






Hazards	Personal Protective Equipment & Procedures
 	  

1.0 PRODUCT / COMPANY IDENTIFICATION

1.1 Product Identifier

Product Name: Pro98[®] Adhesive Kit – Part A
Synonyms: Hobby Rocket Motor Adhesive
Part Numbers: Pro98-ADH-Part-A

1.2 Relevant Identified Uses

Product Use: Component of adhesive for bonding solid fuel grains for propelling hobby rockets

1.3 Details of the Supplier of the SDS

Manufacturer / Supplier: Cesaroni Technology Inc.
P.O. Box 246
2561 Stouffville Rd.
Gormley, Ont.
Canada L0H 1G0
E-mail: regulatory@cesaroni.net

1.4 Emergency Telephone Numbers

Telephone Numbers:
Product Information: Tel: +1-905-887-2370 Fax: +1-905-887-2375
24 Hour Emergency Telephone Number: Tel: +1-613-996-6666 (CANUTEC)

2.0 HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification (UN GHS – ST-SG-AC10-30-Rev5e)
(WHMIS 2015 – Canada, HazCom 2012 – USA, Regulation (EC) No. 1272/2008 [CLP] – EU, 67/548/EEC or 1999/45/EC – EU)

Acute Toxicity, Oral	Category 5
Acute Toxicity, Dermal	Category 5
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Skin sensitization	Category 1
Reproductive toxicity	Category 2
Specific organ toxicity – single exposure	Category 2
Specific organ toxicity – repeated exposure	Category 2
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

2.2 Label Elements

Signal Word: Warning

GHS Pictograms:



Hazard Statements:

H303 + H313	May be harmful if swallowed or in contact with skin
H315	Causes skin irritation
H319	Causes serious eye irritation
H317	May cause allergic skin reaction
H360	May damage fertility or the unborn child
H370	May cause damage to gastrointestinal tract, liver and/or nerves
H372	May cause damage to gastrointestinal tract, liver and/or nerves through prolonged or repeated exposure
H413	May cause long-lasting harmful effects to aquatic life

Precautionary Statements

P260	Do not breathe fume/vapo(u)rs/spray
P280	Wear protective gloves / protective clothing / eye protection / face protection
P308 + P311	If exposed or concerned: Call a Poison Control Center or doctor / physician
P308 + P313	If exposed or concerned: Get medical advice / attention

2.3 Other Hazards

Emergency Overview:

This mixture contains ingredients that will target the gastrointestinal tract, liver and/or the nerves. Avoid skin contact and other means of exposure. Remove to fresh air and rinse effected area with water for several minutes.

Potential Health Effects:

Eye:

Not a likely route of exposure. May cause eye irritation.

Skin:

May be harmful if absorbed through the skin. Causes skin irritation.

Ingestion:

Not a likely route of exposure. May be harmful if swallowed

Inhalation:

Not a likely route of exposure. May cause respiratory tract irritation.

3.0 COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances n/a

3.2 Mixtures

3.2.1 Description of the Mixtures

Pro98 Adhesive Part – A contains a plasticizer and cure catalyst, dispersed in synthetic rubber.

3.2.2 Hazardous Ingredients

Name	CAS No.	EC No.	REACH Registration No.	% [weight]	Classification according to Regulation (EC) No. 1278/2008 (CLP)
HTPB	69102-90-5	614-926-3	exempted	80-90 %	Not classified
Dioctyl Adipate	103-23-1	203-090-1	01-2119439699-19-0000	10-15 %	none
Dibutyltin Dilaurate	77-58-7	201-039-8	01-2119496068-27-0000	1-5 %	Acute Tox. 4, Skin Corr. 1C, Skin Sens. 1, Repr. 1B, Muta. 2, STOT Single Exp. 1, STOT Rep. Exp. 1

4.0 FIRST AID MEASURES

4.1 Description of First Aid Measures

4.1.1 General Information

Follow normal first aid procedures for symptoms.

