b>	Use only non-sparking tools.
<b>P243</b>	Take precautionary measures against static discharge.
<b>P261</b>	Avoid breathing dust/fume/gas/mist/vapours/spray.

## Precautionary statement(s) Response

<b>P308+P313</b>	IF exposed or concerned: Get medical advice/ attention.
<b>P370+P378</b>	In case of fire: Use alcohol resistant foam or normal protein foam for extinction.
<b>P305+P351+P338</b>	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
<b>P312</b>	Call a POISON CENTER/doctor/.../if you feel unwell.
<b>P337+P313</b>	If eye irritation persists: Get medical advice/attention.
<b>P303+P361+P353</b>	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
<b>P304+P340</b>	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

## Precautionary statement(s) Storage

<b>P403+P235</b>	Store in a well-ventilated place. Keep cool.
<b>P405</b>	Store locked up.
<b>P403+P233</b>	Store in a well-ventilated place. Keep container tightly closed.

## Precautionary statement(s) Disposal

<b>P501</b>	Dispose of contents/container in accordance with local regulations.
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## 2.3. Other hazards

Cumulative effects may result following exposure\*.

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

## 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]
1.67-64-1 2.200-662-2 3.606-001-00-8 4.01-2119498062-37-XXXX, 01-2119471330-49-XXXX	38	<u>acetone</u>	Flammable Liquid Category 2, Eye Irritation Category 2, STOT - SE (Narcosis) Category 3; H225, H319, H336, EUH066 [3]
1.78-93-3 2.201-159-0 3.606-002-00-3 4.01-2119457290-43-XXXX, 01-2119943742-35-XXXX	37	<u>methyl ethyl ketone</u>	Flammable Liquid Category 2, Eye Irritation Category 2, STOT - SE (Narcosis) Category 3; H225, H319, H336, EUH066 [3]
1.1333-86-4 2.215-609-9 3.Not Available 4.01-2119384822-32-XXXX, 01-2119489801-30-XXXX, 01-2119475601-40-XXXX	6	<u>carbon black</u>	Carcinogen Category 2; H351 [1]
1.67-63-0 2.200-661-7 3.603-117-00-0 4.01-2119457558-25-XXXX	5	<u>isopropanol</u>	Flammable Liquid Category 2, Eye Irritation Category 2, STOT - SE (Narcosis) Category 3; H225, H319, H336 [3]

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1.108-65-6 2.203-603-9, 283-152-2 3.607-195-00-7 4.01-2119475791-29-XXXX	5	<u>propylene glycol monomethyl ether acetate, alpha-isomer</u>	Flammable Liquid Category 3; H226 [3]
<b>Legend:</b> 1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI 4. Classification drawn from C&L			

## SECTION 4 FIRST AID MEASURES

## 4.1. Description of first aid measures

<b>General</b>	<ul style="list-style-type: none"> <li>Immediately give a glass of water.</li> <li>First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul> <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>Wash out immediately with fresh running water.</li> <li>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.</li> <li>Seek medical attention without delay; if pain persists or recurs seek medical attention.</li> <li>Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul> <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <li>Flush skin and hair with running water (and soap if available).</li> <li>Seek medical attention in event of irritation.</li> </ul>
<b>Eye Contact</b>	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>Wash out immediately with fresh running water.</li> <li>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.</li> <li>Seek medical attention without delay; if pain persists or recurs seek medical attention.</li> <li>Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <li>Flush skin and hair with running water (and soap if available).</li> <li>Seek medical attention in event of irritation.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>If fumes or combustion products are inhaled remove from contaminated area.</li> <li>Lay patient down. Keep warm and rested.</li> <li>Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>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.</li> <li>Transport to hospital, or doctor, without delay.</li> </ul>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>Immediately give a glass of water.</li> <li>First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li> <li>If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.</li> </ul>

## 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

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For acute or short term repeated exposures to acetone:

- Symptoms of acetone exposure approximate ethanol intoxication.
  - About 20% is expired by the lungs and the rest is metabolised. Alveolar air half-life is about 4 hours following two hour inhalation at levels near the Exposure Standard; in overdose, saturable metabolism and limited clearance, prolong the elimination half-life to 25-30 hours.
  - There are no known antidotes and treatment should involve the usual methods of decontamination followed by supportive care.
- [Ellenhorn and Barceloux: Medical Toxicology]

Management:

Measurement of serum and urine acetone concentrations may be useful to monitor the severity of ingestion or inhalation.

Inhalation Management:

- Maintain a clear airway, give humidified oxygen and ventilate if necessary.
- If respiratory irritation occurs, assess respiratory function and, if necessary, perform chest X-rays to check for chemical pneumonitis.
- Consider the use of steroids to reduce the inflammatory response.
- Treat pulmonary oedema with PEEP or CPAP ventilation.

Dermal Management:

- Remove any remaining contaminated clothing, place in double sealed, clear bags, label and store in secure area away from patients and staff.
- Irrigate with copious amounts of water.
- An emollient may be required.

Eye Management:

- Irrigate thoroughly with running water or saline for 15 minutes.
- Stain with fluorescein and refer to an ophthalmologist if there is any uptake of the stain.

Oral Management:

- No **GASTRIC LAVAGE OR EMETIC**
- Encourage oral fluids.

Systemic Management:

- Monitor blood glucose and arterial pH.
- Ventilate if respiratory depression occurs.
- If patient unconscious, monitor renal function.
- Symptomatic and supportive care.

The Chemical Incident Management Handbook:

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Guy's and St. Thomas' Hospital Trust, 2000

## BIOLOGICAL EXPOSURE INDEX

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Sampling Time	Index	Comments
Acetone in urine	End of shift	50 mg/L	NS

NS: Non-specific determinant; also observed after exposure to other material

## SECTION 5 FIREFIGHTING MEASURES

## 5.1. Extinguishing media

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

## 5.2. Special hazards arising from the substrate or mixture

<b>Fire Incompatibility</b>	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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## 5.3. Advice for firefighters

<b>Fire Fighting</b>	<ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ May be violently or explosively reactive.</li> <li>▶ Wear breathing apparatus plus protective gloves in the event of a fire.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> <li>▶ Consider evacuation (or protect in place).</li> <li>▶ Fight fire from a safe distance, with adequate cover.</li> <li>▶ If safe, switch off electrical equipment until vapour fire hazard removed.</li> <li>▶ Use water delivered as a fine spray to control the fire and cool adjacent area.</li> <li>▶ Avoid spraying water onto liquid pools.</li> <li>▶ <b>Do not approach containers suspected to be hot.</b></li> <li>▶ Cool fire exposed containers with water spray from a protected location.</li> <li>▶ If safe to do so, remove containers from path of fire.</li> </ul>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>▶ Liquid and vapour are highly flammable.</li> <li>▶ Severe fire hazard when exposed to heat, flame and/or oxidisers.</li> <li>▶ Vapour may travel a considerable distance to source of ignition.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>▶ On combustion, may emit toxic fumes of carbon monoxide (CO).</li> </ul> <p>Combustion products include; carbon dioxide (CO<sub>2</sub>) other pyrolysis products typical of burning organic material <b>Contains low boiling substance:</b> Closed containers may rupture due to pressure buildup under fire conditions.</p>

