Dow Chemical Canada ULC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. **Product and Company Identification**

**Product Name**
U428 Plus Primerless to Auto Glass Urethane Adhesive

**COMPANY IDENTIFICATION**
Dow Chemical Canada ULC
A Subsidiary of The Dow Chemical Company
Suite 2100
450 - 1st Street S.W
Calgary, AB T2P 5H1
Canada

For MSDS updates and Product Information: 800-258-2436
Revision 2012.08.21
Print Date: 10/15/2013

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

**EMERGENCY TELEPHONE NUMBER**
24-Hour Emergency Contact: (989) 636-4400
Local Emergency Contact: 989-636-4400

2. **Hazards Identification**

**Emergency Overview**
- **Color:** Black
- **Physical State:** Paste
- **Odor:** Odorless
- **Hazard of product:**

Potential Health Effects

Eye Contact: May cause eye irritation.

Skin Contact: Prolonged contact may cause skin irritation with local redness. Material may stick to skin causing irritation upon removal. May stain skin.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Skin Sensitization: A component in this mixture has been shown to be a skin sensitizer. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material or mist may cause respiratory irritation and other effects. For the minor component(s):

- Methylene diphenyl disocyanate (MDI). Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. May cause pulmonary edema (fluid in the lungs). Decreased lung function has been associated with overexposure to isocyanates. May cause nausea and vomiting. Effects may be delayed. This material contains mineral and/or inorganic fillers. There is essentially no potential for inhalation exposure to these fillers incidental to industrial handling due to the physical state.

- Respiratory Sensitization: A component in this mixture may cause an allergic respiratory response. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

- Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea.

- Aspiration hazard: Based on physical properties, not likely to be an aspiration hazard.

- Effects of Repeated Exposure: Contains component(s) which have been reported to cause effects on the following organs in animals: Liver. Kidney. Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Cancer Information: Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Birth Defects/Developmental Effects: In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother. Contains component(s) which did not cause birth defects in animals; other fetal effects occurred only at doses toxic to the mother.

Reproductive Effects: For the phthalate ester(s): In laboratory animals, excessive doses toxic to the parent animals caused decreased weight and survival of offspring.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount W/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI BASED URETHANE POLYMER P93-1485</td>
<td>Not available</td>
<td>&gt; 35.0 - &lt; 45.0 %</td>
</tr>
<tr>
<td>Carbon black</td>
<td>1333-86-4</td>
<td>&gt; 20.0 - &lt; 30.0 %</td>
</tr>
<tr>
<td>Diisononyl phthalate</td>
<td>28553-12-0</td>
<td>&gt; 15.0 - &lt; 25.0 %</td>
</tr>
<tr>
<td>Phthalic acid, di-C8-10-branched alkyl esters, C9-rich</td>
<td>68515-48-0</td>
<td>&gt; 15.0 - &lt; 25.0 %</td>
</tr>
<tr>
<td>Calcined clay</td>
<td>66402-68-4</td>
<td>&gt; 5.0 - &lt; 15.0 %</td>
</tr>
<tr>
<td>Hexamethylene-1,6-diisocyanate homopolymer</td>
<td>28182-81-2</td>
<td>&lt; 1.0 %</td>
</tr>
<tr>
<td>4,4' -Methylenedi phenyl diisocyanate</td>
<td>101-68-8</td>
<td>&lt; 1.0 %</td>
</tr>
</tbody>
</table>

Amounts are presented as percentages by weight.
4. First-aid measures

Description of first aid measures

**General advice:** First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

**Inhalation:** Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

**Skin Contact:** Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands. Safety shower should be located in immediate work area.

**Eye Contact:** Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

**Ingestion:** If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

**Most important symptoms and effects, both acute and delayed**

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

**Indication of immediate medical attention and special treatment needed**

May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants and antitussives may be of help. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Maintain adequate ventilation and oxygenation of the patient. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive Airways dysfunction syndrome).

5. Fire Fighting Measures

**Suitable extinguishing media**

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective. Water fog, applied gently may be used as a blanket for fire extinguishment.