4.1.2 Following Inhalation

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

4.1.3 Following Skin Contact

If there is any sign of skin reaction or irritation, flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

4.1.4 Following Eye Contact

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

4.1.5 Following Ingestion

Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.

4.1.6 Self-Protection of the First Aider

Avoid contact with the substance.

4.2 Most Important Symptoms and Effects, both acute and delayed

4.2.1 Symptoms:

Skin rash

4.2.2 Effects:

Continued rash may indicate sensitivity to one or more ingredients

4.3 Indication of any immediate medical attention and special treatment needed

4.3.1 Notes for the doctor:

Treat with regular procedures

4.3.2 Special Treatment:

No special treatments required

5.0 FIRE FIGHTING MEASURES

5.1 Extinguishing Media:

5.1.1 Suitable Extinguishing Media

In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam to contain surrounding fire.

5.1.2 Unsuitable Extinguishing Media

None

5.2 Special Hazards Arising from the Substance or Mixture

5.2.1 Hazardous Combustion Products

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

5.3 Advice for Fire Fighters

Keep all persons and hazardous materials away. Avoid breathing exhaust products
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

5.4 Additional Information

This mixture is only slightly flammable. Do not inhale exhaust products.

6.0 ACCIDENTAL RELEASE MEASURES

- 6.1 Personal precautions, protective equipment and emergency procedures**
- 6.1.1 For non-emergency personnel**
Protective equipment: Nitrile Gloves, eye protection, protective clothing.
Emergency procedures: Take up liquid with an absorbent material and seal securely.
- 6.1.2 For emergency responders**
Personal protective equipment: Nitrile Gloves, eye protection, protective clothing.
- 6.2 Environmental precautions:** Seal securely and dispose of as hazardous waste.
- 6.3 Methods and material for containment and cleaning up**
- 6.3.1 For containment:** Take up liquid with an absorbent material (eg. Sand, earth, vermiculite) and place in a sealed container.
- 6.3.2 For cleaning up:** Clean up spills immediately.
- 6.3.3 Other information:** None
- 6.4 Reference to other sections** See section 13 for disposal procedures.
- 6.5 Additional information:** None

7.0 HANDLING AND STORAGE

- 7.1 Precautions for safe handling**
- 7.1.1 Protective measures:**
Advice on safe handling: Do not get in eyes, on skin or on clothing. Do not taste or swallow. Avoid contact with skin. Follow manufacturer's instructions for use.
Fire preventions: Keep away from sources of heat or ignition.
Aerosol and dust generation preventions: n/a
Environmental precautions: Store in a cool, dry place.
- 7.1.2 Advice on general occupational hygiene**
- 7.2 Conditions for safe storage, including any incompatibilities**
Technical measures & storage conditions: Store in a cool, dry place, away from sources of heat or ignition.
Packaging materials: Store in original packaging until immediately before use.
Requirements for storage rooms and vessels: Store in a cool, dry place, away from sources of heat or ignition.
Hints on storage assembly: n/a
Storage class: n/a
Materials to avoid: Do not store with combustibles.
Further information on storage conditions: n/a
- 7.3 Specific end uses:**
Recommendations: Use as per supplied instructions.
Specific end uses: For bonding Pro98[®] propellant grains

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameters

8.1.1 Occupational Exposure Limits

No occupational exposure limits listed

8.1.2 Biological Limit Values

No biological limits listed

8.1.3 Exposure Limits at Intended Use

8.1.4 DNEL/PNEC Values

No DNEL values listed
No PNEC values listed.

8.1.5 Risk management measures according to used control banding approach

Employ good industrial hygiene practices.

8.2 Exposure Controls

8.2.1 Appropriate Engineering Controls

Ensure good ventilation of the work station.

8.2.2 Personal Protective Equipment

8.2.2.1 Eye/Face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

8.2.2.2 Skin Protection

Wear nitrile gloves and suitable protective clothing.