## 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	<ul style="list-style-type: none"><li>▶ Remove all ignition sources.</li><li>▶ Clean up all spills immediately.</li><li>▶ Avoid breathing vapours and contact with skin and eyes.</li><li>▶ Control personal contact with the substance, by using protective equipment.</li><li>▶ Contain and absorb small quantities with vermiculite or other absorbent material.</li><li>▶ Wipe up.</li><li>▶ Collect residues in a flammable waste container.</li></ul>									
Major Spills	Chemical Class: ketones For release onto land: recommended sorbents listed in order of priority.									
	<table><tr><th>SORBENT TYPE</th><th>RANK</th><th>APPLICATION</th><th>COLLECTION</th><th>LIMITATIONS</th></tr></table>					SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
	SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS					
	LAND SPILL - SMALL									
	cross-linked polymer - particulate	1	shovel	shovel	R, W, SS					
	cross-linked polymer - pillow	1	throw	pitchfork	R, DGC, RT					
	sorbent clay - particulate	2	shovel	shovel	R,I, P					
	wood fiber - pillow	3	throw	pitchfork	R, P, DGC, RT					
	treated wood fiber - pillow	3	throw	pitchfork	DGC, RT					
	foamed glass - pillow	4	throw	pitchfork	R, P, DGC, RT					
LAND SPILL - MEDIUM										
cross-linked polymer - particulate	1	blower	skiploader	R,W, SS						
cross-linked polymer - pillow	2	throw	skiploader	R, DGC, RT						

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sorbent clay - particulate	3	blower	skiploader	R, I, P
polypropylene - particulate	3	blower	skiploader	R, SS, DGC
expanded mineral - particulate	4	blower	skiploader	R, I, W, P, DGC
polypropylene - mat	4	throw	skiploader	DGC, RT

## Legend

DGC: Not effective where ground cover is dense

R; Not reusable

I: Not incinerable

P: Effectiveness reduced when rainy

RT: Not effective where terrain is rugged

SS: Not for use within environmentally sensitive sites

W: Effectiveness reduced when windy

Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;

R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988

- ▶ 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.

## 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	<ul style="list-style-type: none"> <li>▶ Containers, even those that have been emptied, may contain explosive vapours.</li> <li>▶ Do NOT cut, drill, grind, weld or perform similar operations on or near containers.</li> </ul> <p><b>Contains low boiling substance:</b></p> <p>Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.</p> <ul style="list-style-type: none"> <li>▶ Check for bulging containers.</li> <li>▶ Vent periodically</li> <li>▶ Always release caps or seals slowly to ensure slow dissipation of vapours</li> <li>▶ <b>DO NOT allow clothing wet with material to stay in contact with skin</b></li> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> <li>▶ <b>DO NOT enter confined spaces until atmosphere has been checked.</b></li> <li>▶ Avoid smoking, naked lights, heat or ignition sources.</li> <li>▶ When handling, <b>DO NOT eat, drink or smoke.</b></li> <li>▶ Vapour may ignite on pumping or pouring due to static electricity.</li> <li>▶ <b>DO NOT use plastic buckets.</b></li> <li>▶ Earth and secure metal containers when dispensing or pouring product.</li> <li>▶ Use spark-free tools when handling.</li> <li>▶ Avoid contact with incompatible materials.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ Avoid physical damage to containers.</li> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately.</li> <li>▶ Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.</li> </ul>
Fire and explosion protection	See section 5
Other information	<ul style="list-style-type: none"> <li>▶ Store in original containers in approved flame-proof area.</li> <li>▶ No smoking, naked lights, heat or ignition sources.</li> <li>▶ <b>DO NOT store in pits, depressions, basements or areas where vapours may be trapped.</b></li> <li>▶ Keep containers securely sealed.</li> <li>▶ Store away from incompatible materials in a cool, dry well ventilated area.</li> <li>▶ Protect containers against physical damage and check regularly for leaks.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> </ul>

## 7.2. Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> <li>▶ Packing as supplied by manufacturer.</li> <li>▶ Plastic containers may only be used if approved for flammable liquid.</li> <li>▶ Check that containers are clearly labelled and free from leaks.</li> <li>▶ 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.</li> </ul>
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	<ul style="list-style-type: none"> <li>▶ For materials with a viscosity of at least 2680 cSt. (23 deg. C)</li> <li>▶ For manufactured product having a viscosity of at least 250 cSt. (23 deg. C)</li> <li>▶ 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.</li> <li>▶ 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</li> <li>▶ In addition, where inner packagings are 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.</li> </ul>
Storage incompatibility	<p>Methyl ethyl ketone:</p> <ul style="list-style-type: none"> <li>▶ reacts violently with strong oxidisers, aldehydes, nitric acid, perchloric acid, potassium tert-butoxide, oleum</li> <li>▶ is incompatible with inorganic acids, aliphatic amines, ammonia, caustics, isocyanates, pyridines, chlorosulfonic acid</li> <li>▶ forms unstable peroxides in storage, or on contact with propanol or hydrogen peroxide</li> <li>▶ attacks some plastics</li> <li>▶ may generate electrostatic charges, due to low conductivity, on flow or agitation</li> </ul> <p>Acetone:</p> <ul style="list-style-type: none"> <li>▶ may react violently with chloroform, activated charcoal, aliphatic amines, bromine, bromine trifluoride, chlorotriazine, chromic(IV) acid, chromic(VI) acid, chromium trioxide, chromyl chloride, hexachloromelamine, iodine heptafluoride, iodoform, liquid oxygen, nitrosyl chloride, nitrosyl perchlorate, nitril perchlorate, perchloromelamine, peroxomonosulfuric acid, platinum, potassium tert-butoxide, strong acids, sulfur dichloride, trichloromelamine, xenon tetrafluoride</li> <li>▶ reacts violently with bromoform and chloroform in the presence of alkalies or in contact with alkaline surfaces.</li> <li>▶ may form unstable and explosive peroxides in contact with strong oxidisers, fluorine, hydrogen peroxide (90%), sodium perchlorate, 2-methyl-1,3-butadiene</li> <li>▶ can increase the explosive sensitivity of nitromethane on contact flow or agitation may generate electrostatic charges due to low conductivity</li> <li>▶ dissolves or attacks most rubber, resins, and plastics (polyethylenes, polyester, vinyl ester, PVC, Neoprene, Viton)</li> </ul> <p>Ketones in this group:</p> <ul style="list-style-type: none"> <li>▶ are reactive with many acids and bases liberating heat and flammable gases (e.g., H<sub>2</sub>).</li> <li>▶ react with reducing agents such as hydrides, alkali metals, and nitrides to produce flammable gas (H<sub>2</sub>) and heat.</li> <li>▶ are incompatible with isocyanates, aldehydes, cyanides, peroxides, and anhydrides.</li> <li>▶ react violently with aldehydes, HNO<sub>3</sub> (nitric acid), HNO<sub>3</sub> + H<sub>2</sub>O<sub>2</sub> (mixture of nitric acid and hydrogen peroxide), and HClO<sub>4</sub> (perchloric acid).</li> <li>▶ may react with hydrogen peroxide to form unstable peroxides; many are heat- and shock-sensitive explosives.</li> </ul> <p>A significant property of most ketones is that the hydrogen atoms on the carbons next to the carbonyl group are relatively acidic when compared to hydrogen atoms in typical hydrocarbons. Under strongly basic conditions these hydrogen atoms may be abstracted to form an enolate anion. This property allows ketones, especially methyl ketones, to participate in condensation reactions with other ketones and aldehydes. This type of condensation reaction is favoured by high substrate concentrations and high pH (greater than 1 wt% NaOH).</p> <p>Propylene glycol monomethyl ether acetate:</p> <ul style="list-style-type: none"> <li>▶ may polymerise unless properly inhibited due to peroxide formation</li> <li>▶ should be isolated from UV light, high temperatures, free radical initiators</li> <li>▶ may react with strong oxidisers to produce fire and/ or explosion</li> <li>▶ reacts violently with sodium peroxide, uranium fluoride</li> <li>▶ is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates, boranes</li> <li>▶ Avoid strong bases.</li> <li>▶ Avoid reaction with oxidising agents</li> </ul>

