



Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the GHS guidelines & India Hazardous substances (Classification, Labeling & Packaging) Draft Rules 2011.

SECTION 1: Identification

1.1. Product identifier

3M(tm) Adhesion Promoter K-500

1.2. Recommended use and restrictions on use

Recommended use

Adhesion promoter.

1.3. Supplier's details

Address: 3M India Limited, plot-48-51, Electronic city, Hosur road, Bangalore-560100
Telephone: 080-45543000, contact Product EHS team
E Mail: productehs.in@mmm.com
Website: <http://solutions.3mindia.co.in>

1.4. Emergency telephone number

080-45543000 (Contact hours: 8:00 AM to 5:00 PM)

SECTION 2: Hazard identification

Under MSIHC Rules, information is noted below on flammability, acute toxicity and explosivity relevant to this product. In line with international standards, information on other hazard classes and associated precautionary statements relevant to this product are included as well.

2.1. Classification of the substance or mixture

Flammable Liquid: Category 2.
Acute Toxicity (inhalation): Category 5.
Skin Corrosion/Irritation: Category 2.
Serious Eye Damage/Irritation: Category 2A
Respiratory Sensitizer: Category 1.
Skin Sensitizer: Category 1.
Reproductive Toxicity: Category 1B.
Specific Target Organ Toxicity (repeated exposure): Category 1.
Specific Target Organ Toxicity (single exposure): Category 3.
Aspiration Hazard: Category 1.
Acute Aquatic Toxicity: Category 2.
Chronic Aquatic Toxicity: Category 3.

2.2. Label elements**Signal Word**

Danger

Symbols

Flame | Exclamation mark | Health Hazard |

Pictograms**HAZARD STATEMENTS:**

| | |
|------|---|
| H225 | Highly flammable liquid and vapour. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H333 | May be harmful if inhaled. |
| H317 | May cause an allergic skin reaction. |
| H360 | May damage fertility or the unborn child. |
| H336 | May cause drowsiness or dizziness. |
| H304 | May be fatal if swallowed and enters airways. |
| H372 | Causes damage to organs through prolonged or repeated exposure: nervous system respiratory system sensory organs. |
| H401 | Toxic to aquatic life. |
| H412 | Harmful to aquatic life with long lasting effects. |

PRECAUTIONARY STATEMENTS**Prevention:**

| | |
|-------|--|
| P201 | Obtain special instructions before use. |
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P260 | Do not breathe dust/fume/gas/mist/vapours/spray. |
| P280E | Wear protective gloves. |
| P284 | In case of inadequate ventilation wear respiratory protection. |

Response:

| | |
|--------------------|--|
| P301 + P310 | IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. |
| P304 + P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P308 + P313 | IF exposed or concerned: Get medical advice/attention. |
| P331 | Do NOT induce vomiting. |
| P333 + P313 | If skin irritation or rash occurs: Get medical advice/attention. |
| P342 + P311 | If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. |
| P370 + P378 | In case of fire: Use a fire fighting agent suitable for flammable liquids such as dry chemical or carbon dioxide to extinguish. |

Storage:

P405 Store locked up.

Disposal:

P501 Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

2.3. Other hazards

Persons previously sensitised to isocyanates may develop a cross-sensitisation reaction to other isocyanates.

SECTION 3: Composition/information on ingredients

This material is a mixture.

| Ingredient | CAS Nbr | % by Wt |
|---|----------------|----------------|
| Toluene | 108-88-3 | 85 - 95 |
| Polypropylene, chlorinated | 68442-33-1 | 1 - 5 |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | 1 - 5 |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | 1 - 5 |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | 0.1 - 1 |

SECTION 4: First aid measures**4.1. Description of first aid measures****Inhalation**

Remove person to fresh air. If you feel unwell, get medical attention.

Skin contact

Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Eye contact

Immediately flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. Get medical attention.

If swallowed

Do not induce vomiting. Get immediate medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Allergic respiratory reaction (difficulty breathing, wheezing, cough, and tightness of chest). Allergic skin reaction (redness, swelling, blistering, and itching). Aspiration pneumonitis (coughing, gasping, choking, burning of the mouth, and difficulty breathing).