8.2.2.3 Respiratory protection

A respirator is not typically necessary.

8.2.2.4 Thermal Hazards

None.

8.2.3 Environmental Exposure Controls

8.2.4 Consumer Exposure Controls

Follow supplied instructions.

9.0 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

9.1.1 Appearance

Physical State:	liquid
Appearance:	viscous liquid
Odour:	characteristic
Odour Threshold:	Not available.
pH:	Not available.
Vapour Pressure:	Not available.
Vapour Density:	Not available.
Viscosity:	Not available.
Evaporation Rate:	Not available.
Boiling Point:	224°C (DOA).
Freezing/Melting Point:	Not available.
Coefficient of water/oil distribution:	Not available.
Autoignition Temperature:	350°C (DOA)
Flash Point:	> 200°C (HTPB) , 232°C (DOA), 113°C (DBTDL)
Explosion Limits, lower (LEL):	Not available.
Explosion Limits, upper (UEL):	Not available.
Sensitivity to Mechanical Impact:	Not available.
Sensitivity to Static Discharge:	Not available.

Decomposition Temperature: Not available.
Solubility in water: Not available.
Specific Gravity/Density: HTPB = 0.9, DOA = 0.927, DBTDL = 1.066
Molecular Formula: Not applicable
Molecular Weight: Not applicable.

9.2 Other Information

No additional other information available

10.0 STABILITY AND REACTIVITY

10.1 Reactivity

No dangerous reactions known under normal conditions of use.

10.2 Chemical Stability

Under storage at normal ambient temperatures, the product is stable.

10.3 Possibility of Hazardous Reactions

HTPB cracks into gaseous and liquid products above 426°C. HTPB decomposes by polymerization above 204°C. Once initiated, the reaction generates enough heat to continue spontaneously.

10.4 Conditions to Avoid

Heat, direct sunlight, high temperature.

10.5 Incompatible Materials

Strong oxidizing agents, strong reducing agents. Free radical initiators/peroxides.

10.6 Hazardous Decomposition Products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. DOA may produce oxides of carbon.

11.0 TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

11.1.1 Substances not applicable

11.1.2 Mixtures

(a) Acute toxicity	no data available
(b) Irritation	no data available
(c) Corrosivity	no data available
(d) Sensitisation	no data available
(e) Repeated dose toxicity	no data available
(f) Carcinogenicity	no data available
(g) Mutagenicity	no data available
(h) Toxicity for reproduction	no data available

11.2 Other Information

HTPB	LD50 (oral, rat)	> 5000 mg/kg
DOA	LD50 (oral, rat)	= 5600 mg/kg
DBTDL	LD50 (oral, rat)	= 2071 mg/kg

12.0 ECOLOGICAL INFORMATION

12.1 Toxicity No Data Available

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	The substance has a very low global warming potential.

13.0 DISPOSAL CONSIDERATIONS

- 13.1 Waste Treatment Methods**
- 13.1.1 Product/Packaging Disposal**
Empty containers should be taken for recycling .
- 13.1.2 Waste Treatment Options**
Propellant should be burned before disposal.
- 13.1.3 Other Disposal Recommendations**
Consult local regulations.
- 13.2 Additional Information**
None

14.0 TRANSPORT INFORMATION

	Land Transport (ADR/RID)	Inland Waterway Transport (AND)	Sea Transport (IMDG)	Air Transport (ICAO-TI/IATA- DGR)
14.1 UN No.	Not considered Dangerous Goods for Transport			
14.2 UN Proper Shipping Name	n/a			
14.3 Transport Hazard Class	n/a			
14.4 Packing Group	n/a			
14.5 Environmental Hazards	None listed			

- 14.6 Special Precautions for the User**
- 14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not designed for bulk transport.
- 14.8 Additional Information**
- 14.8.1 All Transport Carriers**
See below
- 14.8.2 Land Transport (ADR/RID)**
Not considered Dangerous Goods for Transport
- 14.8.3 Inland Waterway Transport (ADN)**
Not considered Dangerous Goods for Transport
- 14.8.4 Sea Transport (IMDG)**
Not considered Dangerous Goods for Transport
- 14.8.5 Air Transport (ICAO-TI / IATA-DGR)**
Not considered Dangerous Goods for Transport