## 7.3. Specific end use(s)

See section 1.2

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

## 8.1. Control parameters

## DERIVED NO EFFECT LEVEL (DNEL)

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)	acetone	Acetone	1210 mg/m <sup>3</sup> / 500 ppm	3620 mg/m <sup>3</sup> / 1500 ppm	Not Available	Not Available
European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)	acetone	Acetone	1 210 mg/m <sup>3</sup> / 500 ppm	Not Available	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	acetone	Acetone	1210 mg/m <sup>3</sup> / 500 ppm	Not Available	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	methyl ethyl ketone	Butan-2-one (methyl ethyl ketone)	600 mg/m <sup>3</sup> / 200 ppm	899 mg/m <sup>3</sup> / 300 ppm	Not Available	Sk, BMGV
European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)	methyl ethyl ketone	Butanone	600 mg/m <sup>3</sup> / 200 ppm	900 mg/m <sup>3</sup> / 300 ppm	Not Available	Not Available
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	methyl ethyl ketone	Butanone	600 mg/m <sup>3</sup> / 200 ppm	900 mg/m <sup>3</sup> / 300 ppm	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	carbon black	Carbon black	3.5 mg/m <sup>3</sup>	7 mg/m <sup>3</sup>	Not Available	Not Available

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UK Workplace Exposure Limits (WELs)	isopropanol	Propan-2-ol	999 mg/m <sup>3</sup> / 400 ppm	1250 mg/m <sup>3</sup> / 500 ppm	Not Available	Not Available
UK Workplace Exposure Limits (WELs)	propylene glycol monomethyl ether acetate, alpha-isomer	1-Methoxypropyl acetate	274 mg/m <sup>3</sup> / 50 ppm	548 mg/m <sup>3</sup> / 100 ppm	Not Available	Sk
European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)	propylene glycol monomethyl ether acetate, alpha-isomer	2-Methoxy-1-methylethylacetate	275 mg/m <sup>3</sup> / 50 ppm	550 mg/m <sup>3</sup> / 100 ppm	Not Available	Skin
EU Consolidated List of Indicative Occupational Exposure Limit Values (IOELVs)	propylene glycol monomethyl ether acetate, alpha-isomer	1-Methoxypropyl-2-acetate	275 mg/m <sup>3</sup> / 50 ppm	550 mg/m <sup>3</sup> / 100 ppm	Not Available	Skin

## EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
acetone	Acetone	Not Available	Not Available	Not Available
methyl ethyl ketone	Butanone, 2-; (Methyl ethyl ketone; MEK)	Not Available	Not Available	Not Available
carbon black	Carbon black	9 mg/m <sup>3</sup>	99 mg/m <sup>3</sup>	590 mg/m <sup>3</sup>
isopropanol	Isopropyl alcohol	400 ppm	400 ppm	12000 ppm
propylene glycol monomethyl ether acetate, alpha-isomer	Propylene glycol monomethyl ether acetate, alpha-isomer; (1-Methoxypropyl-2-acetate)	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
acetone	20,000 ppm	2,500 [LEL] ppm
methyl ethyl ketone	3,000 ppm	3,000 [Unch] ppm
carbon black	N.E. mg/m <sup>3</sup> / N.E. ppm	1,750 mg/m <sup>3</sup>
isopropanol	12,000 ppm	2,000 [LEL] ppm
propylene glycol monomethyl ether acetate, alpha-isomer	Not Available	Not Available

## MATERIAL DATA

Odour Threshold Value: 3.6 ppm (detection), 699 ppm (recognition)

Saturation vapour concentration: 237000 ppm @ 20 C

NOTE: Detector tubes measuring in excess of 40 ppm, are available.

Exposure at or below the recommended TLV-TWA is thought to protect the worker against mild irritation associated with brief exposures and the bioaccumulation, chronic irritation of the respiratory tract and headaches associated with long-term acetone exposures. The NIOSH REL-TWA is substantially lower and has taken into account slight irritation experienced by volunteer subjects at 300 ppm. Mild irritation to acclimatised workers begins at about 750 ppm - unacclimatised subjects will experience irritation at about 350-500 ppm but acclimatisation can occur rapidly. Disagreement between the peak bodies is based largely on the view by ACGIH that widespread use of acetone, without evidence of significant adverse health effects at higher concentrations, allows acceptance of a higher limit.

Half-life of acetone in blood is 3 hours which means that no adjustment for shift-length has to be made with reference to the standard 8 hour/day, 40 hours per week because body clearance occurs within any shift with low potential for accumulation.

A STEL has been established to prevent excursions of acetone vapours that could cause depression of the central nervous system.

Odour Safety Factor(OSF)

OSF=38 (ACETONE)

for propylene glycol monomethyl ether acetate (PGMEA)

Saturated vapour concentration: 4868 ppm at 20 C.

A two-week inhalation study found nasal effects to the nasal mucosa in animals at concentrations up to 3000 ppm. Differences in the teratogenic potential of the alpha (commercial grade) and beta isomers of PGMEA may be explained by the formation of different metabolites. The beta-isomer is thought to be oxidised to methoxypropionic acid, a homologue to methoxyacetic acid which is a known teratogen. The alpha- form is conjugated and excreted. PGMEA mixture (containing 2% to 5% beta isomer) is a mild skin and eye irritant, produces mild central nervous system effects in animals at 3000 ppm and produces mild CNS impairment and upper respiratory tract and eye irritation in humans at 1000 ppm. In rats exposed to 3000 ppm PGMEA produced slight foetotoxic effects (delayed sternal ossification) - no effects on foetal development were seen in rabbits exposed at 3000 ppm.

For methyl ethyl ketone:

Odour Threshold Value: Variously reported as 2 ppm and 4.8 ppm

Odour threshold: 2 ppm (detection); 5 ppm (recognition); 25 ppm (easy recognition); 300 ppm IRRITATING

Exposures at or below the recommended TLV-TWA are thought to prevent injurious systemic effects and to minimise objections to odour and irritation. Where synergism or potentiation may occur stringent control of the primary toxin (e.g. n-hexane or methyl butyl ketone) is desirable and additional consideration should be given to lowering MEK exposures.

Odour Safety Factor(OSF)

OSF=28 (METHYL ETHYL KETONE)

Odour Threshold Value: 3.3 ppm (detection), 7.6 ppm (recognition)

Exposure at or below the recommended isopropanol TLV-TWA and STEL is thought to minimise the potential for inducing narcotic effects or significant irritation of the eyes or upper respiratory tract. It is believed, in the absence of hard evidence, that this limit also provides protection against the development of chronic health effects. The limit is intermediate to that set for ethanol, which is less toxic, and n-propyl alcohol, which is more toxic, than isopropanol

