Neopentyl glycol diacrylate

sc-228826

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME
HIGH
MODERATE
LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Neopentyl glycol diacrylate

STATEMENT OF HAZARDOUS NATURE

NFPA

SUPPLIER
Company: Santa Cruz Biotechnology, Inc.
Address:
2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305
Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE
■ UV/EB-curing is a drying technology for coatings, inks and adhesives. It uses light of a certain wavelength or high speed electrons to give almost instantaneous dry films. It allows formulators to develop products for a wide variety of applications and substrates without using volatile organic compounds as solvents. It represents therefore a major technological advance compared to other technologies, which may require abatement installations to take care of these compounds, as many of these compounds are able to cause either environmental or health risks if present in a too large concentration. Reactive multifunctional monomer. Intermediate

SYNONYMS
C11-H16-O4, (H2C=CHCO2CH2)2C(CH3)2, "acrylic acid, 2, 2-dimethyltrimethylene ester", "acrylic acid, 2, 2-dimethyltrimethylene ester", "2, 2-dimethyl-1, 3-propanediol acrylate", "2, 2-dimethyl-1, 3-propanediol acrylate", "2-propenoic acid, 2, 2-dimethyl-1, 3-propanediyl ester", "2-propenoic acid, 2, 2-dimethyl-1, 3-propanediyl ester", SR-247

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW
RISK
Toxic in contact with skin.
May cause SENSITIZATION by inhalation and skin contact.
Irritating to eyes, respiratory system and skin.

POTENTIAL HEALTH EFFECTS
ACUTE HEALTH EFFECTS

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

EYE
■ This material can cause eye irritation and damage in some persons.

SKIN
■ Skin contact with the material may produce toxic effects; systemic effects may result following absorption.
■ The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
■ All multifunctional acrylates (MFA) produce skin disorders and sensitize the skin and inflammation. Vapors generated by the heat of milling may occur in sufficient concentration to produce inflammation. Because exposure to industrial aerosols of MFA includes exposure to resin systems, photo-initiators, solvents, hydrogen-transfer agents, stabilizers, surfactants, fillers and polymerization inhibitors, poisoning may arise due to a range of chemical actions.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions 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.

INHALED
■ The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.
■ Inhalation hazard is increased at higher temperatures.
■ No report of respiratory illness in humans as a result of exposure to multifunctional acrylates has been found.
■ Acute effects from inhalation of high vapor concentrations may be chest and nasal irritation with coughing, sneezing, headache and even nausea.

CHRONIC HEALTH EFFECTS
■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. Inhalation this product is more likely to cause a sensitization reaction in some persons compared to the general population.
■ Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
■ Sensitization may give severe responses to very low levels of exposure, i.e. hypersensitivity. Sensitized persons should not be allowed to work in situations where exposure may occur.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS

<table>
<thead>
<tr>
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<th>Min</th>
<th>Max</th>
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<tbody>
<tr>
<td>Flammability:</td>
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<tr>
<td>Toxicity:</td>
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<td>Body Contact:</td>
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<td>Chronic:</td>
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NAME | CAS RN | %
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neopentyl glycol diacrylate | 2223-82-7 | >98
inhibitor as 4-methoxyphenol (MEHQ) | 150-76-5 | 0.012
related other acrylate esters | 1 max |

Section 4 - FIRST AID MEASURES

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

EYE
■ If this product comes in contact with the eyes:
■ Immediately hold eyelids apart and flush the eye continuously with running water.
■ Ensure complete irritation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
■ Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
Transport to hospital or doctor without delay.
Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
- If skin or hair contact occurs:
  - Quickly but gently, wipe material off skin with a dry, clean cloth.
  - Immediately remove all contaminated clothing, including footwear.
  - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
  - Transport to hospital, or doctor.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
  - Lay patient down. Keep warm and rested.
  - Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
  - Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
  - Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN
- Treat symptomatically.
  - for poisons (where specific treatment regime is absent):

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**BASIC TREATMENT**

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary edema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures .
- DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

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**ADVANCED TREATMENT**

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary edema.
- Hypotension with signs of hypovolemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.
EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994.

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**Section 5 - FIRE FIGHTING MEASURES**

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<tr>
<th>Property</th>
<th>Value</th>
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<tr>
<td>Vapour Pressure (mmHg)</td>
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<td>Upper Explosive Limit (%)</td>
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<tr>
<td>Specific Gravity (water=1)</td>
<td>1.031</td>
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<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not available</td>
</tr>
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</table>

**EXTINGUISHING MEDIA**

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

**FIRE FIGHTING**

- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapor fire hazard removed.
- Use water delivered as a fine spray to control the fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
- May emit acrid smoke.
- Mists containing combustible materials may be explosive.

