1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

- Chemical Name: Hydrazine Hydrate
- Catalogue #: H697600

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

- Product Uses: To be used only for scientific research and development. Not for use in humans or animals.

1.3 Details of the Supplier of the Safety Data Sheet

- Company: Toronto Research Chemicals
  2 Brisbane Road
  Toronto, ON M3J 2J8
  CANADA
- Telephone: +14166659696
- FAX: +14166654439
- Email: orders@trc-canada.com

1.4 Emergency Telephone Number

- Emergency#: +1(416) 665-9696 between 0800-1700 (GMT-5)

2. HAZARDS IDENTIFICATION

WHMIS Classification (Canada)

- B3: Combustible Liquid
- D1A: Very Toxic Material Causing Immediate and Serious Toxic Effects
  - Highly Toxic by Inhalation
- D1B: Toxic Material Causing Immediate and Serious Toxic Effects
  - Toxic by Ingestion/Skin Absorption
- D2A: Very Toxic Material Causing Other Toxic Effects
  - Carcinogen
- E: Corrosive Material

WHMIS Symbols (Canada)

2.1/2.2 Classification of the Substance or Mixture and Label Elements

**GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)**

- Acute Toxicity, Oral (Category 3)
- Acute Toxicity, Inhalation (Category 2)
- Acute Toxicity, Dermal (Category 3)
- Skin Corrosion (Category 1B)
- Serious Eye Damage (Category 1)
- Sensitisation, Skin (Category 1)
- Carcinogenicity (Category 1B)
- Hazardous to the Aquatic Environment, Acute Hazard (Category 1)
- Hazardous to the Aquatic Environment, Long-Term Hazard (Category 1)
GHS Hazard Statements
H301 Toxic if swallowed.
H330 Fatal if inhaled.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.
H350 May cause cancer.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

GHS Precautionary Statements
P201 Obtain special instructions before use.
P260 Do not breathe dust/fume/gas/mist/vapours/spray
P264 Wash hands thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P284 Wear respiratory protection.
P301/P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P304/P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Unclassified Hazards/Hazards Not Otherwise Classified
No data available.

3. COMPOSITION/INFORMATION ON INGREDIENTS
3.1 Substances
Molecular Formula: H₆N₂O
Molecular Weight: 50.06
CAS Registry #: 7803-57-8
EC#: 206-114-9
Synonyms
Hydrazine Monohydrate; Hydrazine Hydroxide; Hydrazinium Hydroxide

3.2 Mixtures
Not a mixture.

4. FIRST AID MEASURES
4.1 Description of First Aid Measures
General Advice
If medical attention is required, show this safety data sheet to the doctor.

If Inhaled
If inhaled, move casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact
Remove contaminated clothing and shoes. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In Case of Eye Contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.
If Swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed
CNS stimulation, Cyanosis, Salivation, Seizures, Diarrhea, Fever, Confusion, Hypoglycemia, Anorexia, Convulsions, Coma.

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed
No data available.

5. FIREFIGHTING MEASURES

5.1 Extinguishing Media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special Hazards Arising from the Substance or Mixture
Nitrogen oxides

5.3 Advice for Firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further Information
No data available.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures
Use recommended personal protective equipment (see Section 8). Adequate ventilation must be provided to ensure vapours or mists are not inhaled. Vapours are heavier than air and may accumulate in low areas. All sources of ignition, including sources of static discharge, must be removed from area.

6.2 Environmental Precautions
Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

6.3 Methods and Materials for Containment and Cleaning Up
Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

6.4 Reference to Other Sections
For protective equipment, refer to Section 8. For disposal, see Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling
Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of vapours and mists. Remove all sources of ignition and take precautionary measures to prevent the buildup of electrostatic discharge (ground and bond containers as appropriate). No smoking, eating or drinking around this material. Wash hands after use.

7.2 Conditions for Safe Storage, Including any Incompatibilities
Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Storage conditions: Room Temperature

7.3 Specific End Uses
For scientific research and development only. Not for use in humans or animals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>7803-57-8</td>
<td>TWA</td>
<td>0.010000 ppm</td>
<td>Canada. British Columbia OEL</td>
</tr>
</tbody>
</table>
Remarks
IARC '2B' applies to substances deemed possibly carcinogenic to humans. Contributes significantly to the overall exposure by the skin route.

TWAEV 0.010000 ppm  Canada. Ontario OELs

Skin
TWA 0.010000 ppm  0.010000 mg/m3  Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)

Substance may be readily absorbed through intact skin
TWAEV 0.100000 ppm  Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
0.130000 mg/m3
TWA 0.010000 ppm  USA. ACGIH Threshold Limit Values (TLV)

8.2 Exposure Controls
Appropriate Engineering Controls
A laboratory fume hood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

Personal Protective Equipment
All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

Eye/Face Protection
Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

Skin Protection
Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as “chemical resistant” by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not recommended.
Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated “chemical resistant” as per EN 734 with the resistance codes corresponding to the anticipated use of the material.
Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

Body Protection
Chemical-resistant bodysuit (laminated Tychem SL or equivalent).

