

# 3M 3009 and 7543 Scotchbond Multipurpose Adhesive

Hazard Alert Code:  
**MODERATE**

Chemwatch Material Safety Data Sheet (REVIEW)

Version No: 5

Chemwatch 6558-77

Issue Date: 11-Aug-2009

CD 2011/1

NC317TCP

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

3M 3009 and 7543 Scotchbond Multipurpose Adhesive

### SYNONYMS

"dental adhesive"

### PRODUCT NUMBERS

49540

### PRODUCT USE

Dental adhesive.

### SUPPLIER

Company: 3M Pty Ltd

Address:

2-74 Dunheved Circuit

St Marys

NSW, 2760

Australia

Telephone: +61 2 9677 5333

Telephone: 136 136

Emergency Tel: **+61 2 9 677 5333 (24hr)**

Fax: +61 2 9677 5170

Email: 3Mau@mmm.com

Website: <http://www.mmm.com>

## Section 2 - HAZARDS IDENTIFICATION

### STATEMENT OF HAZARDOUS NATURE

**HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.**

COMBUSTIBLE LIQUID, regulated under AS1940 for Bulk Storage purposes only.

### CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	1	
Toxicity:	2	
Body Contact:	2	
Reactivity:	1	
Chronic:	2	

Min/Nil=0  
Low=1  
Moderate=2  
High=3  
Extreme=4



### POISONS SCHEDULE

None

### RISK

- Irritating to eyes, respiratory system and skin.
- May cause SENSITISATION by skin contact.
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- Vapours may cause drowsiness and dizziness.
- Inhalation and/or ingestion may produce health damage\*.
- Cumulative effects may result following exposure\*.
- Possible respiratory sensitiser\*.
- May possibly affect fertility\*.

### SAFETY

- Do not breathe gas/ fumes/ vapour/ spray.
- Use only in well ventilated areas.
- Keep container in a well ventilated place.
- Avoid exposure - obtain special instructions before use.
- To clean the floor and all objects contaminated by this material, use water and detergent.
- Keep container tightly closed.
- This material and its container must be disposed of in a safe way.
- In case of contact with eyes, rinse with plenty of water and

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\* (limited evidence).

contact Doctor or Poisons Information Centre.

- If swallowed, IMMEDIATELY contact Doctor or Poisons Information Centre (show this container or label).
- Use appropriate container to avoid environment contamination.
- Avoid release to the environment. Refer to special instructions/ safety data sheets.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
<a href="#">bisphenol A glycidylmethacrylate</a>	1565-94-2	60-70
<a href="#">2-hydroxyethyl methacrylate</a>	868-77-9	30-40

## 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:
  - Wash out immediately with fresh running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Seek medical attention without delay; if pain persists or recurs seek medical attention.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

### SKIN

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

### 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.

## Section 5 - FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

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

### FIRE FIGHTING

■

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- Alert Fire Brigade 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 vapour fire hazard removed.
- Use water delivered as a fine spray to control the fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.

## **FIRE/EXPLOSION HAZARD**

- 
- 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 (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), other pyrolysis products typical of burning organic material.

May emit clouds of acrid smoke.

May emit poisonous fumes.

May emit corrosive fumes.

## **FIRE INCOMPATIBILITY**

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

## **HAZCHEM**

None

## **Personal Protective Equipment**

Breathing apparatus.

Gas tight chemical resistant suit.

Limit exposure duration to 1 BA set 30 mins.

## **Section 6 - ACCIDENTAL RELEASE MEASURES**

### **MINOR SPILLS**

- 
- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours 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, labelled container for waste disposal.

### **MAJOR SPILLS**

- Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- 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.

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

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## Section 7 - HANDLING AND STORAGE

### 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 localised 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 polymerisation.
- If product freezes, heat as indicated above and mix gently to redistribute the inhibitor. Product should be consumed in its entirety after heating/ melting; avoid multiple "reheats" which may affect product quality or result in product degradation.
- Product should be packaged with inhibitor(s). Unless inhibited, product may polymerise, 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 freeing 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.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- 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.