Combustion products include: carbon dioxide (CO2), other pyrolysis products typical of burning organic material.
May emit clouds of acrid smoke.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

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

PERSONAL PROTECTION

Glasses:
Chemical goggles.

Gloves:

Respirator:
Type A-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable labeled container for waste disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL


<table>
<thead>
<tr>
<th>Name</th>
<th>Isolation Distance</th>
<th>Downwind Protection Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone A)</td>
<td>700 ft (215 m)</td>
<td>1.2 mile (1.9 km)</td>
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<tr>
<td>Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone B)</td>
<td>200 ft (60 m)</td>
<td>0.2 mile (0.3 km)</td>
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<tr>
<td>Toxic liquid, organic, n.o.s. (when Inhalation Hazard Zone C)</td>
<td>700 ft (215 m)</td>
<td>1.2 mile (1.9 km)</td>
</tr>
</tbody>
</table>

From IERG (Canada/Australia)

<table>
<thead>
<tr>
<th>Name</th>
<th>Isolation Distance</th>
<th>Downwind Protection Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone A)</td>
<td>25 meters</td>
<td>250 meters</td>
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</table>
**PROCEDURE FOR HANDLING**

- Most acrylic monomers have low viscosity therefore pouring, material transfer and processing of these materials do not necessitate heating.
- Viscous monomers may require heating to facilitate handling. To facilitate product transfer from original containers, product must be heated to no more than 60 deg. C. (140 F.), for not more than 24 hours.
- Do NOT use localized heat sources such as band heaters to heat/ melt product.
- Do NOT use steam.
- Hot boxes or hot rooms are recommended for heating/ melting material. The hot box or hot room should be set a maximum temperature of 60 deg. C. (140 F.).
- Do NOT overheat - this may compromise product quality and/or result in an uncontrolled hazardous polymerization.
- If product freezes, heat as indicated above and mix gently to redistribute the inhibitor. Product should be consumed in its entirety after heating/ melting; multiple "reheats" which may affect product quality or result in product degradation.
- Product should be packaged with inhibitor(s). Unless inhibited, product may polymerize, raising temperature and pressure, possibly rupturing container. Check inhibitor level periodically, adding to bulk material if needed. In addition, the product's inhibitor(s) require the presence of dissolved oxygen. Maintain, at a minimum, the original headspace in the product container and do NOT blanket or mix with oxygen-free gas as it renders the inhibitor ineffective. Ensure air space (oxygen) is present during product heating / melting.
- Store product indoors at temperatures greater than the product's freezing point (or greater than 0 deg. C. (32 F.)) if no freezing point available and below 38 deg. C (100 F.).
- Avoid prolonged storage (longer than shelf-life) storage temperatures above 38 deg. C (100 F.).
- Store in tightly closed containers in a properly vented storage area away from heat, sparks, open flame, strong oxidisers, radiation and other initiators.
- Prevent contamination by foreign materials.
- Prevent moisture contact.
- Use only non-sparking tools and limit storage time. Unless specified elsewhere, shelf-life is 6 months from receipt.
- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.

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**FOOTNOTES**

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

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

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

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


6 IERG information is derived from CANUTEC - Transport Canada.

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**ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)**

| AEGL 1 | The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
| AEGL 2 | The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
| AEGL 3 | The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

<table>
<thead>
<tr>
<th>Name</th>
<th>Isolation Distance</th>
<th>Downwind Protective Action Day</th>
<th>Protection Distance Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone A)</td>
<td>3000 ft (915 m)</td>
<td>(7.0+ mile (11.0+ km)</td>
<td>(7.0+ mile (11.0+ km)</td>
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<tr>
<td>Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone B)</td>
<td>600 ft (185 m)</td>
<td>1 mile (1.6 km)</td>
<td>2.5 mile (4 km)</td>
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<tr>
<td>Toxic liquid, organic, n.o.s. (when Inhalation Hazard is on a package or shipping paper)</td>
<td>3000 ft (915 m)</td>
<td>(7.0+ mile (11.0+ km)</td>
<td>(7.0+ mile (11.0+ km)</td>
</tr>
</tbody>
</table>
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

**RECOMMENDED STORAGE METHODS**

- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.
- For low viscosity materials:
  - Drums and jerricans must be of the non-removable head type.
  - Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):
  - Removable head packaging;
  - Cans with friction closures and
  - Low pressure tubes and cartridges may be used.
- - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning
  material in contact with inner and outer packages * . - In addition, where inner packagings are glass and contain liquids of
  packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a
  close fitting molded plastic box and the substances are not incompatible with the plastic.