**Extinguishing Media to Avoid:** Do not use direct water stream. May spread fire.

**Special hazards arising from the substance or mixture**

**Hazardous Combustion Products:** During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide. Combustion products may include trace amounts of: Hydrogen cyanide.

**Unusual Fire and Explosion Hazards:** Product reacts with water. Reaction may produce heat and/or gases. Any closed container may rupture when exposed to extreme heat in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns.

**Advice for firefighters**

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has
passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishment. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the “Accidental Release Measures” and the “Ecological Information” sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

See Section 9 for related Physical Properties

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep upwind of spill. Ventilate area of leak or spill. Refer to Section 7, Handling, for additional precautionary measures. See Section 10 for more specific information. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Absorb with materials such as: Cat litter. Sand. Sawdust. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Avoid breathing vapor or mist. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Protect from atmospheric moisture. Store in a dry place. Avoid moisture.

Storage Period: 9 Months

Storage temperature: > 5 °C < 35 °C

8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,4’ -Methylenediphenyl diisocyanate</td>
<td>ACGIH</td>
<td>TWA</td>
<td>0.005 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD AB OEL</td>
<td>TWA</td>
<td>0.05 mg/m3  0.005 ppm</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>TWA</td>
<td>0.005 ppm SKIN</td>
</tr>
<tr>
<td></td>
<td>CAD BC OEL</td>
<td>CEILING</td>
<td>0.01 ppm SKIN</td>
</tr>
</tbody>
</table>
Consult local authorities for recommended exposure limits. Although some of the fillers used in this product may have exposure guidelines, no exposure would be expected under normal handling conditions because of the physical state of the material. A “skin” notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered. A “SEN” notation following the exposure guideline refers to the potential to produce sensitization, as confirmed by human or animal data.

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields).

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate (“EVAL”). Examples of acceptable glove barrier materials include: Neoprene. Nitrile/butadiene rubber (“nitrile” or “NBR”). Polyvinyl chloride (“PVC” or “vinyl”). Viton. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (air line or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and people working at this point. The odor and irritancy of this material are inadequate to warn of excessive exposure.

9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Paste</td>
</tr>
<tr>
<td>Color</td>
<td>Black</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
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</tr>
<tr>
<td>pH</td>
<td>No test data available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>No test data available</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>No test data available</td>
</tr>
<tr>
<td>Boiling Point (760 mmHg)</td>
<td>No test data available</td>
</tr>
</tbody>
</table>
**Flash Point - Closed Cup**  
$> 110 \degree C$  
ASTM D3278

**Evaporation Rate (Butyl Acetate = 1)**  
No test data available

**Flammability (solid, gas)**  
Lower: No test data available  
Upper: No test data available

**Flammable Limits In Air**  
No

**Vapor Pressure**  
No test data available

**Vapor Density (air = 1)**  
No test data available

**Specific Gravity (H2O = 1)**  
1.252  
ASTM D1475

**Solubility in water (by weight)**  
No test data available

**Partition coefficient, n-octanol/water (log Pow)**  
No data available for this product. See Section 12 for individual component data.

**Autoignition Temperature**  
No test data available

**Decomposition Temperature**  
No test data available

**Kinematic Viscosity**  
Not applicable

**Flammable Limits In Air**  
No test data available

**Explosive properties**  
no data available

**Oxidizing properties**  
no data available

**Volatile Organic Compounds**  
0.02 lb/gal  
EPA Method No. 24 (typical value)

### 10. Stability and Reactivity

**Reactivity**  
No dangerous reaction known under conditions of normal use.

**Chemical stability**  
Stable under recommended storage conditions. See Storage, Section 7.

**Possibility of hazardous reactions**  
Polymerization will not occur.

**Conditions to Avoid:** Some components of this product can decompose at elevated temperatures. Avoid moisture.


**Hazardous decomposition products**  
Decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition.

### 11. Toxicological Information

**Acute Toxicity**

**Ingestion**
Single dose oral LD50 has not been determined.

**Dermal**
The dermal LD50 has not been determined.

**Inhalation**
The LC50 has not been determined.

**Eye damage/eye irritation**
May cause eye irritation.

**Skin corrosion/irritation**
Prolonged contact may cause skin irritation with local redness. Material may stick to skin causing irritation upon removal. May stain skin.