## 8.2. Exposure controls

## 8.2.1. Appropriate engineering 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



## 838AR-Liquid Total Ground Carbon Conductive Coating

	required to effectively remove the contaminant.										
	<table><tr><th>Type of Contaminant:</th><th>Air Speed:</th></tr><tr><td>solvent, vapours, degreasing etc., evaporating from tank (in still air).</td><td>0.25-0.5 m/s (50-100 f/min.)</td></tr><tr><td>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)</td><td>0.5-1 m/s (100-200 f/min.)</td></tr><tr><td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td><td>1-2.5 m/s (200-500 f/min.)</td></tr></table>	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.)		
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	Within each range the appropriate value depends on:										
	<table><tr><th>Lower end of the range</th><th>Upper end of the range</th></tr><tr><td>1: Room air currents minimal or favourable to capture</td><td>1: Disturbing room air currents</td></tr><tr><td>2: Contaminants of low toxicity or of nuisance value only.</td><td>2: Contaminants of high toxicity</td></tr><tr><td>3: Intermittent, low production.</td><td>3: High production, heavy use</td></tr><tr><td>4: Large hood or large air mass in motion</td><td>4: Small hood-local control only</td></tr></table>	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
Lower end of the range	Upper end of the range										
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2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity										
3: Intermittent, low production.	3: High production, heavy use										
4: Large hood or large air mass in motion	4: Small hood-local control only										
	Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.										
8.2.2. Personal protection											
Eye and face protection	<ul style="list-style-type: none"><li>▶ Safety glasses with side shields.</li><li>▶ Chemical goggles.</li><li>▶ 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 59], [AS/NZS 1336 or national equivalent]</li></ul>										
Skin protection	See Hand protection below										
Hands/feet protection	<p>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 can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>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.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"><li>▶ frequency and duration of contact,</li><li>▶ chemical resistance of glove material,</li><li>▶ glove thickness and</li><li>▶ dexterity</li></ul> <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"><li>▶ 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.</li><li>▶ 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.</li><li>▶ Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.</li><li>▶ Contaminated gloves should be replaced.</li></ul> <p>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.</p> <ul style="list-style-type: none"><li>▶ Wear chemical protective gloves, e.g. PVC.</li><li>▶ Wear safety footwear or safety gumboots, e.g. Rubber</li></ul>										
Body protection	See Other protection below										
Other protection	<ul style="list-style-type: none"><li>▶ Overalls.</li><li>▶ PVC Apron.</li><li>▶ PVC protective suit may be required if exposure severe.</li><li>▶ Eyewash unit.</li><li>▶ Ensure there is ready access to a safety shower.</li></ul> <p>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</p> <p>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</p> <p>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.</p>										
Thermal hazards	Not Available										

## Recommended material(s)

## GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

## Respiratory protection

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

Continued...



## 838AR-Liquid Total Ground Carbon Conductive Coating

**"Forsberg Clothing Performance Index".**

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

838AR-Liquid Total Ground Carbon Conductive Coating

Material	CPI
PE/EVAL/PE	A
BUTYL	C
BUTYL/NEOPRENE	C
CPE	C
HYPALON	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON/NEOPRENE	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 "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.

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	AX-AUS / Class 1	-	AX-PAPR-AUS / Class 1
up to 50 x ES	Air-line*	-	-
up to 100 x ES	-	AX-3	-
100+ x ES	-	Air-line**	-

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

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(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

### 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	Note that all of the monopropylene glycol ethers may exist in two isomeric forms, alpha or beta. The alpha form, which is thermodynamically favored during synthesis, consists of a secondary alcohol configuration. The beta form consists of a primary alcohol. The two isomeric forms are shown above. The di- and tripropylene glycol ethers may form up to 4 and 8 isomeric forms, respectively. Even so, all isomers exhibit either the "alpha" or "beta" configuration, existing as secondary or primary alcohols, respectively. The distribution of isomeric forms for the di- and tripropylene glycols, as with the mono-PGEs, also results in predominantly the alpha form (i.e., a secondary alcohol). It should be noted that only the alpha isomer and isomeric mixtures (consisting predominantly of the alpha isomer) are produced commercially; the purified beta isomer is not produced at this time.		
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	Black		

Physical state	#00Liquid	Relative density (Water = 1)	1
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	>315
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	154

Continued...

## 838AR-Liquid Total Ground Carbon Conductive Coating

Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	-17	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	12	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	2	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	17	Gas group	Not Available
Solubility in water (g/L)	#01partimmiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	>2	VOC g/L	Not Available

## 9.2. Other information

Not Available

## SECTION 10 STABILITY AND REACTIVITY

10.1.Reactivity	See section 7.2
10.2.Chemical stability	<ul style="list-style-type: none"> <li>▶ Unstable in the presence of incompatible materials.</li> <li>▶ Product is considered stable.</li> <li>▶ Hazardous polymerisation will not occur.</li> </ul>
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	<p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical 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 system.</p> <p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>The material has <b>NOT</b> been classified by EC Directives or other classification systems as "harmful by inhalation". This is because of the lack of corroborating animal or human evidence. In the absence of such evidence, care should be taken nevertheless to ensure exposure is kept to a minimum and that suitable control measures be used, in an occupational setting to control vapours, fumes and aerosols.</p> <p>Mice exposed at up to 3000 ppm PGMEA 6 hr/day for a total of 9 days during an 11-day period showed no pronounced effect on the weights of liver, kidneys, heart, spleen, thymus or testes. Histopathological examination revealed degeneration of the olfactory epithelium in mice exposed at 300 ppm for the same time. Rats, similarly failed to show changes in internal organs and did not show olfactory epithelium degeneration until 3000 ppm. The no-effect level in rats was 1000 ppm.</p> <p>Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.</p> <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p> <p>Acute exposure of humans to high concentrations of methyl ethyl ketone produces irritation to the eyes, nose, and throat. Other effects reported from acute inhalation exposure in humans include central nervous system depression, headache, and nausea.</p> <p>Easy odour recognition and irritant properties of methyl ethyl ketone means that high vapour levels are readily detected and should be avoided by application of control measures; however odour fatigue may occur with loss of warning of exposure.</p> <p>The odour of isopropanol may give some warning of exposure, but odour fatigue may occur. Inhalation of isopropanol may produce irritation of the nose and throat with sneezing, sore throat and runny nose. The effects in animals subject to a single exposure, by inhalation, included inactivity or anaesthesia and histopathological changes in the nasal canal and auditory canal.</p> <p>Exposure to ketone vapours may produce nose, throat and mucous membrane irritation. High concentrations of vapour may produce central nervous system depression characterised by headache, vertigo, loss of coordination, narcosis and cardiorespiratory failure. Some ketones produce neurological disorders (polyneuropathy) characterised by bilateral symmetrical paresthesia and muscle weakness primarily in the legs and arms.</p>
Ingestion	<p>The material has <b>NOT</b> 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.</p> <p>Following ingestion, a single exposure to isopropyl alcohol produced lethargy and non-specific effects such as weight loss and irritation. Ingestion of near-lethal doses of isopropanol produces histopathological changes of the stomach, lungs and kidneys, incoordination, lethargy, gastrointestinal tract irritation, and inactivity or anaesthesia.</p> <p>Swallowing 10 ml. of isopropanol may cause serious injury; 100 ml. may be fatal if not promptly treated. The adult single lethal doses is approximately 250 ml. The toxicity of isopropanol is twice that of ethanol and the symptoms of intoxication appear to be similar except for the absence of an initial euphoric effect; gastritis and vomiting are more prominent. Ingestion may cause nausea, vomiting, and diarrhoea.</p> <p>There is evidence that a slight tolerance to isopropanol may be acquired.</p>
Skin Contact	<p>The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.</p> <p>Repeated application of commercial grade PGMEA to the skin of rabbits for 2-weeks caused slight redness and very slight exfoliation.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p>

Continued...