**STORAGE REQUIREMENTS**

- Polymerization may occur slowly at room temperature.
- WARNING: Gradual decomposition in strong, sealed containers may lead to a large pressure build-up and subsequent
  explosion.
- Storage requires stabilizing inhibitor content and dissolved oxygen content to be monitored. Refer to manufacturer's
  recommended levels.
- DO NOT overfill containers so as to maintain free head space above product.
- Blanketing or sparging with nitrogen or oxygen free gas will deactivate stabilizer.
- Store below 38 deg. C.
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

**SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS**

![Diagram showing storage compatibility]

_X:_ Must not be stored together
_O:_ May be stored together with specific preventions
_+:_ May be stored together

### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Source</th>
<th>Material</th>
<th>TWA ppm</th>
<th>TWA mg/m³</th>
<th>STEL ppm</th>
<th>STEL mg/m³</th>
<th>Peak ppm</th>
<th>Peak mg/m³</th>
<th>TWA F/CC</th>
<th>Notes</th>
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<td>Canada - Ontario Occupational Exposure Limits</td>
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<td>US - Minnesota Permissible Exposure Limits (PELs)</td>
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<td>Table Z-1-A Final Rule Limits for Air Contaminants</td>
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</table>

The following materials had no OELs on our records
- neopentyl glycol diacrylate: CAS:2223-82-7

**MATERIAL DATA**

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

OSHA (USA) concluded that exposure to sensory irritants can:
- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

**CEL TWA:** 1 mg/m³ [compare WEEL-TWA* for multifunctional acrylates (MFAs)] Exposure to MFAs has been reported to cause contact dermatitis in humans and serious eye injury in laboratory animals. Exposure to some MFA-resin containing aerosols has also been reported to cause dermatitis. As no assessment of the possible effects of long-term exposure to aerosols was found, a conservative Workplace Environmental Exposure Level (WEEL) was suggested by the American Industrial Hygiene Association (AIHA).

**4-METHOXYPHENOL (MEHQ):**
- For 4-methoxyphenol (MEHQ) MEHQ has caused ocular toxicity in animals and skin depigmentation in rodents and workers. The recommendation for the TLV-TWA arises from documented eye and skin toxicities and by analogy with hydroquinone.

**PERSONAL PROTECTION**
Consult your EHS staff for recommendations

EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

- NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
dextertity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
- 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) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

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.

General warning: Do NOT use latex gloves! Use only recommended gloves - using the wrong gloves may increase the risk:

<table>
<thead>
<tr>
<th>Exposure condition</th>
<th>Short time use; (few minutes less than 0.5 hour) Little physical stress</th>
<th>Medium time use; less than 4 hours Physical stress (opening drums, using tools, etc.)</th>
<th>Long time Cleaning operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of thin nitrile rubber gloves: Nitrile rubber (0.1 mm)</td>
<td>Excellent tactibility (&quot;feel&quot;), powder-free Disposable</td>
<td>Nitrile rubber, NRL (latex) free; &gt;0.56 mm low tactibility (&quot;feel&quot;), powder free</td>
<td></td>
</tr>
</tbody>
</table>

Inexpensive Give adequate protection to low molecular weigh acrylic monomers
Disposable Moderate price Gives adequate protection for most acrylates up to 4 hours Do NOT give adequate protection to low molecular weight monomers at exposures longer than 1 hour Avoid use of ketones and acetates in wash-up solutions.

Where none of this gloves ensure safe handling (for example in long term handling of acrylates containing high levels of acetates and/or ketones, use laminated multilayer gloves.


OTHER

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.
- Avoid inhalation.