### SUITABLE CONTAINER

- 
- Metal can or drum
- Packaging as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

### STORAGE INCOMPATIBILITY

- for multifunctional acrylates:
  - Avoid exposure to free radical initiators (peroxides, persulfates) , iron, rust, oxidisers, and strong acids and strong bases.
  - Avoid heat, flame, sunlight, X-rays or ultra-violet radiation.
  - Storage beyond expiration date, may initiate polymerisation. Polymerisation of large quantities may be violent (even explosive)
  - Contamination with polymerisation catalysts - peroxides, persulfates, oxidising agents - also strong acids, strong alkalis, will cause polymerisation with exotherm - generation of heat.
  - Polymerisation of large quantities may be violent - even explosive.
- For acrylic and methacrylic acid esters:
  - Avoid contact with strong acids, strong alkalis, oxidising agents, polymerisation initiators (peroxides, persulfates), iron or rust
  - Avoid heat, flame, sunlight, x-rays or ultra-violet radiation.
  - Polymerisation may occur at elevated temperature and in presence of ignition sources - polymerisation of large quantities may be violent (even explosive)

### STORAGE REQUIREMENTS

- 
- Polymerisation may occur slowly at room temperature.
- Store in original containers.

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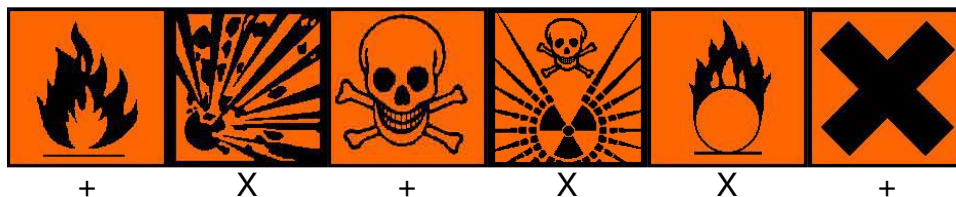
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- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

## SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



*X: Must not be stored together*

*O: May be stored together with specific precautions*

*+: May be stored together*

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

The following materials had no OELs on our records

- bisphenol A glycidylmethacrylate: CAS:1565-94-2
- 2-hydroxyethyl methacrylate: CAS:868-77-9

### MATERIAL DATA

3M 3009 AND 7543 SCOTCHBOND MULTIPURPOSE ADHESIVE:  
BISPHENOL A GLYCIDYLMETHACRYLATE:

■ 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.

BISPHENOL A GLYCIDYLMETHACRYLATE:

■ GEL TWA: 1 mg/m<sup>3</sup> [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).

2-HYDROXYETHYL METHACRYLATE:

■ 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.

for ethylene oxide:

Odour Threshold Value: 257-690 ppm (detection), 493 ppm (recognition)

NOTE: Detector tubes for ethylene oxide, measuring in excess of 1 ppm, are available commercially.

Exposure at or below the TLV-TWA is thought reduce the potential oncogenic risk and the risk from potential, non-neoplastic adverse effects non lungs, liver, kidneys, endocrine system, blood forming elements and the central nervous system. OSHA recognised that ethylene oxide exposures at 1 ppm still might produce significant health risks. A quantitative risk assessment shows an excess cancer mortality risk of 12 to 23 deaths per 10,000 workers at this level. It must be stated that risk assessment models are fraught with much uncertainty.

Odour Safety Factor(OSF)

OSF=0.0023 (ETHYLENE OXIDE).