**Sensitization**
Skin
A component in this mixture has been shown to be a skin sensitizer. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

Respiratory
A component in this mixture may cause an allergic respiratory response. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Repeated Dose Toxicity
Contains component(s) which have been reported to cause effects on the following organs in animals: Liver. Kidney. Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Chronic Toxicity and Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI. For the phthalate ester(s): Kidney effects and/or tumors have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans. Liver effects and/or tumors have been observed in rats. These effects are believed to be species specific and unlikely to occur in humans.

Developmental Toxicity
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother. Contains component(s) which did not cause birth defects in animals; other fetal effects occurred only at doses toxic to the mother.

Reproductive Toxicity
For the phthalate ester(s): In laboratory animals, excessive doses toxic to the parent animals caused decreased weight and survival of offspring. There were no effects on fertility at any dose.

Genetic Toxicology
For the phthalate ester(s): In vitro genetic toxicity studies were negative. Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Component Toxicology - Carbon black

| Skin Absorption | LD50, rabbit > 3,000 mg/kg |
| Component Toxicology - Diisononyl phthalate |
| Skin Absorption | LD50, rabbit > 3,160 mg/kg |
| Component Toxicology - Phthalic acid, di-C8-10-branched alkyl esters, C9-rich |
| Skin Absorption | LD50, rabbit > 3,160 mg/kg |
| Component Toxicology - Hexamethylene-1,6-diisocyanate homopolymer |
| Skin Absorption | As product: The dermal LD50 has not been determined. |

| Skin Absorption | For the major component(s): Estimated. LD50, rabbit > 5,000 mg/kg |
| Component Toxicology - 4,4’-Methylenediphenyl diisocyanate |
| Skin Absorption | LD50, rabbit > 9,400 mg/kg |
| Component Toxicology - Carbon black |
| Inhalation | LC50, 1 h, Aerosol, rat 27 mg/l |
| Component Toxicology - Diisononyl phthalate |
| Inhalation | LC50, 4 h, Aerosol, rat, male and female > 4.4 mg/l |
| Component Toxicology - Phthalic acid, di-C8-10-branched alkyl esters, C9-rich |
| Inhalation | LC50, 4 h, Aerosol, rat, male and female > 4.4 mg/l |
| Component Toxicology - Hexamethylene-1,6-diisocyanate homopolymer |
| Inhalation | As product: The LC50 has not been determined. |

| Inhalation | For the major component(s): LC50, 4 h, Aerosol, rat 4.63 mg/l |
| Component Toxicology - 4,4’-Methylenediphenyl diisocyanate |
| Inhalation | For the minor component(s): LC50, 4 h, Vapor, rat 124 mg/m3 |
| Component Toxicology - 4,4’-Methylenediphenyl diisocyanate |
| Inhalation | LC50, 1 h, Aerosol, rat 2.24 mg/l |
**Component Toxicology - MDI BASED URETHANE POLYMER P93-1485**

- **Ingestion**
  - LD50, rat: > 2,000 mg/kg

**Component Toxicology - Carbon black**

- **Ingestion**
  - LD50, rat: > 8,000 mg/kg

**Component Toxicology - Diisononyl phthalate**

- **Ingestion**
  - LD50, rat: > 10,000 mg/kg

**Component Toxicology - Phthalic acid, di-C8-10-branched alkyl esters, C9-rich**

- **Ingestion**
  - LD50, rat: > 10,000 mg/kg

**Component Toxicology - Hexamethylene-1,6-diisocyanate homopolymer**

- **Ingestion**
  - As product: Single dose oral LD50 has not been determined.