RESPRATOR

- Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

<table>
<thead>
<tr>
<th>Breathing Zone Level ppm (volume)</th>
<th>Maximum Protection Factor</th>
<th>Half-Face Respirator</th>
<th>Full-Face Respirator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>10</td>
<td>A-1 P</td>
<td>-</td>
</tr>
<tr>
<td>1000</td>
<td>50</td>
<td>-</td>
<td>A-1 P</td>
</tr>
<tr>
<td>5000</td>
<td>50</td>
<td>Airline*</td>
<td>-</td>
</tr>
<tr>
<td>5000</td>
<td>100</td>
<td>-</td>
<td>A-2 P</td>
</tr>
<tr>
<td>10000</td>
<td>100</td>
<td>-</td>
<td>A-3 P</td>
</tr>
<tr>
<td>100+</td>
<td>Airline* **</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.
ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator. Correct fit is essential to obtain adequate protection an approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

<table>
<thead>
<tr>
<th>Type of Contaminant:</th>
<th>Air Speed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>solvent, vapors, 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>
<tr>
<td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td>
<td>2.5-10 m/s (500-2000 f/min.)</td>
</tr>
</tbody>
</table>

Within each range the appropriate value depends on:

1: Room air currents minimal or favorable to capture
2: Contaminants of low toxicity or of nuisance value only.
3: Intermittent, low production.
4: Large hood or large air mass in motion

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.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Does not mix with water.
Sinks in water.

<table>
<thead>
<tr>
<th>State</th>
<th>Liquid</th>
<th>Molecular Weight</th>
<th>212.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>Not available</td>
<td>Viscosity</td>
<td>Not Available</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>Not available</td>
<td>Solubility in water (g/L)</td>
<td>Immiscible</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>&gt;230</td>
<td>pH (1% solution)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not Available</td>
<td>pH (as supplied)</td>
<td>Not available</td>
</tr>
<tr>
<td>Autoignition Temp (°F)</td>
<td>Not available</td>
<td>Vapour Pressure (mmHG)</td>
<td>Negligible</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not available</td>
<td>Specific Gravity (water=1)</td>
<td>1.031</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not available</td>
<td>Relative Vapor Density (air=1)</td>
<td>&gt; 1.0</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Negligible</td>
<td>Evaporation Rate</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

APPEARANCE
Clear yellow combustible liquid; sinks in water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

■ Polymerisation may occur at elevated temperatures.
■ Polymerisation may be accompanied by generation of heat as exotherm.
■ Process is self accelerating as heating causes more rapid polymerisation.
■ Exotherm may cause boiling with generation of acrid, toxic and flammable vapour.
■ Polymerization and exotherm may be violent if contamination with strong acids, amines or catalysts occurs.
■ Polymerization and exotherm of material in bulk may be uncontrollable and result in rupture of storage tanks.
■ Polymerization may occur if stabilizing inhibitor becomes depleted by aging.
■ Stabilizing inhibitor requires dissolved oxygen to be present in liquid for effective action.
■ Specific storage requirements must be met for stability on ageing and transport.

STORAGE INCOMPATIBILITY

■ Exposure to light, free radical initiators, iron, rust and strong bases, and storage beyond expiration date, may initiate polymerization.
■ Polymerization may occur slowly at room temperature.
• Storage requires stabilizing inhibitor content and dissolved oxygen content to be monitored. Refer to manufacturer's recommended levels.
• DO NOT overfill containers so as to maintain free head space above product.
• Blanketing or sparging with nitrogen or oxygen free gas will deactivate stabilizer.
• Store below 38 deg. C.

Contamination with polymerization catalysts - peroxides, persulfates, oxidizing agents - also strong acids, strong alkalis, will cause polymerization with exotherm - generation of heat. Polymerization of large quantities may be violent - even explosive.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

neopentyl glycol diacrylate

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

IRRITATION

Oral (rat) LD50: 6730 mg/kg
Skin (rabbit): 500 mg/24h(open) -

Dermal (rabbit) LD50: 400 mg/kg SEVERE

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitization potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitizing substance which is widely distributed can be a more important allergen than one with stronger sensitizing potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compounds. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins. Attention should be paid to atopic diathesis, characterized by increased susceptibility to nasal inflammation, asthma and eczema.

Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure. UV (ultraviolet)/ EB (electron beam) acrylates are generally of low toxicity.

1,4-Butanediol diacrylate is divided into two groups, "stenomeric" and "eurymeric" acrylates.

The first group consists of well-defined acrylates which can be described by a simple idealised chemical;they are low molecular weight species with a very narrow weight distribution profile.

The eurymeric acrylates cannot be described by an idealised structure and may differ fundamentally between various suppliers; they are of relatively high molecular weight and possess a wider weight distribution.