Central nervous system depression (headache, dizziness, drowsiness, incoordination, nausea, slurred speech, giddiness, and unconsciousness). Target organ effects following prolonged or repeated exposure. See Section 11 for additional details.

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

Not applicable

SECTION 5: Fire-fighting measures**5.1. Suitable Extinguishing media**

In case of fire: Use a fire fighting agent suitable for flammable liquids such as dry chemical or carbon dioxide to extinguish.

5.2. Special hazards arising from the substance or mixture

Closed containers exposed to heat from fire may build pressure and explode.

Hazardous Decomposition or By-Products

| <u>Substance</u> | <u>Condition</u> |
|---------------------|--------------------|
| Isocyanates | During combustion. |
| Carbon monoxide. | During combustion. |
| Carbon dioxide. | During combustion. |
| Hydrogen Chloride | During combustion. |
| Hydrogen cyanide. | During combustion. |
| Oxides of nitrogen. | During combustion. |

5.3. Special protective actions for fire-fighters

Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture. Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions

Avoid release to the environment. For larger spills, cover drains and build dykes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up

Contain spill. Cover spill area with a fire-extinguishing foam. Pour isocyanate decontaminant solution (90% water, 8% concentrated ammonia, 2% detergent) on spill and allow to react for 10 minutes. Or pour water on spill and allow to react for more than 30 minutes. Cover with absorbent material. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible using non-sparking tools. Place in a container approved for transportation by appropriate authorities, but do not seal the container for 48 hours to avoid pressure build-up. Place in a metal container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorised person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and Safety Data Sheet. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

For industrial/occupational use only. Not for consumer sale or use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Wash contaminated clothing before reuse. Avoid contact with oxidising agents (eg. chlorine, chromic acid etc.) Wear low static or properly grounded shoes. Use personal protective equipment (eg. gloves, respirators...) as required. To minimize the risk of ignition, determine applicable electrical classifications for the process using this product and select specific local exhaust ventilation equipment to avoid flammable vapor accumulation. Ground/bond container and receiving equipment if there is potential for static electricity accumulation during transfer.

7.2. Conditions for safe storage including any incompatibilities

Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store away from heat. Store away from acids. Store away from oxidising agents.

SECTION 8: Exposure controls/personal protection**8.1 Control parameters****Occupational exposure limits**

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

| Ingredient | CAS Nbr | Agency | Limit type | Additional comments |
|--|-----------|-------------------------|--|---|
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | ACGIH | TWA:0.005 ppm | |
| Toluene | 108-88-3 | ACGIH | TWA:20 ppm | A4: Not class. as human carcin, Ototoxicant |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Manufacturer determined | TWA(inhalable fraction)(8 hours):0.05 mg/m3;CEIL(inhalable fraction):0.1 mg/m3 | Dermal Sensitizer, Respiratory Sensitizer |

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

TWA: Time-Weighted-Average

STEL: Short Term Exposure Limit

CEIL: Ceiling

8.2. Exposure controls**8.2.1. Engineering controls**

Provide ventilated enclosure for curing. Curing enclosures must be exhausted to outdoors or to a suitable emission control device. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapours/spray. If ventilation is not adequate, use respiratory protection equipment. Use explosion-proof ventilation equipment.

8.2.2. Personal protective equipment (PPE)**Eye/face protection**

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:

Safety glasses with side shields.

Indirect vented goggles.

Skin/hand protection

Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing.