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for methacrylic acid:

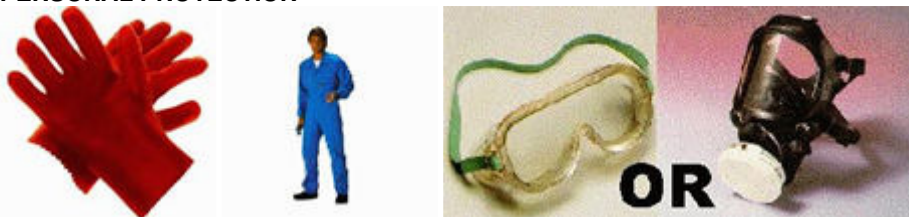
The recommended TLV-TWA is based on analogy with the TLV-TWA for acrylic acid and limited human and animal data. Exposure at or below this level is thought to minimise the potential for ocular or dermal irritation. OSHA considers a skin notation is necessary to prevent dermal absorption and systemic toxicity.

Designated S in List of MAK values: Danger of sensitization.

MAK values, and categories and groups are those recommended within the Federal Republic of Germany.

CEL TWA: 50 ppm, 260 mg/m<sup>3</sup>

## PERSONAL PROTECTION



## EYE

- 
- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens 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]

## HANDS/FEET

### NOTE:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

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
- dexterity

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:

Exposure condition Short time use; (few minutes less than 0.5 hour) Little physical stress

Use of thin nitrile rubber gloves: Nitrile rubber (0.1 mm) Excellent tactility ("feel"), powder-free Disposable Inexpensive Give adequate protection to low molecular weight acrylic monomers

Exposure condition Medium time use; less than 4 hours Physical stress (opening drums, using tools, etc.)

Use of medium thick nitrile rubber gloves Nitrile rubber, NRL (latex) free; <0.45 mm Moderate tactility ("feel"), powder-free 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 Nitrile rubber, NRL (latex) free; >0.56 mm low tactility ("feel"), powder free High price Gives adequate protection for most acrylates in combination with commonly used solvents up to 8 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.

Exposure condition Long time Cleaning operations

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.

Guide to the Classification and Labelling of UV/EB Acrylates Third edition, 231 October 2007 - Cefic.

## OTHER

- 
- Overalls.

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- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

## RESPIRATOR

■ Respiratory protection may be required when ANY "Worst Case" vapour-phase concentration is exceeded (see Computer Prediction in "Exposure Standards").

Protection Factor (Min)	Half-Face Respirator	Full-face Respirator
10 x ES	A-P--AUS A-P--PAPR-AUS	- -
20 x ES	-	A-P--AUS A-P--PAPR-AUS
100 x ES	-	A-P--2 A-P--PAPR-2

^ - Full-face.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

## ENGINEERING CONTROLS

■ CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure 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.

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.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

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

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

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE

Clear slightly yellow liquid with slight acrylate odour; does not mix with water.

### PHYSICAL PROPERTIES

Liquid.

Does not mix with water.

Sinks in water.

State	Liquid	Molecular Weight	Not Applicable
Melting			

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Range (°C)	Not Available	Viscosity	Not Available
Boiling Range (°C)	>35	Solubility in water (g/L)	Immiscible
Flash Point (°C)	101 CC	pH (1% solution)	Not Applicable
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not Applicable
Autoignition Temp (°C)	Not Available	Vapour Pressure (kPa)	Not Available
Upper Explosive Limit (%)	Not Applicable	Specific Gravity (water=1)	1.15
Lower Explosive Limit (%)	Not Applicable	Relative Vapour Density (air=1)	Not Applicable
Volatile Component (%vol)	Not Applicable	Evaporation Rate	Not Applicable

## Section 10 - CHEMICAL STABILITY

### CONDITIONS CONTRIBUTING TO INSTABILITY

- Stable under controlled storage conditions provided material contains adequate stabiliser / polymerisation inhibitor.
- Bulk storages may have special storage requirements
- WARNING: Gradual decomposition in strong, sealed containers may lead to a large pressure build-up and subsequent explosion. Rapid and violent polymerisation possible at temperatures above 32 deg c.
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

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

## Section 11 - TOXICOLOGICAL INFORMATION

### POTENTIAL HEALTH EFFECTS

#### ACUTE HEALTH EFFECTS

##### SWALLOWED

■ Accidental ingestion of the material may be damaging to the health of the individual. Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.