Stenomeric acrylates are usually more hazardous than the eurymeric substances. Stenomeric acrylates are also well defined which allows comparison and exchange of toxicity data - this allows more accurate classification.

The stenomeric acrylates cannot be classified as a group; they exhibit substantial variation.

Where no "official" classification for acrylates and methacrylates exists, there has been cautious attempts to create classifications in the absence of contrary evidence. For example, Monalkyl or monoaerylesters of acrylic acids should be classified as R36/37/38 and R51/53.

4-METHOXYPHENOL (MEHQ):

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

IRRITATION

Oral (rat) LD50: 1600 mg/kg
Skin (rabbit): 6000 mg/12d-I Mild
Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

4-METHOXYPHENOL (MEHQ):
■ DO NOT discharge into sewer or waterways.
NEOPENTYL GLYCOL DIACRYLATE:
■ Substances containing unsaturated carbons are ubiquitous in indoor environments. They result from many sources (see below). Most are reactive with environmental ozone and many produce stable products which are thought to adversely affect human health. The potential for surfaces in an enclosed space to facilitate reactions should be considered.

<table>
<thead>
<tr>
<th>Source of unsaturated substances</th>
<th>Unsatarted substances (Reactive Emissions)</th>
<th>Major Stable Products produced following reaction with ozone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupants (exhaled breath, ski oils, personal care products)</td>
<td>Isoprene, nitric oxide, squalene, unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products</td>
<td>Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, 6MHQ, geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9-oxo-nonanoic acid, azelaic acid, nonanoic acid</td>
</tr>
<tr>
<td>Soft woods, wood flooring, including cypress, cedar and silver fir boards, houseplants</td>
<td>Isoprene, limonene, alpha-pinene, other terpenes and sesquiterpenes</td>
<td>Formaldehyde, 4-AMC, pinoaldehyde, pinic acid, pinonic acid, formic acid, methacrolein, methyl vinyl ketone, SOAs including ultrafine particles</td>
</tr>
<tr>
<td>Carpets and carpet backing</td>
<td>4-Phenylcyclohexene, 4-vinylcyclohexene, styrene, 2-ethylhexyl acrylate, unsaturated fatty acids and esters</td>
<td>Formaldehyde, acetaldehyde, benzaldehyde, hexanal, nonanal, 2-nonenal</td>
</tr>
<tr>
<td>Linoleum and paints/polishes containing linseed oil</td>
<td>Linoleic acid, linolenic acid</td>
<td>Propanal, hexanal, nonanal, 2-heptenal, 2-nonenal, 2-decenal, 1-pentene-3-one, propionic acid, n-butyric acid</td>
</tr>
<tr>
<td>Latex paint</td>
<td>Residual monomers</td>
<td>Formaldehyde</td>
</tr>
<tr>
<td>Certain cleaning products, polishes, waxes, air fresheners</td>
<td>Limonene, alpha-pinene, terpinolene, alpha-terpineol, linalool, linalyl acetate and other terpenoids, longifolene and other sesquiterpenes</td>
<td>Formaldehyde, acetaldehyde, glycoaldehyde, formic acid, acetic acid, hydrogen and organic peroxides, acetone, benzaldehyde, 4-hydroxy-4-methyl-5-hexen-1-ol, 5-ethenyl-dihydro-5-methyl-2(3H)-furanone, 4-AMC, SOAs including ultrafine particles</td>
</tr>
<tr>
<td>Natural rubber adhesive</td>
<td>Isoprene, terpenes</td>
<td>Formaldehyde, methacrolein, methyl vinyl ketone</td>
</tr>
<tr>
<td>Photocopy toner, printed paper, styrene polymers</td>
<td>Styrene</td>
<td>Formaldehyde, benzaldehyde</td>
</tr>
<tr>
<td>Environmental tobacco smoke</td>
<td>Styrene, acrolein, nicotine</td>
<td>Formaldehyde, benzaldehyde, hexanal, glyoxal, N-methylformamide, nicotinaldehyde, colitone</td>
</tr>
<tr>
<td>Soiled clothing, fabrics, bedding</td>
<td>Squalene, unsaturated sterols, oleic acid and other saturated fatty acids</td>
<td>Acetone, geranyl acetone, 6MHQ, 4OPA, formaldehyde, nonanal, decanal, 9-oxo-nonanoic acid, azelaic acid, nonanoic acid</td>
</tr>
<tr>
<td>Soiled particle filters</td>
<td>Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles</td>
<td>Formaldehyde, nonanal, and other aldehydes; azelaic acid; nonanoic acid; 9-oxo-nonanoic acid and other oxo-acids; compounds with mixed functional groups (=O, -OH, and -COOH)</td>
</tr>
<tr>
<td>Ventilation ducts and duct liners</td>
<td>Unsaturated fatty acids and esters, unsaturated oils, neoprene</td>
<td>C5 to C10 aldehydes</td>
</tr>
<tr>
<td><em>Urban grime</em></td>
<td>Polycyclic aromatic hydrocarbons</td>
<td>Oxidized polycyclic aromatic hydrocarbons</td>
</tr>
<tr>
<td>Perfumes, colognes, essential oils (e.g. lavender, eucalyptus, tea tree)</td>
<td>Limonene, alpha-pinene, linalool, linalyl acetate, terpine-4-ol, gamma-terpine</td>
<td>Formaldehyde, 4-AMC, acetone, 4-hydroxy-4-methyl-5-hexene-1-ol, 5-ethyl-dihydro-5-methyl-2(3H)-furanone, SOAs including ultrafine particles</td>
</tr>
<tr>
<td>Overall home emissions</td>
<td>Limonene, alpha-pinene, styrene</td>
<td>Formaldehyde, 4-AMC, pinoaldehyde, acetone, pinic acid, pinonic acid, formic acid, benzaldehyde, SOAs including ultrafine particles</td>
</tr>
</tbody>
</table>