15.0 REGULATORY INFORMATION

- 15.1 Safety, Health and Environmental Regulations/Legislation**
- 15.1.1 EU Regulations**
No REACH Annex XVII restrictions
- Restrictions on Use**
Follow local regulations
- Other EU Regulations**

15.1.2 National Regulations

Canada

This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the SDS contains all of the information required by the CPR.

WHMIS Classification: Not Controlled

United States of America

EPA Hazard Categories (SARA 311,312)

Hazardous Chemical Lists

CERCLA Hazardous Substance (40 CFR 302.4)	No
SARA Extremely Hazardous Substance (40CFR 355)	No
SARA Toxic Chemical (40CFR 372.65)	No
Massachusetts Right-To-Know Substance List (MSL)	No
Pennsylvania Right-To-Know Substance List	No
New Jersey Worker & Community Right-To-Know Act	No
California Proposition 65	No

Chemical Inventories

Canada	All ingredients are listed on the DSL.
United States	All ingredients are listed on the TSCA Inventory.
Europe	All ingredients are listed on the EINECS inventory.
Australia	All ingredients are listed on the AICS Inventory.
China	All ingredients are listed on the IECSC Inventory.
Japan	All ingredients are listed on the ENCS Inventory.
Korea	All ingredients are listed on the Existing Chemicals List (ECL).
Philippines	All ingredients are listed on the PICCS.

15.2 Chemical safety Assessment

A Chemical Safety Assessment is not required for this product.

16.0 OTHER INFORMATION

16.1 Changes From Last Version

Update for REACH, WHMIS 2015 & HAZCom 2012 requirements.

16.2 Abbreviations and Acronyms

DNEL	Derived No-Effect Exposure Limit
GHS	Globally Harmonized System
PNEL	Predicted No Effect level

16.3 Key Literature References and Sources of Data

GESTIS

16.4 Classification for mixtures and used evaluation method according to regulation (EC) 1207/2008 [CLP]

No tests conducted.

16.5 Relevant R-, H-, and EUH- Phrases

Hazard Statements:

H303 + H313	May be harmful if swallowed or in contact with skin
H315	Causes skin irritation
H319	Causes serious eye irritation
H317	May cause allergic skin reaction
H360	May damage fertility or the unborn child
H370	May cause damage to gastrointestinal tract, liver and/or nerves
H372	May cause damage to gastrointestinal tract, liver and/or nerves through prolonged or repeated exposure
H413	May cause long-lasting harmful effects to aquatic life

Precautionary Statements

P260 Do not breathe fume/vapo(u)rs/spray
P280 Wear protective gloves / protective clothing / eye protection / face protection
P308 + P311 If exposed or concerned: Call a Poison Control Center or doctor / physician
P308 + P313 If exposed or concerned: Get medical advice / attention

16.6 Training Advice

Follow supplied instructions carefully.






16.7 Further Information

SDS Prepared by: Regulatory Affairs Department
Cesaroni Technology Inc.
P.O. Box 246
2561 Stouffville Rd.
Gormley, ON
Canada L0H 1G0

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Web Sites: www.cesaronitech.com
www.Pro38.com

The data in this Safety Data Sheet relates only to the specific material or product designated herein and does not relate to use in combination with any other material or in any process.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

Hazards	Personal Protective Equipment & Procedures
 	  

1.0 PRODUCT / COMPANY IDENTIFICATION

1.1 Product Identifier

Product Name: Adhesive Kit for Pro75[®] & Pro98[®] – Part B
Synonyms: Hobby Rocket Motor Adhesive
Part Numbers: Pro98-ADH-Part-B