Gloves made from the following material(s) are recommended: Fluoroelastomer

Polymer laminate

If this product is used in a manner that presents a higher potential for exposure (eg. spraying, high splash potential etc.), then use of protective coveralls may be necessary. Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Apron - polymer laminate

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:

Half facepiece or full facepiece air-purifying respirator suitable for organic vapours and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---|--|
| Physical state | Liquid. |
| Specific Physical Form: | Liquid. |
| Color | Amber |
| Odor | Solvent |
| Odour threshold | No data available. |
| pH | Not applicable. |
| Melting point/Freezing point: NA | No data available. |
| Boiling point/Initial boiling point/Boiling range | 111 °C [Test Method:Estimated] [Details:Based On Toluene.] |
| Flash point | 4 °C [Test Method:Tagliabue closed cup] [Details:Based on Toluene] |
| Evaporation rate | ± 1 Units not available or not applicable. [Ref Std:TOLUENE=1] |
| Flammability (solid, gas) | Not applicable. |
| Flammable Limits(LEL) | 1 % volume |
| Flammable Limits(UEL) | 7.2 % volume |
| Vapour pressure | 2,933.1 Pa [Details:@20 deg C] |
| Vapor Density and/or Relative Vapor Density | 3.14 [Ref Std:AIR=1] |
| Density | 0.88 g/cm ³ |
| Relative density | 0.88 [Ref Std:WATER=1] |
| Water solubility | Nil |
| Solubility- non-water | No data available. |
| Partition coefficient: n-octanol/water | No data available. |
| Autoignition temperature | 480 °C [Test Method:Estimated] [Details:Based On Toluene.] |
| Decomposition temperature | No data available. |
| Viscosity/Kinematic Viscosity | <=10 mPa-s [Details:@23 deg C] |
| Volatile organic compounds (VOC) | 810 g/l |
| Percent volatile | <=95 % weight |
| VOC less H ₂ O & exempt solvents | < 836 g/l |
| Molecular weight | No data available. |

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is considered to be non reactive under normal use conditions

10.2 Chemical stability

Stable.

10.3 Possibility of hazardous reactions

Hazardous polymerisation will not occur.

10.4 Conditions to avoid

Heat.

Sparks and/or flames.

Temperatures above the boiling point.

10.5 Incompatible materials

Strong oxidising agents.

10.6 Hazardous decomposition products

| <u>Substance</u> | <u>Condition</u> |
|------------------|------------------|
| None known. | |

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labelling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1 Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation

May be harmful if inhaled. Respiratory tract irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Allergic respiratory reaction: Signs/symptoms may include difficulty breathing, wheezing, cough, and tightness of chest. May cause additional health effects (see below).

Skin contact

Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, dryness, cracking, blistering, and pain. Allergic skin reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Eye contact

Severe eye irritation: Signs/symptoms may include significant redness, swelling, pain, tearing, cloudy appearance of the cornea, and impaired vision.

Ingestion

Chemical (aspiration) pneumonitis: Signs/symptoms may include coughing, gasping, choking, burning of the mouth, difficulty breathing, bluish coloured skin (cyanosis), and may be fatal. Gastrointestinal irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhoea. May cause additional health effects (see below).

Additional Health Effects:

Single exposure may cause target organ effects:

Central nervous system (CNS) depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

Prolonged or repeated exposure may cause target organ effects:

Ocular effects: Signs/symptoms may include blurred or significantly impaired vision. Auditory effects: Signs/symptoms may include hearing impairment, balance dysfunction and ringing in the ears. Olfactory effects: Signs/symptoms may include decreased ability to detect odours and complete loss of smell. Neurological effects: Signs/symptoms may include personality changes, lack of coordination, sensory loss, tingling or numbness of the extremities, weakness, tremors, and changes in blood pressure and heart rate. Respiratory effects: Signs/symptoms may include cough, shortness of breath, chest tightness, wheezing, increased heart rate, bluish coloured skin (cyanosis), sputum production, changes in lung function tests, and respiratory failure.

Reproductive/Developmental Toxicity:

Contains a chemical or chemicals which can cause birth defects or other reproductive harm.

Additional information:

Persons previously sensitised to isocyanates may develop a cross-sensitisation reaction to other isocyanates.