- For the major component(s): Estimated. LD50, rat: > 5,000 mg/kg

**Component Toxicology - 4,4’-Methylenediphenyl diisocyanate**

- **Ingestion**
  - LD50, rat: > 2,000 mg/kg

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### 12. Ecological Information

**Toxicity**

**Data for Component: MDI BASED URETHANE POLYMER P93-1485**

Not expected to be acutely toxic to aquatic organisms.

**Data for Component: Carbon black**

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

**Fish Acute & Prolonged Toxicity**

LC50, Leuciscus idus (Golden orfe), static test, 96 h: > 1,000 mg/l

**Aquatic Invertebrate Acute Toxicity**

EC50, Daphnia magna (Water flea), 24 h, immobilization: > 5,600 mg/l

**Data for Component: Diisononyl phthalate**

Toxicity to aquatic species occurs at concentrations above material’s water solubility.

**Fish Acute & Prolonged Toxicity**

The LC50 value is above the water solubility. LC50, rainbow trout (Oncorhynchus mykiss), flow-through test, 96 h: > 0.16 mg/l

**Aquatic Invertebrate Acute Toxicity**

The LC50 value is above the water solubility. LC50, saltwater mysid Mysidopsis bahia, static test, 96 h: > 0.39 mg/l

The EC50 value is above the water solubility. EC50, water flea Daphnia magna, 48 h, immobilization: > 0.06 mg/l

**Aquatic Plant Toxicity**

The EC50 value is above the water solubility. EC50, Pseudokirchneriella subcapitata (green algae), static test, 5 d: > 1.8 mg/l

**Toxicity to Micro-organisms**

The EC50 value is above the water solubility. EC50; activated sludge, Respiration inhibition, 30 min: > 83.9 mg/l

**Fish Chronic Toxicity Value (ChV)**

Oryzias latipes (Orange-red killifish), 284 d, NOEC

**Data for Component: Phthalic acid, di-C8-10-branched alkyl esters, C9-rich**

Toxicity to aquatic species occurs at concentrations above material’s water solubility.

**Fish Acute & Prolonged Toxicity**

The LC50 value is above the water solubility. LC50, rainbow trout (Oncorhynchus mykiss), flow-through test, 96 h: > 0.16 mg/l

**Aquatic Invertebrate Acute Toxicity**

The LC50 value is above the water solubility. LC50, saltwater mysid Mysidopsis bahia, static test, 96 h: > 0.39 mg/l
The EC50 value is above the water solubility. EC50, water flea Daphnia magna, 48 h, immobilization: > 0.06 mg/l

**Aquatic Plant Toxicity**
The EC50 value is above the water solubility. EC50, Pseudokirchneriella subcapitata (green algae), static test, 5 d: > 1.8 mg/l

**Toxicity to Micro-organisms**
The EC50 value is above the water solubility. EC50; activated sludge, Respiration inhibition, 30 min: > 83.9 mg/l

**Fish Chronic Toxicity Value (ChV)**
Oryzias latipes (Orange-red killifish), 284 d, NOEC

**Data for Component:** Calcined clay
Not expected to be acutely toxic to aquatic organisms.

**Data for Component:** Hexamethylene-1,6-diisocyanate homopolymer
For the major component(s): Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

**Fish Acute & Prolonged Toxicity**
NOEC mortality, Danio rerio (zebra fish), static test, 96 h: > 100 mg/l

**Aquatic Invertebrate Acute Toxicity**
NOEC, Daphnia magna (Water flea), static test, 48 h, immobilization: > 100 mg/l

**Aquatic Plant Toxicity**
EC50, alga Scenedesmus sp., static test, biomass growth inhibition, 72 h: > 1,000 mg/l

**Toxicity to Micro-organisms**
EC50, OECD 209 Test; activated sludge, 3 h: > 1,000 mg/l

**Data for Component:** 4,4’-Methylenediphenyl diisocyanate
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

**Fish Acute & Prolonged Toxicity**
Based on information for a similar material: LC50, Danio rerio (zebra fish), static test, 96 h: > 1,000 mg/l