1.2 Relevant Identified Uses

Product Use: Component of adhesive for bonding solid fuel grains for propelling hobby rockets

1.3 Details of the Supplier of the SDS

Manufacturer / Supplier: Cesaroni Technology Inc.
P.O. Box 246
2561 Stouffville Rd.
Gormley, Ont.
Canada L0H 1G0
E-mail: regulatory@cesaroni.net

1.4 Emergency Telephone Numbers

Telephone Numbers:
Product Information: Tel: +1-905-887-2370 Fax: +1-905-887-2375
24 Hour Emergency Telephone Number: Tel: +1-613-996-6666 (CANUTEC)

2.0 HAZARDS IDENTIFICATION

2.1 Classification

GHS Classification (UN GHS – ST-SG-AC10-30-Rev5e)
(WHMIS 2015 – Canada, HazCom 2012 – USA, Regulation (EC) No. 1272/2008 [CLP] – EU, 67/548/EEC or 1999/45/EC – EU)

WARNING! May cause allergic skin reaction.
May cause allergic respiratory reaction.
May cause lung injury.
May cause eye irritation.
May cause skin irritation.
May cause respiratory tract irritation.
Toxic fumes may be released in fire situations.
May react with water.
Elevated temperatures can cause hazardous polymerization.
Material reacts slowly with water, releasing carbon dioxide which can cause pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction. Isolate area.
Keep upwind of spill. Stay out of low areas.

2.2 Label Elements

Signal Word: Warning

GHS Pictograms:



Hazard Statements:

H315	Causes skin irritation
H317	May cause allergic skin reaction
H319	Causes serious eye irritation
H332	Harmful if inhaled
H335	May cause respiratory irritation
H351	Suspected of causing cancer
H373	May cause damage to respiratory system through prolonged or repeated exposure by inhalation

Precautionary Statements

P260	Do not breathe fume/vapo(u)rs/spray
P280	Wear protective gloves / protective clothing / eye protection / face protection
P285	In case of inadequate ventilation, wear respiratory 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
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do, continue rinsing
P309 + P311	If exposed or if you feel unwell: Call a Poison Control Center or doctor / physician
EUH204	Contains isocyanates. May produce an allergic reaction

2.3 Other Hazards

Emergency Overview:

This mixture contains ingredients that will target the gastrointestinal tract, liver and/or the nerves. Avoid skin contact and other means of exposure. Remove to fresh air and rinse effected area with water for several minutes.

Potential Health Effects:

Eye:

Not a likely route of exposure. May cause eye irritation.

Skin:

May be harmful if absorbed through the skin. Causes skin irritation.

Ingestion:

Not a likely route of exposure. May be harmful if swallowed

Inhalation:

Not a likely route of exposure. May cause respiratory tract irritation.

3.0 COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances n/a

3.2 Mixtures

3.2.1 Description of the Mixtures

Pro98 Adhesive Part – B contains a polymeric methylene diphenyl diisocyanate (MDI).

3.2.2 Hazardous Ingredients

Name	CAS No.	EC No.	REACH Registration No.	% [weight]	Classification according to Regulation (EC) No. 1278/2008 (CLP)
Diphenylmethane Diisocyanate	9016-87-9			100 %	
4,4'-Methylenediphenyl diisocyanate	101-68-8	202-966-0	01-2119457014-47-0000	45-55 %	Acute Tox. 4 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1 STOT Single Exp. 3 STOT Rep. Exp. 2

NOTE: CAS 101-68-8 is an MDI monomer that is part of CAS 9016-87-9

4.0 FIRST AID MEASURES

4.1 Description of First Aid Measures

4.1.1 General Information

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.

4.1.2 Following Inhalation

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

4.1.3 Following 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. Suitable emergency safety shower facility should be available in work area.

4.1.4 Following 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. Suitable emergency eye wash facility should be immediately available.

4.1.5 Following Ingestion

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

4.1.6 Self-Protection of the First Aider

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.