Abbreviations: 4-AMC, 4-acetyl-1-methylcyclohexene; 6MHQ, 6-methyl-5-heptene-2-one; 4OPA, 4-oxopentanal; SOA, Secondary Organic Aerosols
Reference: Charles J Weschler; Environmental Health Perspectives, Vol 114, October 2006.
■ Ecotoxicity of acrylates is a function of n-octanol/ water partition coefficient (log Pow, log Kow). Compounds with a log Pow >5 exhibit simple narcosis, but at lower log Pow the toxicity of acrylates is greater than predicted for simple narcotics.
4-METHOXYPHENOL (MEHQ):
■ Fish LC50 (96hr.) (mg/l): 200 (48hr)
■ log Pow (Verschueren 1983): 1.34
Degradation Biological: by soil microflora 16 days

**Ecotoxicity**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>neopentyl glycol diacrylate</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>4-methoxyphenol (MEHQ)</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
<td>MED</td>
</tr>
</tbody>
</table>

Ecotoxicity Reference: Charles J Weschler; Environmental Health Perspectives, Vol 114, October 2006.
Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.

- Puncture containers to prevent re-use and bury at an authorized landfill.
- Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction,
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated 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.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 6.1
Identification Numbers: UN2810 PG: III
Label Codes: 6.1 Special provisions: IB3, T7, TP1, TP28
Packaging: Exceptions: 153 Packaging: Non-bulk: 203
Packaging: Exceptions: 153 Quantity limitations: Passenger aircraft/rail: 60 L
Quantity Limitations: Cargo aircraft only: 220 L Vessel stowage: Location: A
Vessel stowage: Other: 40

Hazardous materials descriptions and proper shipping names:
Toxic, liquids, organic, n.o.s.

Air Transport IATA:
ICAO/IATA Class: 6.1 ICAO/IATA Subrisk: None
UN/ID Number: 2810 Packing Group: III
Special provisions: A3

Maritime Transport IMDG:
IMDG Class: 6.1 IMDG Subrisk: None
UN Number: 2810 Packing Group: III
EMS Number: F-A,S-A Special provisions: 223 274 944
Limited Quantities: 5 L

Shipping Name: TOXIC LIQUID, ORGANIC, N.O.S. *(CONTAINS NEOPENTYL GLYCOL DIACRYLATE)"

Section 15 - REGULATORY INFORMATION

neopentyl glycol diacrylate (CAS: 2223-82-7) is found on the following regulatory lists;
*Canada Non-Domestic Substances List (NDSL)*,"US EPA Master Testing List - Index I Chemicals Listed","US EPA Master Testing List - Index II Chemicals Removed","US Toxic Substances Control Act (TSCA) - Inventory" Regulations for ingredients

4-methoxyphenol (MEHQ) (CAS: 150-76-5) is found on the following regulatory lists;
Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
- Inhalation and/or ingestion may produce health damage*.
- Cumulative effects may result following exposure*.
* (limited evidence).

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- Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.
- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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