**Aquatic Invertebrate Acute Toxicity**
Based on information for a similar material: EC50, Daphnia magna (Water flea), static test, 24 h: > 1,000 mg/l

**Aquatic Plant Toxicity**
Based on information for a similar material: NOEC, Desmodesmus subspicatus (green algae), static test, Growth rate inhibition, 72 h: 1,640 mg/l

**Toxicity to Micro-organisms**
Based on information for a similar material: EC50; activated sludge, static test, 3 h: > 100 mg/l

**Toxicity to Soil Dwelling Organisms**
EC50, Eisenia fetida (earthworms), 14 d: > 1,000 mg/kg

**Persistence and Degradability**

**Data for Component:** MDI BASED URETHANE POLYMER P93-1485
Surface photodegradation is expected with exposure to sunlight. No appreciable biodegradation is expected.

**Data for Component:** Carbon black
Biodegradation is not applicable.

**Data for Component:** Diisononyl phthalate
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% biodegradation in OECD test(s) for inherent biodegradability).

**Stability in Water (1/2-life):**
3.4 y; 25 °C; pH 7: hydrolysis
125.2 d; 25 °C; pH 8: hydrolysis

**OECD Biodegradation Tests:**
Product Name: U428 Plus Primerless to Auto Glass Urethane Adhesive

Issue Date: 2012.08.21

Biodegradation

<table>
<thead>
<tr>
<th>Exposition Time</th>
<th>Method</th>
<th>10 Day Window</th>
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</thead>
<tbody>
<tr>
<td>74 % 28 d</td>
<td>OECD 301C Test</td>
<td>Not applicable</td>
</tr>
<tr>
<td>&gt; 99 % 28 d</td>
<td>OECD 302A Test</td>
<td>Not applicable</td>
</tr>
<tr>
<td>70.5 % 28 d</td>
<td>OECD 301F Test</td>
<td>Not applicable</td>
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</tbody>
</table>

Indirect Photodegradation with OH Radicals

<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.34E-11 cm3/s</td>
<td>5.487 h</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 2.64 mg/mg

Data for Component: Phthalic acid, di-C8-10-branched alkyl esters, C9-rich

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% biodegradation in OECD test(s) for inherent biodegradability).

Stability in Water (1/2-life):
3.4 y; 25 °C; pH 7: hydrolysis
125.2 d; 25 °C; pH 8: hydrolysis

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Exposition Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>74 % 28 d</td>
<td>OECD 301C Test</td>
<td>Not applicable</td>
</tr>
<tr>
<td>&gt; 99 % 28 d</td>
<td>OECD 302A Test</td>
<td>Not applicable</td>
</tr>
<tr>
<td>70.5 % 28 d</td>
<td>OECD 301F Test</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Indirect Photodegradation with OH Radicals

<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.34E-11 cm3/s</td>
<td>5.487 h</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

Theoretical Oxygen Demand: 2.64 mg/mg

Data for Component: Calcined clay

Biodegradation is not applicable.

Data for Component: Hexamethylene-1,6-diisocyanate homopolymer

For this family of materials: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

OECD Biodegradation Tests:

<table>
<thead>
<tr>
<th>Exposition Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 % 28 d</td>
<td>No data available.</td>
<td>fail</td>
</tr>
</tbody>
</table>

Data for Component: 4,4’-Methylenediphenyl diisocyanate

In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.

OECD Biodegradation Tests: Based on information for a similar material:

<table>
<thead>
<tr>
<th>Exposition Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 % 28 d</td>
<td>OECD 302C Test</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Bioaccumulative potential

Data for Component: MDI BASED URETHANE POLYMER P93-1485

Bioaccumulation: No bioconcentration is expected because of the relatively high molecular weight (MW greater than 1000).

Data for Component: Carbon black

Bioaccumulation: No relevant data found.

Data for Component: Diisononyl phthalate

Bioaccumulation: Bioconcentration potential is low (BCF less than 100 or log Pow greater than 7).