4.2 Most Important Symptoms and Effects, both acute and delayed

4.2.1 Symptoms:

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.

4.2.2 Effects:

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.

4.3 Indication of any immediate medical attention and special treatment needed

4.3.1 Notes for the doctor:

Maintain adequate ventilation and oxygenation of the patient. 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. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. 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).

4.3.2 Special Treatment:

See 4.3.1

5.0 FIRE FIGHTING MEASURES

5.1 Extinguishing Media:

5.1.1 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.

5.1.2 Unsuitable Extinguishing Media

Do not use direct water stream. May spread fire.

5.2 Special Hazards Arising from the Substance or Mixture

5.2.1 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. Isocyanates. Hydrogen cyanide. Carbon monoxide. Carbon dioxide.

5.3 Advice for Fire Fighters

Keep all persons and hazardous materials away. Avoid breathing exhaust products
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

5.4 Additional Information

This mixture is only slightly flammable. Do not inhale exhaust products.

6.0 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Protective equipment: Nitrile Gloves, eye protection, protective clothing.

Emergency procedures: Take up liquid with an absorbent material and seal securely.

6.1.2 For emergency responders

Personal protective equipment: Nitrile Gloves, eye protection, protective clothing.

6.2 Environmental precautions:

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

6.3 Methods and material for containment and cleaning up

6.3.1 For containment:

Contain spilled material if possible. Absorb with materials such as: Dirt. Vermiculite. Sand. Clay. Do NOT use absorbent materials such as: Cement powder (Note: may generate heat). Collect in suitable and properly labeled open containers. Do not place in sealed containers.

Suitable containers include: Metal drums. Plastic drums. Polylined fiber pacs.

6.3.2 For cleaning up:

Wash the spill site with large quantities of water. Attempt to neutralize by adding suitable decontaminant solution: Formulation 1: sodium carbonate 5 - 10%; liquid detergent 0.2 - 2%; water to make up to 100%, OR Formulation 2: concentrated ammonia solution 3 - 8%; liquid detergent 0.2 - 2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure.

6.3.3 Other information:

None

6.4 Reference to other sections

See section 13 for disposal procedures.

6.5 Additional information:

None

7.0 HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Protective measures:

Advice on safe handling:

Do not get in eyes, on skin or on clothing. Do not taste or swallow. Avoid contact with skin. Follow manufacturer's instructions for use.

Fire preventions:

Keep away from sources of heat or ignition.

Aerosol and dust generation preventions:

n/a

Environmental precautions:

Store in a cool, dry place.

7.1.2 Advice on general occupational hygiene

7.2 Conditions for safe storage, including any incompatibilities

Technical measures & storage conditions: Store in a cool, dry place, away from sources of heat or ignition.

Packaging materials: Store in original packaging until immediately before use.

Requirements for storage rooms and vessels: Store in a cool, dry place, away from sources of heat or ignition.

Hints on storage assembly: n/a

Storage class: n/a

Materials to avoid: Avoid contamination with water.

Further information on storage conditions: n/a

7.3 Specific end uses:

Recommendations:

Use as per supplied instructions.

Specific end uses:

For bonding Pro75[®] & Pro98[®] propellant grains

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameters

8.1.1 Occupational Exposure Limits

ACGIH	TWA	0.005 ppm
CAD AB OEL	TWA	0.05 mg/m ³ 0.005 ppm
CAD BC OEL	TWA	0.005 ppm Skin
CAD BC OEL	Ceiling	0.01 ppm Skin
CAD ON OEL	TWAEV	0.005 ppm
CAD ON OEL	CEV	0.02 ppm
CAD QC	TWA	0.05 mg/m ³ 0.005 ppm SEN
		Exposure must be minimized
CAD SK OEL	8 HR ACL	0.005 ppm
CAD SK OEL	15 Min ACL	0.015 ppm

Consult local authorities for recommended exposure limits.

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.