##### EYE

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

##### SKIN

■ This material can cause inflammation of the skin oncontact in some persons.

The material may accentuate any pre-existing dermatitis condition.

All multifunctional acrylates (MFA) produce skin disorders and sensitise the skin and inflammation. Vapours 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, stabilisers, surfactants, fillers and polymerisation 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



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- The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.

Inhalation of 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.

Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.

## CHRONIC HEALTH EFFECTS

- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

Bisphenol A may have effects similar to female sex hormones and when administered to pregnant women, may damage the foetus. It may also damage male reproductive organs and sperm.

## TOXICITY AND IRRITATION

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

### 2-HYDROXYETHYL METHACRYLATE:

#### 3M 3009 AND 7543 SCOTCHBOND MULTIPURPOSE ADHESIVE:

- Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. 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 sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising 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.

- 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 monoarylestere of acrylic acids should be classified as R36/37/38 and R51/53

Monoalkyl or monoaryl esters of methacrylic acid should be classified as R36/37/38.

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

### BISPHENOL A GLYCIDYLMETHACRYLATE:

#### 3M 3009 AND 7543 SCOTCHBOND MULTIPURPOSE ADHESIVE:

- UV (ultraviolet)/ EB (electron beam) acrylates are generally of low toxicity

UV/EB acrylates are 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 wide 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 stenomerics cannot be classified as a group; they exhibit substantial variation.

#### 3M 3009 AND 7543 SCOTCHBOND MULTIPURPOSE ADHESIVE:

### BISPHENOL A GLYCIDYLMETHACRYLATE:

#### 2-HYDROXYETHYL METHACRYLATE:

##### TOXICITY

Oral (rat) LD50: 5050 mg/kg

Intraperitoneal (Mouse) LD50: 497 mg/kg post-exposure

Oral (Guinea pig) LD50: 4680 mg/kg

Intraperitoneal (Rat) LD50: 1250 mg/kg \* Rohm & Haas

Oral (Mouse) LD50: 3275 mg/kg

##### IRRITATION

Eye (rabbit): SEVERE \*

Skin (rabbit): non-irritating\*

- Based on the available oncogenicity data and without a better understanding of the carcinogenic mechanism the Health and

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Environmental Review Division (HERD), Office of Toxic Substances (OTS), of the US EPA previously concluded that all chemicals that contain the acrylate or methacrylate moiety ( $\text{CH}_2=\text{CHCOO}$  or  $\text{CH}_2=\text{C}(\text{CH}_3)\text{COO}$ ) should be considered to be a carcinogenic hazard unless shown otherwise by adequate testing.

This position has now been revised and acrylates and methacrylates are no longer de facto carcinogens.

Dermal (rabbit): >5000 mg/kg\* Effects persist beyond 21 days

## Section 12 - ECOLOGICAL INFORMATION

2-HYDROXYETHYL METHACRYLATE:  
BISPHENOL A GLYCIDYLMETHACRYLATE:

■ DO NOT discharge into sewer or waterways.

■ 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.

If released to surface water, acrylic acid and the acrylic esters would all be rapidly biodegraded while a portion would volatilise to the air. Acrylic acid was shown to rapidly biodegrade aerobically in soil ( $t_{1/2} < 1$  day). Volatilised acrylic acid and acrylic esters are predicted to degrade rapidly by atmospheric photo-oxidation with estimated half-lives of 2 to 24 h.