## 838AR-Liquid Total Ground Carbon Conductive Coating

	Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. 511ipa												
Eye	<p>The vapour when concentrated has pronounced eye irritation effects and this gives some warning of high vapour concentrations. If eye irritation occurs seek to reduce exposure with available control measures, or evacuate area.</p> <p>Undiluted propylene glycol monomethyl ether acetate (PGMEA) causes moderate discomfort, slight conjunctival redness and slight corneal injury in rabbits. Isopropanol vapour may cause mild eye irritation at 400 ppm. Splashes may cause severe eye irritation, possible corneal burns and eye damage. Eye contact may cause tearing or blurring of vision.</p> <p>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.</p> <p>The liquid may produce eye discomfort and is capable of causing temporary impairment of vision and/or transient eye inflammation, ulceration</p>												
Chronic	<p>On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.</p> <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Long term or repeated ingestion exposure of isopropanol may produce incoordination, lethargy and reduced weight gain.</p> <p>Repeated inhalation exposure to isopropanol may produce narcosis, incoordination and liver degeneration. Animal data show developmental effects only at exposure levels that produce toxic effects in the adult animals. Isopropanol does not cause genetic damage in bacterial or mammalian cell cultures or in animals.</p> <p>There are inconclusive reports of human sensitisation from skin contact with isopropanol. Chronic alcoholics are more tolerant of systemic isopropanol than are persons who do not consume alcohol; alcoholics have survived as much as 500 ml. of 70% isopropanol.</p> <p>Continued voluntary drinking of a 2.5% aqueous solution through two successive generations of rats produced no reproductive effects.</p> <p>NOTE: Commercial isopropanol does not contain "isopropyl oil". An excess incidence of sinus and laryngeal cancers in isopropanol production workers has been shown to be caused by the byproduct "isopropyl oil". Changes in the production processes now ensure that no byproduct is formed. Production changes include use of dilute sulfuric acid at higher temperatures.</p> <p>Workers exposed to 700 ppm acetone for 3 hours/day for 7-15 years showed inflammation of the respiratory tract, stomach and duodenum, attacks of giddiness and loss of strength. Exposure to acetone may enhance liver toxicity of chlorinated solvents.</p>												
838AR-Liquid Total Ground Carbon Conductive Coating	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Not Available</td><td>Not Available</td></tr> </table>	TOXICITY	IRRITATION	Not Available	Not Available								
TOXICITY	IRRITATION												
Not Available	Not Available												
acetone	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Dermal (rabbit) LD50: 20000 mg/kg<sup>[2]</sup></td><td>Eye (human): 500 ppm - irritant</td></tr> <tr> <td>Inhalation (rat) LC50: 50.1 mg/L/8 hr<sup>[2]</sup></td><td>Eye (rabbit): 20mg/24hr - moderate</td></tr> <tr> <td>Oral (rat) LD50: 5800 mg/kgE<sup>[2]</sup></td><td>Eye (rabbit): 3.95 mg - SEVERE</td></tr> <tr> <td></td><td>Skin (rabbit): 500 mg/24hr - mild</td></tr> <tr> <td></td><td>Skin (rabbit): 395mg (open) - mild</td></tr> </table>	TOXICITY	IRRITATION	Dermal (rabbit) LD50: 20000 mg/kg <sup>[2]</sup>	Eye (human): 500 ppm - irritant	Inhalation (rat) LC50: 50.1 mg/L/8 hr <sup>[2]</sup>	Eye (rabbit): 20mg/24hr - moderate	Oral (rat) LD50: 5800 mg/kgE <sup>[2]</sup>	Eye (rabbit): 3.95 mg - SEVERE		Skin (rabbit): 500 mg/24hr - mild		Skin (rabbit): 395mg (open) - mild
TOXICITY	IRRITATION												
Dermal (rabbit) LD50: 20000 mg/kg <sup>[2]</sup>	Eye (human): 500 ppm - irritant												
Inhalation (rat) LC50: 50.1 mg/L/8 hr <sup>[2]</sup>	Eye (rabbit): 20mg/24hr - moderate												
Oral (rat) LD50: 5800 mg/kgE <sup>[2]</sup>	Eye (rabbit): 3.95 mg - SEVERE												
	Skin (rabbit): 500 mg/24hr - mild												
	Skin (rabbit): 395mg (open) - mild												
methyl ethyl ketone	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Dermal (rabbit) LD50: &gt;8100 mg/kg<sup>[1]</sup></td><td>- mild</td></tr> <tr> <td>Inhalation (rat) LC50: 23.5 mg/L/8h<sup>[2]</sup></td><td>Eye (human): 350 ppm - irritant</td></tr> <tr> <td>Inhalation (rat) LC50: 50.1 mg/L/8 hr<sup>[2]</sup></td><td>Eye (rabbit): 80 mg - irritant</td></tr> <tr> <td>Oral (rat) LD50: 3474.9 mg/kg<sup>[1]</sup></td><td>Skin (rabbit): 402 mg/24 hr - mild</td></tr> <tr> <td></td><td>Skin (rabbit): 13.78mg/24 hr open</td></tr> </table>	TOXICITY	IRRITATION	Dermal (rabbit) LD50: >8100 mg/kg <sup>[1]</sup>	- mild	Inhalation (rat) LC50: 23.5 mg/L/8h <sup>[2]</sup>	Eye (human): 350 ppm - irritant	Inhalation (rat) LC50: 50.1 mg/L/8 hr <sup>[2]</sup>	Eye (rabbit): 80 mg - irritant	Oral (rat) LD50: 3474.9 mg/kg <sup>[1]</sup>	Skin (rabbit): 402 mg/24 hr - mild		Skin (rabbit): 13.78mg/24 hr open
TOXICITY	IRRITATION												
Dermal (rabbit) LD50: >8100 mg/kg <sup>[1]</sup>	- mild												
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	Skin (rabbit): 13.78mg/24 hr open												
carbon black	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Dermal (rabbit) LD50: &gt;3000 mg/kg<sup>[2]</sup></td><td>Not Available</td></tr> <tr> <td>Oral (rat) LD50: &gt;8000 mg/kg<sup>[1]</sup></td><td></td></tr> </table>	TOXICITY	IRRITATION	Dermal (rabbit) LD50: >3000 mg/kg <sup>[2]</sup>	Not Available	Oral (rat) LD50: >8000 mg/kg <sup>[1]</sup>							
TOXICITY	IRRITATION												
Dermal (rabbit) LD50: >3000 mg/kg <sup>[2]</sup>	Not Available												
Oral (rat) LD50: >8000 mg/kg <sup>[1]</sup>													
isopropanol	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Dermal (rabbit) LD50: 12792 mg/kg<sup>[1]</sup></td><td>Eye (rabbit): 10 mg - moderate</td></tr> <tr> <td>Inhalation (rat) LC50: 72.6 mg/L/4h<sup>[2]</sup></td><td>Eye (rabbit): 100 mg - SEVERE</td></tr> <tr> <td>Oral (rat) LD50: 5000 mg/kg<sup>[2]</sup></td><td>Eye (rabbit): 100mg/24hr-moderate</td></tr> <tr> <td></td><td>Skin (rabbit): 500 mg - mild</td></tr> </table>	TOXICITY	IRRITATION	Dermal (rabbit) LD50: 12792 mg/kg <sup>[1]</sup>	Eye (rabbit): 10 mg - moderate	Inhalation (rat) LC50: 72.6 mg/L/4h <sup>[2]</sup>	Eye (rabbit): 100 mg - SEVERE	Oral (rat) LD50: 5000 mg/kg <sup>[2]</sup>	Eye (rabbit): 100mg/24hr-moderate		Skin (rabbit): 500 mg - mild		
TOXICITY	IRRITATION												
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propylene glycol monomethyl ether acetate, alpha-isomer	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr> <td>Dermal (rabbit) LD50: &gt;5000 mg/kg<sup>[2]</sup></td><td>* [CCINFO]</td></tr> <tr> <td>Inhalation (rat) LC50: 4345 ppm/6h<sup>[2]</sup></td><td>Nil reported</td></tr> <tr> <td>Oral (rat) LD50: 8532 mg/kg<sup>[2]</sup></td><td></td></tr> </table>	TOXICITY	IRRITATION	Dermal (rabbit) LD50: >5000 mg/kg <sup>[2]</sup>	* [CCINFO]	Inhalation (rat) LC50: 4345 ppm/6h <sup>[2]</sup>	Nil reported	Oral (rat) LD50: 8532 mg/kg <sup>[2]</sup>					
TOXICITY	IRRITATION												
Dermal (rabbit) LD50: >5000 mg/kg <sup>[2]</sup>	* [CCINFO]												
Inhalation (rat) LC50: 4345 ppm/6h <sup>[2]</sup>	Nil reported												
Oral (rat) LD50: 8532 mg/kg <sup>[2]</sup>													
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data												