8.1.2 Biological Limit Values

No biological limits listed

8.1.3 Exposure Limits at Intended Use

8.1.4 DNEL/PNEC Values

No DNEL values listed
No PNEC values listed.

8.1.5 Risk management measures according to used control banding approach

Employ good industrial hygiene practices.

8.2 Exposure Controls

8.2.1 Appropriate Engineering Controls

Ensure good ventilation of the work station.

8.2.2 Personal Protective Equipment

8.2.2.1 Eye/Face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

8.2.2.2 Skin Protection

Use protective clothing chemically resistant to this material.

Hand protection: Use gloves chemically resistant to this material.

Suitable Gloves: Butyl rubber. Polyethylene. Chlorinated polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Viton. Neoprene. Polyvinyl chloride ("PVC" or "vinyl"). Nitrile/butadiene rubber ("nitrile" or "NBR").

Not Suitable Gloves: Latex.

8.2.2.3 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.

8.2.2.4 Thermal Hazards

None.

8.2.3 Environmental Exposure Controls

8.2.4 Consumer Exposure Controls

Follow supplied instructions.

9.0 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

9.1.1 Appearance

Physical State:	liquid
Appearance:	brown liquid
Odour:	musty
Odour Threshold:	0.4 ppm, based on literature for MDI.
pH:	Not available.
Vapour Pressure:	< 0.00001 mm Hg @ 25°C.
Vapour Density:	8.5
Viscosity:	Not available.
Evaporation Rate:	Not available.
Boiling Point:	210°C
Freezing/Melting Point:	Not available.
Coefficient of water/oil distribution:	Not available.
Autoignition Temperature:	>600°C
Flash Point:	> 204°C (ASTM D93)
Explosion Limits, lower (LEL):	Not explosive.

Explosion Limits, upper (UEL):	Not explosive.
Sensitivity to Mechanical Impact:	Not available.
Sensitivity to Static Discharge:	Not available.
Decomposition Temperature:	> 230°C
Solubility in water:	insoluble, reacts, evolution of CO ₂ .
Specific Gravity/Density:	1.24
Molecular Formula:	Not applicable
Molecular Weight:	Not applicable.

9.2 Other Information

No additional other information available

10.0 STABILITY AND REACTIVITY

10.1 Reactivity

No dangerous reactions known under normal conditions of use.

10.2 Chemical Stability

Under storage at normal ambient temperatures, the product is stable.

10.3 Possibility of Hazardous Reactions

HTPB cracks into gaseous and liquid products above 426°C. HTPB decomposes by polymerization above 204°C. Once initiated, the reaction generates enough heat to continue spontaneously.

10.4 Conditions to Avoid

Heat, direct sunlight, high temperature.

10.5 Incompatible Materials

Strong oxidizing agents, strong reducing agents. Free radical initiators/peroxides.

10.6 Hazardous Decomposition Products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. DOA may produce oxides of carbon.

11.0 TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

11.1.1 Substances not applicable

11.1.2 Mixtures

- | | |
|----------------------------|---|
| (a) Acute toxicity | (ingestion) LD50, rat >10,000 mg/kg (typical) |
| (b) Irritation | May cause moderate eye irritation. May cause slight corneal injury
Prolonged contact may cause slight skin irritation with local redness. |
| (c) Corrosivity | no data available |
| (d) Sensitisation | Skin contact may cause an allergic skin reaction. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.
May cause 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. |
| (e) Repeated dose toxicity | Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols. |
| (f) Carcinogenicity | Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m ³) 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. |

- (g) **Mutagenicity** no data available
(h) **Toxicity for reproduction** no data available

11.2 Other Information

none

12.0 ECOLOGICAL INFORMATION

- 12.1 Toxicity** 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).
- 12.2 Persistence and Degradability** 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.
- 12.3 Bioaccumulative Potential** In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.
- 12.4 Mobility in Soil** In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.
- 12.5 Results of PBT and vPvB Assessment** No Data Available
- 12.6 Other Adverse Effects** No Data Available