The mobility in soil of acrylic acid and its esters ranged from 'medium' to 'very high'. Calculated bioconcentration factors ranged from 1 to 37, suggesting a low bioconcentration potential. Acrylic acid and methyl acrylate showed limited biodegradability in the five day biochemical oxygen demand (BOD5) test, while ethyl acrylate and butyl acrylate were degraded easily (77% and 56%, respectively). Using the OECD method 301D 28-d closed bottle test, degradability for acrylic acid was 81% at 28 days, while the acrylic esters ranged from 57% to 60%. Acrylic acid degraded rapidly to carbon dioxide in soil ( $t_{1/2} < 1$  day).

According to classification procedures developed by the US EPA, the acute toxicity of acrylic acid to fish and invertebrates ranged from 'slightly' toxic to 'practically non-toxic'. The acute toxicity of the acrylic esters was 'moderately' toxic. Effects on algae of these compounds could not be judged from static tests due to the extensive biodegradation and volatilisation that occurred during the tests. Toxicity tests were conducted using freshwater and marine fish, invertebrates, and algae. Acrylic acid effect concentrations for fish and invertebrates ranged from 27 to 236 mg/l. Effect concentrations (LC50 or EC50) for fish and invertebrates using methyl acrylate, ethyl acrylate, and butyl acrylate ranged from 1.1 to 8.2 mg/l. The chronic maximum acceptable toxicant concentration (MATC) for acrylic acid with *Daphnia magna* was 27 mg/l based on length and young produced per adult reproduction day and for ethyl acrylate was 0.29 mg/l based on both the reproductive and growth endpoints. MATC values represent an approximate threshold of chronic effects to an organism.

Overall these studies show that acrylic acid and the acrylic esters studied can rapidly biodegrade, have a low potential for persistence or bioaccumulation in the environment, and have low to moderate toxicity.

C. A. Staples et al; Chemosphere Vol 40, January 2000, pp 29-38.

■ 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.

Source of unsaturated substances	Unsaturated substances (Reactive Emissions)	Major Stable Products produced following reaction with ozone.
Occupants (exhaled breath, ski oils, personal care products)	Isoprene, nitric oxide, squalene, unsaturated sterols, oleic acid and other unsaturated fatty acids, unsaturated oxidation products	Methacrolein, methyl vinyl ketone, nitrogen dioxide, acetone, 6MHQ, geranyl acetone, 4OPA, formaldehyde, nonanol, decanal, 9-oxo-nonanoic acid, azelaic acid, nonanoic acid.
Soft woods, wood flooring, including cypress, cedar and silver fir boards, houseplants	Isoprene, limonene, alpha-pinene, other terpenes and sesquiterpenes	Formaldehyde, 4-AMC, pinoaldehyde, pinic acid, pinonic acid, formic acid, methacrolein, methyl vinyl ketone, SOAs including ultrafine particles
Carpets and carpet backing	4-Phenylcyclohexene, 4-vinylcyclohexene, styrene, 2-ethylhexyl acrylate, unsaturated fatty acids and esters	Formaldehyde, acetaldehyde, benzaldehyde, hexanal, nonanal, 2-nonenal
Linoleum and paints/polishes containing linseed oil	Linoleic acid, linolenic acid	Propanal, hexanal, nonanal, 2-heptenal, 2-nonenal, 2-decenal, 1-pentene-3-one, propionic acid, n-butyric acid
Latex paint	Residual monomers	Formaldehyde
Certain cleaning products, polishes, waxes, air fresheners	Limonene, alpha-pinene, terpinolene, alpha-terpineol, linalool, linalyl acetate and other terpenoids, longifolene and other sesquiterpenes	Formaldehyde, acetaldehyde, glycoaldehyde, formic acid, acetic acid, hydrogen and organic peroxides, acetone, benzaldehyde, 4-hydroxy-4-methyl-5-hexen-1-al, 5-ethenyl-dihydro-5-methyl-2(3H)-furanone, 4-AMC, SOAs including ultrafine particles
Natural rubber adhesive	Isoprene, terpenes	Formaldehyde, methacrolein, methyl vinyl ketone
Photocopier toner, printed paper, styrene polymers	Styrene	Formaldehyde, benzaldehyde
Environmental tobacco smoke	Styrene, acrolein, nicotine	Formaldehyde, benzaldehyde, hexanal, glyoxal, N-methylformamide, nicotinaldehyde, cotinine
		Acetone, geranyl acetone, 6MHO, 4OPA,