Respiratory Protection
Recommended respirators are NIOSH-approved OV/Multi-gas/P100 or CEN-approved ABEK-FFP3 respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

9. PHYSICAL AND CHEMICAL PROPERTIES
9.1 Information on Basic Physical and Chemical Properties
A) Appearance
Clear Colourless Liquid

B) Odour
No data available
C) Odour Threshold
   No data available

D) pH
   No data available

E) Melting Point/Freezing Point
   N/A

F) Initial Boiling Point/Boiling Range
   No data available

G) Flash point
   No data available

H) Evaporation Rate
   No data available

I) Flammability (Solid/Gas)
   No data available

J) Upper/Lower Flammability/Explosive Limits
   No data available

K) Vapour Pressure
   No data available

L) Vapour Density
   No data available

M) Relative Density
   No data available

N) Solubility
   DMSO, Methanol

O) Partition Coefficient: n-octanol/water
   No data available

P) Auto-Ignition Temperature
   No data available

Q) Decomposition Temperature
   No data available

R) Viscosity
   No data available

S) Explosive Properties
   No data available

9.2 Other Information
   no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
   No data available.

10.2 Chemical Stability
   Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions
   No data available.

10.4 Conditions to Avoid
   Heat, flames and sparks.

10.5 Incompatible Materials
   Strong oxidizing agents, Oxygen, Copper, Organic materials, Zinc.

10.6 Hazardous Decomposition Products
   In the event of fire: See section 5. Other decomposition products: No data available.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

A) Acute Toxicity
   Oral LD50: Rat - 129 mg/kg
   Dermal LD50: No data available.
   Inhalation LC50: No data available.

B) Skin Corrosion/Irritation
   No data available

C) Serious Eye Damage/Irritation
   Corrosive - causes skin and eye burns. May also cause respiratory tract damage.

D) Respiratory or Skin Sensitization
   May cause an allergic skin reaction.

E) Germ Cell Mutagenicity
   No data available

F) Carcinogenicity
   Evidence of a carcinogenic effect.
   This compound has been designated by the IARC as Group 2B: Possibly carcinogenic to humans.

G) Reproductive Toxicity/Teratogenicity
   No data available

H) Single Target Organ Toxicity - Single Exposure

This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
Severe respiratory tract irritation. Material may be extremely destructive to the mucus membranes and the respiratory tract.

**J) Single Target Organ Toxicity - Repeated Exposure**
No data available

**J) Aspiration Hazard**
No data available

**K) Potential Health Effects and Routes of Exposure**

- **Inhalation**
  May be fatal if inhaled. Material is extremely destructive to the mucous membranes and respiratory tract.

- **Ingestion**
  Toxic if swallowed.

- **Skin**
  Toxic if absorbed through skin. Causes skin burns.

- **Eyes**
  Causes severe eye burns and possible permanent eye damage.

**L) Signs and Symptoms of Exposure**

CNS stimulation, Cyanosis, Salivation, Seizures, Diarrhea, Fever, Confusion, Hypoglycemia, Anorexia, Convulsions, Coma.

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

**M) Additional Information**

RTECS: MV8050000

### 12. ECOLOGICAL INFORMATION

**12.1 Toxicity**

- **Toxicity to fish:**
  LC50 - Leuciscus idus melanotus - 0.75 mg/l - 48.0 h

- **Toxicity to daphnia and other aquatic invertebrates:**
  NOEC - Daphnia magna (Water flea) - 0.01 mg/l - 21 d

**12.2 Persistence and Degradability**

No data available.

**12.3 Bioaccumulative Potential**

No data available.

**12.4 Mobility in Soil**

No data available.

**12.5 Results of PBT and vPvB Assessment**

No data available.

**12.6 Other Adverse Effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

### 13. DISPOSAL CONSIDERATIONS

**13.1 Waste Treatment Methods**

**A) Product**

Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

**B) Contaminated Packaging**

Dispose of as above.

**C) Other Considerations**

Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

### 14. TRANSPORT INFORMATION

**14.1 UN Number**

- DOT (US): UN2030
- IATA: UN2030
- IMDG: UN2030
- ADR/RID: UN2030

**14.2 UN Proper Shipping Name**

DOT (US)/IATA:

Hydrazine aqueous solution
IMDG/ARD/RID: HYDRAZINE AQUEOUS SOLUTION

14.3 Transport Hazard Class(es)

<table>
<thead>
<tr>
<th>DOT (US)</th>
<th>IATA</th>
<th>IMDG</th>
<th>ADR/RID</th>
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<td>8 (6.1)</td>
<td>8 (6.1)</td>
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</table>

14.4 Packing Group

<table>
<thead>
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<th>IMDG</th>
<th>ADR/RID</th>
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<tbody>
<tr>
<td>II</td>
<td>II</td>
<td>II</td>
<td>II</td>
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</table>

14.5 Environmental Hazards

<table>
<thead>
<tr>
<th>DOT (US)</th>
<th>IATA</th>
<th>IMDG</th>
<th>ADR/RID</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

14.6 Special Precautions for User

None

15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

A) Canada
   DSL/NDSL Status: This product is not listed on the Canadian DSL/NDSL.

B) United States
   TSCA Status: This product is not listed on the US EPA TSCA.

C) European Union
   ECHA Status: This product is not registered with the EU ECHA.

15.2 Chemical Safety Assessment

No data available

16. OTHER INFORMATION

16.1 Revision History

Original Publication Date: 5/15/2014

16.2 List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50</td>
<td>Median lethal dose of a substance required to kill 50% of a test population.</td>
</tr>
<tr>
<td>LC50</td>
<td>Median lethal concentration of a substance required to kill 50% of a test population.</td>
</tr>
<tr>
<td>LDLo</td>
<td>Lowest known lethal dose</td>
</tr>
<tr>
<td>TDLo</td>
<td>Lowest known toxic dose</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
</tr>
<tr>
<td>NTP</td>
<td>National Toxicology Program</td>
</tr>
<tr>
<td>RTECS</td>
<td>Registry of Toxic Effects of Chemical Substances</td>
</tr>
</tbody>
</table>

16.3 Further Information

Copyright 2015. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.