13.0 DISPOSAL CONSIDERATIONS

- 13.1 Waste Treatment Methods**
- 13.1.1 Product/Packaging Disposal**
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..
- 13.1.2 Waste Treatment Options**
Consult local regulations.
- 13.1.3 Other Disposal Recommendations**
Consult local regulations.
- 13.2 Additional Information**
None

14.0 TRANSPORT INFORMATION

	Land Transport (ADR/RID)	Inland Waterway Transport (AND)	Sea Transport (IMDG)	Air Transport (ICAO-TI/ATA- DGR)
14.1 UN No.	Not considered Dangerous Goods for Transport			
14.2 UN Proper Shipping Name	n/a			
14.3 Transport Hazard Class	n/a			
14.4 Packing Group	n/a			
14.5 Environmental Hazards	None listed			

14.6 Special Precautions for the User

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not designed for bulk transport.

14.8 Additional Information

14.8.1 All Transport Carriers

See below

14.8.2 Land Transport (ADR/RID)

Not considered Dangerous Goods for Transport

14.8.3 Inland Waterway Transport (ADN)

Not considered Dangerous Goods for Transport

14.8.4 Sea Transport (IMDG)

Not considered Dangerous Goods for Transport

14.8.5 Air Transport (ICAO-TI / IATA-DGR)

Not considered Dangerous Goods for Transport

15.0 REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislation

15.1.1 EU Regulations

No REACH Annex XVII restrictions

Restrictions on Use

Follow local regulations

Other EU Regulations

15.1.2 National Regulations

Canada

This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the SDS contains all of the information required by the CPR.

WHMIS Classification: Not Controlled

United States of America

EPA Hazard Categories (SARA 311,312)

Hazardous Chemical Lists

CERCLA Hazardous Substance (40 CFR 302.4)	No
SARA Extremely Hazardous Substance (40CFR 355)	No
SARA Toxic Chemical (40CFR 372.65)	No
Massachusetts Right-To-Know Substance List (MSL)	No
Pennsylvania Right-To-Know Substance List	No
New Jersey Worker & Community Right-To-Know Act	No
California Proposition 65	No

Chemical Inventories

Canada	All ingredients are listed on the DSL.
United States	All ingredients are listed on the TSCA Inventory.
Europe	All ingredients are listed on the EINECS inventory.
Australia	All ingredients are listed on the AICS Inventory.
China	All ingredients are listed on the IECSC Inventory.
Japan	All ingredients are listed on the ENCS Inventory.
Korea	All ingredients are listed on the Existing Chemicals List (ECL).
Philippines	All ingredients are listed on the PICCS.

15.2 Chemical safety Assessment

A Chemical Safety Assessment is not required for this product.

16.0 OTHER INFORMATION

16.1 Changes From Last Version

Update for REACH, WHMIS 2015 & HAZCom 2012 requirements.

16.2 Abbreviations and Acronyms

ACGIH	American Conference of Industrial Hygienists
ACL	Alternate Concentration Limit
DNEL	Derived No-Effect Exposure Limit
GHS	Globally Harmonized System
OEL	Occupational Exposure Limit
OSHA	Occupational Safety & Health Administration (USA)
PNEL	Predicted No Effect level
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
TWAEV	Time Weighted Average Exposure Values

16.3 Key Literature References and Sources of Data

GESTIS

16.4 Classification for mixtures and used evaluation method according to regulation (EC) 1207/2008 [CLP]

No tests conducted.

16.5 Relevant R-, S-, and EUH- Phrases

Risk Phrases

R48/R20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R40	Limited evidence of a carcinogenic effect
R42/43	May cause sensitization by inhalation and skin contact
R36/37/38	Irritating to eyes, respiratory system and skin
R20	Harmful by inhalation

Safety Phrases

S38	In case of insufficient ventilation, wear suitable respiratory equipment.
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16.6 Training Advice

Follow supplied instructions carefully.

16.7 Further Information

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