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Soiled clothing, fabrics, bedding	Squalene, unsaturated sterols, oleic acid and other saturated fatty acids	formaldehyde, nonanal, decanal, 9-oxo-nonanoic acid, azelaic acid, nonanoic acid
Soiled particle filters	Unsaturated fatty acids from plant waxes, leaf litter, and other vegetative debris; soot; diesel particles	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)
Ventilation ducts and duct liners "Urban grime"	Unsaturated fatty acids and esters, unsaturated oils, neoprene Polycyclic aromatic hydrocarbons	C5 to C10 aldehydes Oxidized polycyclic aromatic hydrocarbons
Perfumes, colognes, essential oils (e.g. lavender, eucalyptus, tea tree)	Limonene, alpha-pinene, linalool, linalyl acetate, terpinene-4-ol, gamma-terpinene	Formaldehyde, 4-AMC, acetone, 4-hydroxy-4-methyl-5-hexen-1-al, 5-ethenyl-dihydro-5-methyl-2(3H) furanone, SOAs including ultrafine particles
Overall home emissions	Limonene, alpha-pinene, styrene	Formaldehyde, 4-AMC, pinonaldehyde, acetone, pinic acid, pinonic acid, formic acid, benzaldehyde, SOAs including ultrafine particles

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.

BISPHENOL A GLYCIDYLMETHACRYLATE:

## Marine Pollutant

Yes

■ Very toxic to aquatic organisms.

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

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

2-HYDROXYETHYL METHACRYLATE:

## Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
3M 3009 and 7543 Scotchbond Multipurpose Adhesive	No Data Available	No Data Available		
bisphenol A glycidylmethacrylate	No Data Available	No Data Available		
2- hydroxyethyl methacrylate	LOW	No Data Available	LOW	HIGH

## Section 13 - DISPOSAL CONSIDERATIONS

- 
- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- 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.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

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

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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.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

## Section 14 - TRANSPORTATION INFORMATION



Labels Required: COMBUSTIBLE LIQUID, regulated under AS1940 for Bulk Storage purposes only.

### HAZCHEM:

None (ADG7)

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: UN, IATA, IMDG

## Section 15 - REGULATORY INFORMATION

### POISONS SCHEDULE

None

### REGULATIONS

#### Regulations for ingredients

**bisphenol A glycidylmethacrylate (CAS: 1565-94-2) is found on the following regulatory lists;**

"Australia Inventory of Chemical Substances (AICS)"

**2-hydroxyethyl methacrylate (CAS: 868-77-9) is found on the following regulatory lists;**

"Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

**No data for 3M 3009 and 7543 Scotchbond Multipurpose Adhesive (CW: 6558-77)**

## Section 16 - OTHER INFORMATION

### Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes	
bisphenol A glycidylmethacrylate		1565- 94- 2	Xi; R38 N; R50/53

### EXPOSURE STANDARD FOR MIXTURES

■ "Worst Case" computer-aided prediction of vapour components/concentrations: ■ Composite Exposure Standard for Mixture (TWA) (mg/m<sup>3</sup>): 260 mg/m<sup>3</sup> ■ If the breathing zone concentration of ANY of the components listed below is exceeded, "Worst Case" considerations deem the individual to be overexposed. Component Breathing Zone ppm Breathing Zone mg/m<sup>3</sup> Mixture Conc: (%).

Component	Breathing zone (ppm)	Breathing zone (mg/m <sup>3</sup> )	Mixture Conc (%)
2-hydroxyethyl methacrylate	50.00	260.0000	40.0
2-hydroxyethyl methacrylate	0.00	0.0000	0.0

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

A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://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

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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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