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

| Name | Route | Species | Value |
|---|--------------------------------|---------|--|
| Overall product | Dermal | | No data available; calculated ATE >5,000 mg/kg |
| Overall product | Inhalation-Vapor(4 hr) | | No data available; calculated ATE >20 - =50 mg/l |
| Overall product | Ingestion | | No data available; calculated ATE >5,000 mg/kg |
| Toluene | Dermal | Rat | LD50 12,000 mg/kg |
| Toluene | Inhalation-Vapor (4 hours) | Rat | LC50 30 mg/l |
| Toluene | Ingestion | Rat | LD50 5,550 mg/kg |
| Polymethylene polyphenylene isocyanate | Dermal | Rabbit | LD50 > 5,000 mg/kg |
| Polymethylene polyphenylene isocyanate | Inhalation-Dust/Mist (4 hours) | Rat | LC50 0.368 mg/l |
| Polymethylene polyphenylene isocyanate | Ingestion | Rat | LD50 31,600 mg/kg |
| P,P'-Methylenebis(phenyl isocyanate) | Dermal | Rabbit | LD50 > 5,000 mg/kg |
| P,P'-Methylenebis(phenyl isocyanate) | Inhalation-Dust/Mist (4 hours) | Rat | LC50 0.368 mg/l |
| P,P'-Methylenebis(phenyl isocyanate) | Ingestion | Rat | LD50 31,600 mg/kg |
| Epichlorhydrin - trimethylolpropane copolymer | Dermal | Rat | LD50 > 3,170 mg/kg |
| Epichlorhydrin - trimethylolpropane copolymer | Ingestion | Rat | LD50 3,398 mg/kg |

ATE = acute toxicity estimate

Skin Corrosion/Irritation

| Name | Species | Value |
|---|-------------------------|----------|
| Toluene | Rabbit | Irritant |
| Polymethylene polyphenylene isocyanate | official classification | Irritant |
| P,P'-Methylenebis(phenyl isocyanate) | official classification | Irritant |
| Epichlorhydrin - trimethylolpropane copolymer | In vitro data | Irritant |

Serious Eye Damage/Irritation

| Name | Species | Value |
|--|----------|-------------------|
| Toluene | Rabbit | Moderate irritant |
| Polymethylene polyphenylene isocyanate | official | Severe irritant |

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|---|--------------------------------|-----------------|
| | classificat ion | |
| P,P'-Methylenebis(phenyl isocyanate) | official classificat ion | Severe irritant |
| Epichlorhydrin - trimethylolpropane copolymer | Rabbit | Corrosive |

Sensitization:**Skin Sensitisation**

| Name | Species | Value |
|---|--------------------------------|----------------|
| Toluene | Guinea pig | Not classified |
| Polymethylene polyphenylene isocyanate | official classificat ion | Sensitising |
| P,P'-Methylenebis(phenyl isocyanate) | official classificat ion | Sensitising |
| Epichlorhydrin - trimethylolpropane copolymer | similar compoun ds | Sensitising |

Respiratory Sensitisation

| Name | Species | Value |
|--|---------|-------------|
| Polymethylene polyphenylene isocyanate | Human | Sensitising |
| P,P'-Methylenebis(phenyl isocyanate) | Human | Sensitising |

Germ Cell Mutagenicity

| Name | Route | Value |
|---|----------|--|
| Toluene | In Vitro | Not mutagenic |
| Toluene | In vivo | Not mutagenic |
| Polymethylene polyphenylene isocyanate | In Vitro | Some positive data exist, but the data are not sufficient for classification |
| P,P'-Methylenebis(phenyl isocyanate) | In Vitro | Some positive data exist, but the data are not sufficient for classification |
| Epichlorhydrin - trimethylolpropane copolymer | In Vitro | Some positive data exist, but the data are not sufficient for classification |
| Epichlorhydrin - trimethylolpropane copolymer | In vivo | Mutagenic |

Carcinogenicity

| Name | Route | Species | Value |
|--|------------|---------|--|
| Toluene | Dermal | Mouse | Some positive data exist, but the data are not sufficient for classification |
| Toluene | Ingestion | Rat | Some positive data exist, but the data are not sufficient for classification |
| Toluene | Inhalation | Mouse | Some positive data exist, but the data are not sufficient for classification |
| Polymethylene polyphenylene isocyanate | Inhalation | Rat | Some positive data exist, but the data are not sufficient for classification |
| P,P'-Methylenebis(phenyl isocyanate) | Inhalation | Rat | Some positive data exist, but the data are not sufficient for classification |