## 838AR-Liquid Total Ground Carbon Conductive Coating

extracted from RTECS - Register of Toxic Effect of chemical Substances

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

Legend: ✗ – Data available but does not fill the criteria for classification  
 ✓ – Data required to make classification available  
 ☐ – Data Not Available to make classification

## SECTION 12 ECOLOGICAL INFORMATION

## 12.1. Toxicity

Ingredient	Endpoint	Test Duration	Species	Value	Source
acetone	LC50	96	Fish	>1000mg/L	4
acetone	EC50	48	Crustacea	>1000mg/L	4
acetone	EC50	96	Algae or other aquatic plants	20.5650mg/L	4
acetone	EC0	168	Algae or other aquatic plants	530mg/L	1
acetone	EC0	24	Crustacea	5000mg/L	1
acetone	EC10	24	Algae or other aquatic plants	>10000mg/L	4
acetone	EC100	24	Crustacea	>100000mg/L	1
methyl ethyl ketone	LC50	96	Fish	228.1300mg/L	3
methyl ethyl ketone	EC50	48	Crustacea	3080mg/L	2
methyl ethyl ketone	EC50	96	Algae or other aquatic plants	>5000mg/L	4
methyl ethyl ketone	EC0	24	Crustacea	2600mg/L	4
methyl ethyl ketone	EC3	168	Algae or other aquatic plants	>=12000mg/L	1
carbon black	LC50	96	Fish	=1000mg/L	1
carbon black	EC50	96	Algae or other aquatic plants	95mg/L	2
carbon black	EC100	24	Crustacea	=10000mg/L	1
isopropanol	LC50	96	Fish	183.8440mg/L	3
isopropanol	EC50	48	Crustacea	125000mg/L	5
isopropanol	EC50	96	Algae or other aquatic plants	993.2320mg/L	3
isopropanol	EC0	24	Crustacea	>=10000mg/L	1
isopropanol	EC10	24	Algae or other aquatic plants	680mg/L	4
isopropanol	EC100	24	Crustacea	>100000mg/L	1
isopropanol	EC29	504	Crustacea	100mg/L	1
isopropanol	EC90	96	Algae or other aquatic plants	>10000mg/L	1
propylene glycol monomethyl ether acetate, alpha-isomer	LC50	96	Fish	113.6190mg/L	3
propylene glycol monomethyl ether acetate, alpha-isomer	EC50	96	Algae or other aquatic plants	8.5880mg/L	3

For methyl ethyl ketone:

log Kow : 0.26-0.69

log Koc : 0.69

Koc : 34

Half-life (hr) air : 2.3

Half-life (hr) H<sub>2</sub>O surface water : 72-288Henry's atm m<sup>3</sup>/mol: 1.05E-05

BOD 5 : 1.5-2.24, 46%

COD : 2.2-2.31, 100%

ThOD : 2.44

BCF : 1

**Environmental fate:**

**TERRESTRIAL FATE:** Measured Koc values of 29 and 34 were obtained for methyl ethyl ketone in silt loams. Methyl ethyl ketone is expected to have very high mobility in soil. Volatilisation of methyl ethyl ketone from dry soil surfaces is expected based upon an experimental vapor pressure of 91 mm Hg at 25 deg C. Volatilization from moist soil surfaces is also expected given the measured Henry's Law constant of 4.7x10<sup>-5</sup> atm-cu m/mole. The volatilisation half-life of methyl ethyl ketone from silt and sandy loams was measured as 4.9 days. Methyl ethyl ketone is expected to biodegrade under both aerobic and anaerobic conditions as indicated by numerous screening tests.

**AQUATIC FATE:** Based on Koc values, methyl ethyl ketone is not expected to adsorb to suspended solids and sediment in water. Methyl ethyl ketone is expected to volatilise from water surfaces based on the measured Henry's Law constant. Estimated half-lives for a model river and model lake are 19 and 197, hours respectively. Biodegradation of this compound is expected based upon numerous screening tests. An estimated BCF value of 1 based on an experimental log Kow of 0.29, suggests that bioconcentration in aquatic organisms is low.

**ATMOSPHERIC FATE:** According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere, methyl ethyl ketone, which has an experimental vapor pressure of 91 mm Hg at 25 deg C, will exist solely as a vapor in the ambient atmosphere. Vapour-phase methyl ethyl ketone is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be about 14 days. Methyl ethyl ketone is also expected to undergo photodecomposition in the atmosphere by natural sunlight.

Photochemical degradation of methyl ethyl ketone by natural sunlight is expected to occur at approximately 1/5 the rate of degradation by photochemically produced hydroxyl radicals.

**Ecotoxicity:**

Continued...

## 838AR-Liquid Total Ground Carbon Conductive Coating

Fish LC50 (24 h): bluegill sunfish (*Lepomis macrochirus*) 1690-5640 mg/l; guppy (*Lebistes reticulatus*) 5700 mg/l; goldfish (*Carassius auratus*) >5000 mg/l  
 Fish LC50 (96 h): fathead minnow (*Pimephales promelas*) 3200 mg/l; bluegill sunfish (*Lepomis macrochirus*) 4467 mg/l; mosquito fish (*Gambusia affinis*) 5600 mg/l  
 Daphnia magna LC50 (48 h): <520-1382 mg/l  
 Daphnia magna LC50 (24 h): 8890 mg/l  
 Brine shrimp (*Artemia salina*) LC50 (24 h): 1950 mg/l

For ketones:

Ketones, unless they are alpha, beta--unsaturated ketones, can be considered as narcosis or baseline toxicity compounds

Hydrolysis may also involve the addition of water to ketones to yield ketals under mild acid conditions. However, this addition of water is thermodynamically favorable only for low molecular weight ketones. This addition is an equilibrium reaction that is reversible upon a change of water concentration and the reaction ultimately leads to no permanent change in the structure of the ketone substrate. The higher molecular weight ketones do not form stable ketals. Therefore, the ketones are stable to water under ambient environmental conditions

Another possible reaction of ketones in water involves the enolic hydrogen on the carbons bonded to the carbonyl function. Under conditions of high pH (pH greater than 10), the enolic proton is abstracted by base (OH-) forming a carbanion intermediate that may react with other organic substrates (e.g., ketones, esters, aldehydes) containing a center for nucleophilic attack. The reactions, commonly recognized as condensation reactions, produce higher molecular weight products. Under ambient conditions of temperature, pH, and low concentration, these condensation reactions are unfavorable.

Based on its reactions in air, it seems likely that ketones undergo photolysis in water. It is probable that ketones will be biodegraded to an appreciable degree by micro-organisms in soil and water. They are unlikely to bioconcentrate or biomagnify.

for propylene glycol ethers:

#### Environmental fate:

Most are liquids at room temperature and all are water-soluble.

Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM)

Environmental fate: Log octanol-water partition coefficients (log Kow's) range from 0.309 for TPM to 1.523 for DPnB. Calculated BCFs range from 1.47 for DPnB to 3.16 for DPMA and TPM, indicating low bioaccumulation. Henry's Law Constants, which indicate propensity to partition from water to air, are low for all category members, ranging from  $5.7 \times 10^{-9}$  atm-m<sup>3</sup>/mole for TPM to  $2.7 \times 10^{-9}$  atm-m<sup>3</sup>/mole for PnB. Fugacity modeling indicates that most propylene glycol ethers are likely to partition roughly equally into the soil and water compartments in the environment with small to negligible amounts remaining in other environmental compartments (air, sediment, and aquatic biota). Propylene glycol ethers are unlikely to persist in the environment. Once in air, the half-life of the category members due to direct reactions with photochemically generated hydroxyl radicals, range from 2.0 hours for TPM to 4.6 hours for PnB. In water, most members of this family are "readily biodegradable" under aerobic conditions. (DPMA degraded within 28 days (and within the specified 10-day window) but only using pre-adapted or "acclimated" inoculum.). In soil, biodegradation is rapid for PM and PMA.

#### Ecotoxicity:

Acute aquatic toxicity testing indicates low toxicity for both ethers and acetates. For ethers, effect concentrations are > 500 mg/L. For acetates, effect concentrations are > 151 mg/L.

for acetone:

log Kow: -0.24

Half-life (hr) air: 312-1896

Half-life (hr) H<sub>2</sub>O surface water: 20

Henry's atm m<sup>3</sup>/mol: 3.67E-05

BOD 5: 0.31-1.76, 46-55%

COD: 1.12-2.07

ThOD: 2.2

BCF: 0.69

#### Environmental fate:

Acetone preferentially locates in the air compartment when released to the environment. A substantial amount of acetone can also be found in water, which is consistent with the high water to air partition coefficient and its small, but detectable, presence in rain water, sea water, and lake water samples. Very little acetone is expected to reside in soil, biota, or suspended solids. This is entirely consistent with the physical and chemical properties of acetone and with measurements showing a low propensity for soil absorption and a high preference for moving through the soil and into the ground water

In air, acetone is lost by photolysis and reaction with photochemically produced hydroxyl radicals; the estimated half-life of these combined processes is about 22 days. The relatively long half-life allows acetone to be transported long distances from its emission source.

Acetone is highly soluble and slightly persistent in water, with a half-life of about 20 hours; it is minimally toxic to aquatic life.

Acetone released to soil volatilizes although some may leach into the ground where it rapidly biodegrades.

Acetone does not concentrate in the food chain.

Acetone meets the OECD definition of readily biodegradable which requires that the biological oxygen demand (BOD) is at least 70% of the theoretical oxygen demand (THOD) within the 28-day test period

Drinking Water Standard: none available.

Soil Guidelines: none available.

Air Quality Standards: none available.

#### Ecotoxicity:

Testing shows that acetone exhibits a low order of toxicity

Fish LC50: brook trout 6070 mg/l; fathead minnow 15000 mg/l

Bird LC0 (5 day): Japanese quail, ring-neck pheasant 40,000 mg/l

Daphnia magna LC50 (48 h): 15800 mg/l; NOEC 8500 mg/l

Aquatic invertebrate 2100 - 16700 mg/l

Aquatic plant NOEC: 5400-7500 mg/l

Daphnia magna chronic NOEC 1660 mg/l

Acetone vapors were shown to be relatively toxic to two types insects and their eggs. The time to 50% lethality (LT50) was found to be 51.2 hr and 67.9 hr when the flour beetle (*Tribolium confusum*) and the flour moth (*Ephestia kuehniella*) were exposed to an airborne acetone concentration of 61.5 mg/m<sup>3</sup>. The LT50 values for the eggs were 30-50% lower than for the adult. The direct application of acetone liquid to the body of the insects or surface of the eggs did not, however, cause any mortality.

The ability of acetone to inhibit cell multiplication has been examined in a wide variety of microorganisms. The results have generally indicated mild to minimal toxicity with NOECs greater than 1700 mg/L for exposures lasting from 6 hr to 4 days. Longer exposure periods of 7 to 8 days with bacteria produced mixed results; but overall the data indicate a low degree of toxicity for acetone.

The only exception to these findings were the results obtained with the flagellated protozoa (*Entosiphon sulcatum*) which yielded a 3-day NOEC of 28 mg/L.

**DO NOT** discharge into sewer or waterways.

## 12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
acetone	LOW (Half-life = 14 days)	MEDIUM (Half-life = 116.25 days)
methyl ethyl ketone	LOW (Half-life = 14 days)	LOW (Half-life = 26.75 days)
isopropanol	LOW (Half-life = 14 days)	LOW (Half-life = 3 days)
propylene glycol monomethyl ether acetate, alpha-isomer	LOW	LOW

## 12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
acetone	LOW (BCF = 69)

Continued...

## 838AR-Liquid Total Ground Carbon Conductive Coating

methyl ethyl ketone	LOW (LogKOW = 0.29)
isopropanol	LOW (LogKOW = 0.05)
propylene glycol monomethyl ether acetate, alpha-isomer	LOW (LogKOW = 0.56)

## 12.4. Mobility in soil

Ingredient	Mobility
acetone	HIGH (KOC = 1.981)
methyl ethyl ketone	MEDIUM (KOC = 3.827)
isopropanol	HIGH (KOC = 1.06)
propylene glycol monomethyl ether acetate, alpha-isomer	HIGH (KOC = 1.838)

## 12.5. Results of PBT and vPvB assessment

	P	B	T
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

Product / Packaging disposal	<ul style="list-style-type: none"> <li>Containers may still present a chemical hazard/ danger when empty.</li> <li>Return to supplier for reuse/ recycling if possible.</li> </ul> <p>Otherwise:</p> <ul style="list-style-type: none"> <li>If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.</li> <li>Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li> </ul> <p>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.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> <li>Reduction</li> <li>Reuse</li> <li>Recycling</li> <li>Disposal (if all else fails)</li> </ul> <p>This material may be recycled if unused, or if it has not been contaminated so as 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 change in use, and recycling or reuse may not always be appropriate.</p> <ul style="list-style-type: none"> <li><b>DO NOT allow wash water from cleaning or process equipment to enter drains.</b></li> <li>It may be necessary to collect all wash water for treatment before disposal.</li> <li>In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li> <li>Where in doubt contact the responsible authority.</li> <li>Recycle wherever possible.</li> <li>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.</li> <li>Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material).</li> <li>Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.</li> </ul>
Waste treatment options	Not Available
Sewage disposal options	Not Available

## SECTION 14 TRANSPORT INFORMATION

## Labels Required

	
Marine Pollutant	NO
HAZCHEM	•3YE

## Land transport (ADR)

14.1.UN number	1263
14.2.Packing group	II
14.3.UN proper shipping name	PAINT or PAINT RELATED MATERIAL
14.4.Environmental hazard	No relevant data

Continued...

