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

1.1 Product Identifier

Chemical Name  Captan-d6

Catalogue #  C175727

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)

D1B  Toxic Material Causing Immediate and Serious Toxic Effects
     Toxic by Inhalation

D2A  Very Toxic Material Causing Other Toxic Effects
     Carcinogen

D2B  Toxic Material Causing Other Toxic Effects
     Severe Eye Irritant
     Skin Sensitizer

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, Inhalation (Category 3)
Serious Eye Damage (Category 1)
Sensitisation, Skin (Category 1)
Carcinogenicity (Category 2)
Hazardous to the Aquatic Environment, Acute Hazard (Category 1)

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

Signal Word  Danger

GHS Hazard Statements

H331  Toxic if inhaled.
H318  Causes serious eye damage.
H317  May cause an allergic skin reaction.
H351 Suspected of causing cancer.
H400 Very toxic to aquatic life.

GHS Precautionary Statements
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302/P352 IF ON SKIN: Wash with plenty of soap and water
P304/P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P311 Call a POISON CENTER or doctor/physician.
P305/P351/P338 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: C₉H₂D₆Cl₃NO₂S
Molecular Weight: 306.63
CAS Registry #: 1330190-00-5
EC#: 
Synonyms
3a,4,7,7a-Tetrahydro-2-[(trichloromethyl)thio]-1H-isoindole-1,3(2H)-dione-d₆; N-[(Trichloromethyl)thio]tetrahydrophthalimide-d₆; N-[(Trichloromethyl)thio]-4-cyclohexene-1,2-dicarboximide-d₆; N-Trichloromethylthio-3a,4,7,7a-tetrahydrophthalimide-d₆; Trimegol-d₆; Ugecap-d₆; Ugecap-d₆; NSC 36726-d₆;

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
The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

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
Carbon oxides, Nitrogen oxides, Sulfur oxides, Hydrogen chloride

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
Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Method and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE
Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Keep in a dry place.
Storage conditions: -20°C Freezer

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>Captan</td>
<td>133-06-2</td>
<td>TWA</td>
<td>5.000000 mg/m³</td>
<td>Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)</td>
</tr>
</tbody>
</table>

Remarks
Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required

| TWA       | 5.000000 mg/m³ | Canada. British Columbia OEL  |

Sensitizer: sensitization critical effect

| TWAEV     | 5.000000 mg/m³ | Canada. Ontario OELs          |
| TWAEV     | 5.000000 mg/m³ | Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants |
| TWA       | 5.000000 mg/m³ | 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
Fire resistant (Nomex) lab coat or coveralls.

Respiratory Protection
Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate 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

<table>
<thead>
<tr>
<th>A) Appearance</th>
<th>B) Odour</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Solid</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>C) Odour Threshold</th>
<th>D) pH</th>
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</thead>
<tbody>
<tr>
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<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E) Melting Point/Freezing Point</th>
<th>F) Initial Boiling Point/Boiling Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>172-175°C</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G) Flash point</th>
<th>H) Evaporation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I) Flammability (Solid/Gas)</th>
<th>J) Upper/Lower Flammability/Explosive Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K) Vapour Pressure</th>
<th>L) Vapour Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M) Relative Density</th>
<th>N) Solubility</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>Chloroform, Ethyl Acetate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O) Partition Coefficient: n-octanol/water</th>
<th>P) Auto-Ignition Temperature</th>
</tr>
</thead>
<tbody>
<tr>
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<td>No data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q) Decomposition Temperature</th>
<th>R) Viscosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>S) Explosive Properties</th>
<th>T) Oxidizing Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>
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
No data available.

10.5 Incompatible Materials
Strong bases.

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 - 9,000 mg/kg
   Dermal LD50: Rat - > 5,000 mg/kg
   Inhalation LC50: No data available.

B) Skin Corrosion/Irritation
   No data available

C) Serious Eye Damage/Irritation
   No data available

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

E) Germ Cell Mutagenicity
   No data available

F) Carcinogenicity
   Limited evidence of a carcinogenic effect.
   This compound has been designated as Group 3: Not classifiable as to its carcinogenicity in humans.

G) Reproductive Toxicity/Teratogenicity
   No data available

H) Single Target Organ Toxicity - Single Exposure
   No data available

I) Single Target Organ Toxicity - Repeated Exposure
   No data available

J) Aspiration Hazard
   No data available

K) Potential Health Effects and Routes of Exposure
   Inhalation
   Toxic if inhaled. May cause respiratory tract irritation.
   Ingestion
   May be harmful if swallowed.
   Skin
   May be harmful if absorbed through skin. May cause skin irritation.
   Eyes
   Causes severe eye irritation.

L) Signs and Symptoms of Exposure
   The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

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

12.1 Toxicity
Toxicity to daphnia and other aquatic invertebrates:
EC50 - Daphnia magna (Water flea) - > 7.1 mg/l - 48 h

12.2 Persistence and Degradability
No data available.

12.3 Bioaccumulative Potential
Cyprinus carpio (Carp) -
Bioconcentration factor (BCF): 160

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.

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): UN2811
IATA: UN2811
IMDG: UN2811
ADR/RID: UN2811

14.2 UN Proper Shipping Name
DOT (US)/IATA:
Toxic solids, organic, n.o.s. (Captan)
IMDG/ADR/RID:
TOXIC SOLID, ORGANIC, N.O.S. (Captan)

14.3 Transport Hazard Class(es)
DOT (US): 6.1
IATA: 6.1
IMDG: 6.1
ADR/RID: 6.1

14.4 Packing Group
DOT (US): III
IATA: III
IMDG: III
ADR/RID: III

14.5 Environmental Hazards
DOT (US): None
IATA: None
IMDG: None
ADR/RID: None

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 or a component of this product is registered on the Canadian DSL/NDSL.

B) United States
TSCA Status: This product or a component is listed on the US EPA TSCA.

C) European Union
ECHA Status: This product or a component is registered with the EU ECHA.

15.2 Chemical Safety Assessment
No data available
16. OTHER INFORMATION

16.1 Revision History
Original Publication Date: 5/11/2017

16.2 List of Abbreviations
LD50                  Median lethal dose of a substance required to kill 50% of a test population.
LC50                  Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo                  Lowest known lethal dose
TDLo                  Lowest known toxic dose
IARC                  International Agency for Research on Cancer
NTP                   National Toxicology Program
RTECS                 Registry of Toxic Effects of Chemical Substances

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.