Reproductive Toxicity**Reproductive and/or Developmental Effects**

| Name | Route | Value | Species | Test result | Exposure Duration |
|---------|------------|--|---------|---------------------|-----------------------|
| Toluene | Inhalation | Not classified for female reproduction | Human | NOAEL Not available | occupational exposure |

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| | | | | | |
|---|------------|--|-------|---------------------|--------------------------|
| Toluene | Inhalation | Not classified for male reproduction | Rat | NOAEL 2.3 mg/l | 1 generation |
| Toluene | Ingestion | Toxic to development | Rat | LOAEL 520 mg/kg/day | during gestation |
| Toluene | Inhalation | Toxic to development | Human | NOAEL Not available | poisoning and/or abuse |
| Polymethylene polyphenylene isocyanate | Inhalation | Not classified for development | Rat | NOAEL 0.004 mg/l | during organogenesis |
| P,P'-Methylenebis(phenyl isocyanate) | Inhalation | Not classified for development | Rat | NOAEL 0.004 mg/l | during organogenesis |
| Epichlorhydrin - trimethylolpropane copolymer | Ingestion | Not classified for female reproduction | Rat | NOAEL 100 mg/kg/day | premating into lactation |
| Epichlorhydrin - trimethylolpropane copolymer | Ingestion | Not classified for development | Rat | NOAEL 100 mg/kg/day | premating into lactation |
| Epichlorhydrin - trimethylolpropane copolymer | Ingestion | Toxic to male reproduction | Rat | NOAEL 100 mg/kg/day | 14 days |

Target Organ(s)
Specific Target Organ Toxicity - single exposure

| Name | Route | Target Organ(s) | Value | Species | Test result | Exposure Duration |
|---|------------|-----------------------------------|--|-------------------------|---------------------|------------------------|
| Toluene | Inhalation | central nervous system depression | May cause drowsiness or dizziness | Human | NOAEL Not available | |
| Toluene | Inhalation | respiratory irritation | Some positive data exist, but the data are not sufficient for classification | Human | NOAEL Not available | |
| Toluene | Inhalation | immune system | Not classified | Mouse | NOAEL 0.004 mg/l | 3 hours |
| Toluene | Ingestion | central nervous system depression | May cause drowsiness or dizziness | Human | NOAEL Not available | poisoning and/or abuse |
| Polymethylene polyphenylene isocyanate | Inhalation | respiratory irritation | May cause respiratory irritation | official classification | NOAEL Not available | |
| P,P'-Methylenebis(phenyl isocyanate) | Inhalation | respiratory irritation | May cause respiratory irritation | official classification | NOAEL Not available | |
| Epichlorhydrin - trimethylolpropane copolymer | Inhalation | respiratory irritation | Some positive data exist, but the data are not sufficient for classification | similar health hazards | NOAEL Not available | |

Specific Target Organ Toxicity - repeated exposure

| Name | Route | Target Organ(s) | Value | Species | Test result | Exposure Duration |
|---------|------------|--|--|-------------------------|---------------------|------------------------|
| Toluene | Inhalation | auditory system nervous system eyes olfactory system | Causes damage to organs through prolonged or repeated exposure | Human | NOAEL Not available | poisoning and/or abuse |
| Toluene | Inhalation | respiratory system | Some positive data exist, but the data are not sufficient for classification | Rat | LOAEL 2.3 mg/l | 15 months |
| Toluene | Inhalation | heart liver kidney and/or bladder | Not classified | Rat | NOAEL 11.3 mg/l | 15 weeks |
| Toluene | Inhalation | endocrine system | Not classified | Rat | NOAEL 1.1 mg/l | 4 weeks |
| Toluene | Inhalation | immune system | Not classified | Mouse | NOAEL Not available | 20 days |
| Toluene | Inhalation | bone, teeth, nails, and/or hair | Not classified | Mouse | NOAEL 1.1 mg/l | 8 weeks |
| Toluene | Inhalation | hematopoietic system vascular system | Not classified | Human | NOAEL Not available | occupational exposure |
| Toluene | Inhalation | gastrointestinal tract | Not classified | Multiple animal species | NOAEL 11.3 mg/l | 15 weeks |
| Toluene | Ingestion | nervous system | Some positive data exist, but the | Rat | NOAEL 625 | 13 weeks |