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14.5. Transport hazard class(es)	Class	3
	Subrisk	Not Applicable
14.6. Special precautions for user	Hazard identification (Kemler)	33
	Classification code	F1
	Hazard Label	3
	Special provisions	163 640C 640D 650
	Limited quantity	5 L

## Air transport (ICAO-IATA / DGR)

14.1. UN number	1263		
14.2. Packing group	II		
14.3. UN proper shipping name	Paint (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base); Paint related material (including paint thinning or reducing compounds)		
14.4. Environmental hazard	No relevant data		
14.5. Transport hazard class(es)	ICAO/IATA Class	3	
	ICAO / IATA Subrisk	Not Applicable	
	ERG Code	3L	
14.6. Special precautions for user	Special provisions	A3 A72 A192	
	Cargo Only Packing Instructions	364	
	Cargo Only Maximum Qty / Pack	60 L	
	Passenger and Cargo Packing Instructions	353	
	Passenger and Cargo Maximum Qty / Pack	5 L	
	Passenger and Cargo Limited Quantity Packing Instructions	Y341	
	Passenger and Cargo Limited Maximum Qty / Pack	1 L	

## Sea transport (IMDG-Code / GGVSee)

14.1. UN number	1263		
14.2. Packing group	II		
14.3. UN proper shipping name	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning or reducing compound)		
14.4. Environmental hazard	Not Applicable		
14.5. Transport hazard class(es)	IMDG Class	3	
	IMDG Subrisk	Not Applicable	
14.6. Special precautions for user	EMS Number	F-E , S-E	
	Special provisions	163	
	Limited Quantities	5 L	

## Inland waterways transport (ADN)

14.1. UN number	1263		
14.2. Packing group	II		
14.3. UN proper shipping name	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)		
14.4. Environmental hazard	No relevant data		
14.5. Transport hazard class(es)	3   Not Applicable		
14.6. Special precautions for user	Classification code	F1	
	Special provisions	163; 367; 640C; 640D; 650	
	Limited quantity	5 L	
	Equipment required	PP, EX, A	
	Fire cones number	1	

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

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	methyl ethyl ketone	Z



## 838AR-Liquid Total Ground Carbon Conductive Coating

IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk

propylene glycol monomethyl ether acetate, alpha-isomer

Z

## SECTION 15 REGULATORY INFORMATION

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

## ACETONE(67-64-1) 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 Trade Union Confederation (ETUC) Priority List for REACH Authorisation  
European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)  
European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31  
European Union (EU) 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)  
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) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI  
UK Workplace Exposure Limits (WELs)

## METHYL ETHYL KETONE(78-93-3) 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 Trade Union Confederation (ETUC) Priority List for REACH Authorisation  
European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)  
European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31  
European Union (EU) 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)  
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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)

## CARBON BLACK(1333-86-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

European Customs Inventory of Chemical Substances ECICS (English)  
European List of Notified Chemical Substances (ELINCS)  
European Trade Union Confederation (ETUC) Priority List for REACH Authorisation

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)  
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs  
UK Workplace Exposure Limits (WELs)

## ISOPROPANOL(67-63-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

## 838AR-Liquid Total Ground Carbon Conductive Coating

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 Trade Union Confederation (ETUC) Priority List for REACH Authorisation  
 European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31  
 European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI  
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs  
 UK Workplace Exposure Limits (WELs)

**PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER(108-65-6) 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)  
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 European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI  
 UK Workplace Exposure Limits (WELs)

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : 67/548/EEC, 1999/45/EC, 98/24/EC, 92/85/EC, 94/33/EC, 91/689/EEC, 1999/13/EC, Commission Regulation (EU) 2015/830, Regulation (EC) No 1272/2008 and their amendments as well as the following British legislation: - The Control of Substances Hazardous to Health Regulations (COSHH) 2002 - COSHH Essentials - The Management of Health and Safety at Work Regulations 1999

**15.2. Chemical safety assessment**

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

**ECHA SUMMARY**

Ingredient	CAS number	Index No	ECHA Dossier
acetone	67-64-1	606-001-00-8	01-2119498062-37-XXXX, 01-2119471330-49-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Liq. 2, Eye Irrit. 2, STOT SE 3	GHS07, GHS02, Dgr	H225, H319, H336
2	Flam. Liq. 2, Eye Irrit. 2, STOT SE 3, Eye Irrit. 2A	Dgr, GHS01, GHS08, Wng, GHS06	H225, H319, H400, H371, H228, H315, H340, H332, H302

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
methyl ethyl ketone	78-93-3	606-002-00-3	01-2119457290-43-XXXX, 01-2119943742-35-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Liq. 2, Eye Irrit. 2, STOT SE 3	GHS07, GHS02, Dgr	H225, H319, H336
2	Flam. Liq. 2, Eye Irrit. 2, STOT SE 3, Skin Irrit. 2, Eye Irrit. 2A	Dgr, Wng, GHS01, GHS08	H225, H319, H371, H312, H302, H341, H361, H314

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
carbon black	1333-86-4	Not Available	01-2119384822-32-XXXX, 01-2119489801-30-XXXX, 01-2119475601-40-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
2	Carc. 2, Eye Irrit. 2, STOT RE 1, Self-heat. 1, Skin Irrit. 2, STOT SE 1, Aquatic Chronic 1, Acute Tox. 4, Flam. Sol. 2	GHS08, Wng, Dgr, GHS06, GHS02, GHS09	H351, H319, H372, H251, H228, H315, H370, H410, H332

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
isopropanol	67-63-0	603-117-00-0	01-2119457558-25-XXXX

## 838AR-Liquid Total Ground Carbon Conductive Coating

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Liq. 2, Eye Irrit. 2, STOT SE 3	GHS07, GHS02, Dgr	H225, H319, H336
2	Flam. Liq. 2, Eye Irrit. 2, STOT SE 1, Eye Irrit. 2A, Repr. 2, STOT RE 2	GHS02, Dgr, GHS08, GHS03	H225, H319, H370, H312, H340, H302, H361, H373

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

Ingredient	CAS number	Index No	ECHA Dossier
propylene glycol monomethyl ether acetate, alpha-isomer	108-65-6	607-195-00-7	01-2119475791-29-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Flam. Liq. 3, Eye Irrit. 2, Repr. 1B	GHS02, Wng, GHS08, Dgr	H226, H319, H360
2	Flam. Liq. 3, Eye Dam. 1, Eye Irrit. 2, Repr. 1B	GHS02, Wng, GHS05, Dgr, GHS03, GHS08	H226, H319, H360

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (propylene glycol monomethyl ether acetate, alpha-isomer; acetone; carbon black; isopropanol; methyl ethyl ketone)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
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)

**SECTION 16 OTHER INFORMATION****Full text Risk and Hazard codes**

<b>H226</b>	Flammable liquid and vapour
<b>H228</b>	Flammable solid
<b>H251</b>	Self-heating; may catch fire
<b>H302</b>	Harmful if swallowed
<b>H312</b>	Harmful in contact with skin
<b>H314</b>	Causes severe skin burns and eye damage
<b>H315</b>	Causes skin irritation
<b>H332</b>	Harmful if inhaled
<b>H340</b>	May cause genetic defects
<b>H341</b>	Suspected of causing genetic defects
<b>H360</b>	May damage fertility or the unborn child
<b>H361</b>	Suspected of damaging fertility or the unborn child
<b>H370</b>	Causes damage to organs
<b>H371</b>	May cause damage to organs
<b>H372</b>	Causes damage to organs through prolonged or repeated exposure
<b>H373</b>	May cause damage to organs through prolonged or repeated exposure
<b>H400</b>	Very toxic to aquatic life
<b>H410</b>	Very toxic to aquatic life with long lasting effects

**Other information****Ingredients with multiple cas numbers**

Name	CAS No
propylene glycol monomethyl ether acetate, alpha-isomer	108-65-6, 142300-82-1, 84540-57-8

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

[www.chemwatch.net](http://www.chemwatch.net)

Continued...

**838AR-Liquid Total Ground Carbon Conductive Coating**

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

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 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