Data for Component: **Phthalic acid, di-C8-10-branched alkyl esters, C9-rich**
- **Bioaccumulation:** Bioconcentration potential is low (BCF less than 100 or log Pow greater than 7).
- **Partition coefficient, n-octanol/water (log Pow):** 9.37  Estimated.

Data for Component: **Calcined clay**
- **Bioaccumulation:** Partitioning from water to n-octanol is not applicable.

Data for Component: **Hexamethylene-1,6-diisocyanate homopolymer**
- **Bioaccumulation:** For this family of materials: In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Data for Component: **4,4’-Methylene-diphenyl diisocyanate**
- **Bioaccumulation:** In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

**Mobility in soil**

Data for Component: **MDI BASED URETHANE POLYMER P93-1485**
- **Mobility in soil:** No relevant data found.

Data for Component: **Carbon black**
- **Mobility in soil:** No relevant data found.

Data for Component: **Dioisononyl phthalate**
- **Mobility in soil:** Expected to be relatively immobile in soil (Koc > 5000).
- **Partition coefficient, soil organic carbon/water (Koc):** > 5,000  Estimated.
- **Henry’s Law Constant (H):** 1.49E-06 atm*m3/mole; 25 °C  Estimated.

Data for Component: **Phthalic acid, di-C8-10-branched alkyl esters, C9-rich**
- **Mobility in soil:** Expected to be relatively immobile in soil (Koc > 5000).
- **Partition coefficient, soil organic carbon/water (Koc):** > 5,000  Estimated.
- **Henry’s Law Constant (H):** 1.49E-06 atm*m3/mole; 25 °C  Estimated.

Data for Component: **Calcined clay**
- **Mobility in soil:** No relevant data found.

Data for Component: **Hexamethylene-1,6-diisocyanate homopolymer**
- **Mobility in soil:** No relevant data found.

Data for Component: **4,4’-Methylene-diphenyl diisocyanate**
- **Mobility in soil:** In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

### 13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

**Treatment and disposal methods of used packaging:** Empty containers should be recycled or otherwise disposed of by an approved waste management facility. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. Do not re-use containers for any purpose.

### 14. Transport Information

**TDG Small container**
- **NOT REGULATED**
**Product Name:** U428 Plus Primerless to Auto Glass Urethane Adhesive  
**Issue Date:** 2012.08.21

**TDG Large container**  
NOT REGULATED

**IMDG**  
NOT REGULATED

**ICAO/IATA**  
NOT REGULATED

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### 15. Regulatory Information

**CEPA - Domestic Substances List (DSL)**  
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

**Hazardous Products Act Information: CPR Compliance**  
This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**Hazardous Products Act Information: WHMIS Classification**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon black</td>
<td>1333-86-4</td>
<td>&gt; 20.0 - &lt; 30.0 %</td>
</tr>
<tr>
<td>Hexamethylene-1,6-diisocyanate homopolymer</td>
<td>28182-81-2</td>
<td>&gt; 0.1 - &lt; 1.0 %</td>
</tr>
<tr>
<td>4,4’-Methylenediphenyl diisocyanate</td>
<td>101-68-8</td>
<td>&gt; 0.1 - &lt; 1.0 %</td>
</tr>
</tbody>
</table>

**Hazardous Products Act Information: Hazardous Ingredients**  
This product contains the following ingredients which are Controlled Products and/or are on the Ingredient Disclosure List (Canadian HPA Section 13 and 14).

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### 16. Other Information

**Hazard Rating System**

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Recommended Uses and Restrictions**

**Identified uses**

A urethane adhesive -- For use in automotive applications.

**Revision**

Identification Number: 50980 / 1002 / Issue Date 2012.08.21 / Version: 8.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

**Legend**

<table>
<thead>
<tr>
<th>N/A</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
</tr>
<tr>
<td>STEL</td>
<td>Short Term Exposure Limit</td>
</tr>
</tbody>
</table>
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