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|---|------------|--|--|-------------------------|-----------------------|----------|
| | | | data are not sufficient for classification | | mg/kg/day | |
| Toluene | Ingestion | heart | Not classified | Rat | NOAEL 2,500 mg/kg/day | 13 weeks |
| Toluene | Ingestion | liver kidney and/or bladder | Not classified | Multiple animal species | NOAEL 2,500 mg/kg/day | 13 weeks |
| Toluene | Ingestion | hematopoietic system | Not classified | Mouse | NOAEL 600 mg/kg/day | 14 days |
| Toluene | Ingestion | endocrine system | Not classified | Mouse | NOAEL 105 mg/kg/day | 28 days |
| Toluene | Ingestion | immune system | Not classified | Mouse | NOAEL 105 mg/kg/day | 4 weeks |
| Polymethylene polyphenylene isocyanate | Inhalation | respiratory system | Causes damage to organs through prolonged or repeated exposure | Rat | LOAEL 0.004 mg/l | 13 weeks |
| P,P'-Methylenebis(phenyl isocyanate) | Inhalation | respiratory system | Causes damage to organs through prolonged or repeated exposure | Rat | LOAEL 0.004 mg/l | 13 weeks |
| Epichlorhydrin - trimethylolpropane copolymer | Ingestion | heart skin endocrine system gastrointestinal tract bone, teeth, nails, and/or hair hematopoietic system liver immune system muscles nervous system eyes kidney and/or bladder respiratory system vascular system | Not classified | Rat | NOAEL 300 mg/kg/day | 43 days |

Aspiration Hazard

| Name | Value |
|---------|-------------------|
| Toluene | Aspiration hazard |

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. Additional information leading to material classification in Section 2 is available upon request. In addition, environmental fate and effects data on ingredients may not be reflected in this section because an ingredient is present below the threshold for labelling, an ingredient is not expected to be available for exposure, or the data is considered not relevant to the material as a whole.

12.1. Toxicity

Acute aquatic hazard:

GHS Acute 2: Toxic to aquatic life.

Chronic aquatic hazard:

GHS Chronic 3: Harmful to aquatic life with long lasting effects.

No product test data available.

| Material | CAS Nbr | Organism | Type | Exposure | Test endpoint | Test result |
|----------|----------|--------------|--------------|----------|---------------|-------------|
| Toluene | 108-88-3 | Coho Salmon | Experimental | 96 hours | LC50 | 5.5 mg/l |
| Toluene | 108-88-3 | Grass Shrimp | Experimental | 96 hours | LC50 | 9.5 mg/l |
| Toluene | 108-88-3 | Green algae | Experimental | 72 hours | EC50 | 12.5 mg/l |

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|---|------------|------------------|---|----------|--------------------------------|------------------------------|
| Toluene | 108-88-3 | Leopard frog | Experimental | 9 days | LC50 | 0.39 mg/l |
| Toluene | 108-88-3 | Pink Salmon | Experimental | 96 hours | LC50 | 6.41 mg/l |
| Toluene | 108-88-3 | Water flea | Experimental | 48 hours | EC50 | 3.78 mg/l |
| Toluene | 108-88-3 | Coho Salmon | Experimental | 40 days | NOEC | 1.39 mg/l |
| Toluene | 108-88-3 | Diatom | Experimental | 72 hours | NOEC | 10 mg/l |
| Toluene | 108-88-3 | Water flea | Experimental | 7 days | NOEC | 0.74 mg/l |
| Toluene | 108-88-3 | Activated sludge | Experimental | 12 hours | IC50 | 292 mg/l |
| Toluene | 108-88-3 | Bacteria | Experimental | 16 hours | NOEC | 29 mg/l |
| Toluene | 108-88-3 | Bacteria | Experimental | 24 hours | EC50 | 84 mg/l |
| Toluene | 108-88-3 | Redworm | Experimental | 28 days | LC50 | >150 mg per kg of bodyweight |
| Toluene | 108-88-3 | Soil microbes | Experimental | 28 days | NOEC | <26 mg/kg (Dry Weight) |
| Polypropylene, chlorinated | 68442-33-1 | N/A | Data not available or insufficient for classification | N/A | N/A | N/A |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Activated sludge | Estimated | 3 hours | EC50 | >100 mg/l |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Green algae | Estimated | 72 hours | EC50 | >1,640 mg/l |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Water flea | Estimated | 24 hours | EC50 | >1,000 mg/l |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Zebra Fish | Estimated | 96 hours | LC50 | >1,000 mg/l |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Green algae | Estimated | 72 hours | NOEC | 1,640 mg/l |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Water flea | Estimated | 21 days | NOEC | 10 mg/l |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Green algae | Analogous Compound | 72 hours | No tox obs at lmt of water sol | >100 mg/l |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Water flea | Analogous Compound | 24 hours | No tox obs at lmt of water sol | >100 mg/l |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Green algae | Analogous Compound | 72 hours | No tox obs at lmt of water sol | >100 mg/l |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Activated sludge | Analogous Compound | 3 hours | EC50 | >100 mg/l |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Bacteria | Experimental | 18 hours | EC50 | >10,000 mg/l |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Common Carp | Experimental | 96 hours | LC50 | 75 mg/l |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Green algae | Experimental | 72 hours | EC50 | 9 mg/l |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Water flea | Experimental | 48 hours | EC50 | 3.7 mg/l |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Green algae | Experimental | 72 hours | NOEC | 2.5 mg/l |

12.2. Persistence and degradability

3M(tm) Adhesion Promoter K-500

| Material | CAS Nbr | Test type | Duration | Study Type | Test result | Protocol |
|---|------------|--|----------|-------------------------------|------------------|-------------------------------------|
| Toluene | 108-88-3 | Experimental Biodegradation | 20 days | BOD | 80 %BOD/ThOD | APHA Std Meth Water/Wastewater |
| Toluene | 108-88-3 | Experimental Photolysis | | Photolytic half-life (in air) | 5.2 days (t 1/2) | |
| Polypropylene, chlorinated | 68442-33-1 | Data not available-insufficient | N/A | N/A | N/A | N/A |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Estimated Hydrolysis | | Hydrolytic half-life | 20 hours (t 1/2) | |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Analogous Compound Aquatic Inherent Biodegrad. | 28 days | BOD | 0 %BOD/ThOD | OECD 302C - Modified MITI (II) |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Analogous Compound Hydrolysis | | Hydrolytic half-life | 20 hours (t 1/2) | |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Experimental Biodegradation | 28 days | BOD | 8 %BOD/ThOD | OECD 301F - Manometric respirometry |

12.3 : Bioaccumulative potential

| Material | CAS Nbr | Test type | Duration | Study Type | Test result | Protocol |
|---|------------|---|----------|------------------------|-------------|--------------------------|
| Toluene | 108-88-3 | Experimental BCF - Other | 72 hours | Bioaccumulation factor | 90 | |
| Toluene | 108-88-3 | Experimental Bioconcentration | | Log Kow | 2.73 | |
| Polypropylene, chlorinated | 68442-33-1 | Data not available or insufficient for classification | N/A | N/A | N/A | N/A |
| P,P'-Methylenebis(phenyl isocyanate) | 101-68-8 | Experimental BCF - Fish | 28 days | Bioaccumulation factor | 200 | OECD305-Bioconcentration |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Analogous Compound BCF - Fish | 28 days | Bioaccumulation factor | 200 | OECD305-Bioconcentration |
| Polymethylene polyphenylene isocyanate | 9016-87-9 | Analogous Compound Bioconcentration | | Log Kow | 4.51 | |
| Epichlorhydrin - trimethylolpropane copolymer | 30499-70-8 | Experimental Bioconcentration | | Log Kow | ≤3.4 | |

12.4. Mobility in soil

Please contact manufacturer for more details

12.5 Other Adverse effects

No information available.

SECTION 13: Disposal considerations**13.1. Disposal methods**

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Incinerate in a permitted waste incineration facility. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. As a disposal alternative, utilize an acceptable permitted waste disposal facility. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical

substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

SECTION 14: Transport Information

Air Transport (IATA) Regulations

UN No UN1866

Proper Shipping Name RESIN SOLUTION

Hazard Class/Division 3

Subsidiary Risk Not applicable

Packing Group: II

Marine Transport (IMDG)

UN No UN1866

Proper Shipping Name RESIN SOLUTION

Hazard Class/Division 3

Subsidiary Risk Not applicable

Packing Group: II

Environmental Hazards: Not applicable

SECTION 15: Regulatory information

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

Global inventory status

Contact 3M for more information. The components of this material are in compliance with the provisions of the Korea Chemical Control Act. Certain restrictions may apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of Australia National Industrial Chemical Notification and Assessment Scheme (NICNAS). Certain restrictions may apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of Japan Industrial Safety and Health Law. Certain restrictions may apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of Philippines RA 6969 requirements. Certain restrictions may apply. Contact the selling division for additional information. The components of this product are in compliance with the new substance notification requirements of CEPA. This product complies with Measures on Environmental Management of New Chemical Substances. All ingredients are listed on or exempt from on China IECSC inventory. The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

Applicable Environmental, Health and Safety Regulations

The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989

Hazardous Waste (Management, Handling & Transboundary) Rules, 2008

Hazardous Chemicals (Classification, Packaging and Labelling Draft Rules), 2011

The following ingredients are listed as hazardous on Part II of Schedule I of the India Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) rules

Benzene, 1,1'-methylenebis[4-isocyanato-

P,P'-Methylenebis(phenyl isocyanate)

Toluene

The following ingredients are classified as hazardous based on the criteria listed under Part I of Schedule I of the India Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) rules:

The product is classified as Very Highly Flammable liquid as per MSIHC Rules, 1989.

SECTION 16: Other information**NFPA Hazard Classification****Health: 2 Flammability: 3 Instability: 0 Special Hazards: None**

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Revision information:

Label: GHS Classification information was modified.
Label: GHS Precautionary - Prevention information was modified.
Label: GHS Precautionary - Response information was modified.
Label: GHS Target Organ Hazard Statement information was modified.
Label: Signal Word information was modified.
Label: Symbol information was modified.
Section 1: Product identification numbers information was deleted.
Section 04: First Aid - Symptoms and Effects (GHS) information was added.
Section 04: Information on toxicological effects information was deleted.
Section 09: Percent Volatile information was added.
Section 09: Vapor Density Value information was added.
Section 09: Viscosity information was added.
Section 09: VOC Less H₂O & Exempt Solvents information was added.
Section 09: Volatile Organic Compounds information was added.
Section 11: Acute Toxicity table information was modified.
Section 11: Reproductive Toxicity Table information was modified.
Section 11: Target Organs - Repeated Table information was modified.
Section 12: Component ecotoxicity information information was modified.
Section 12: Persistence and Degradability information information was modified.
Section 12: Bioaccumulative potential information information was modified.
Section 8: Eye/face protection information information was modified.
Section 8: Occupational exposure limit table information was modified.
Section 8: Skin protection - protective clothing information information was modified.
Section 8: Skin protection - recommended gloves information information was modified.
Section 9: Property description for optional properties information was added.
Section 9: Property description for optional properties information was deleted.
Section 9: Vapour density value information was deleted.
Section 9: Viscosity information information was deleted.

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3M India SDSs are available at <http://solutions.3mindia.co.in>