

Coghlan's Ltd.

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian NOHSC, Japanese, SPRING Singapore Korean and European Union Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: # 0150 FIRE LIGHTERS

SYNONYMS: None

CHEMICAL FAMILY NAME: Wood Fiber Impregnated with Petroleum-Based Fluid

FORMULA: Not Applicable

PRODUCT USE:	Fire Starter
MANUFACTURED/SUPPLIED FOR:	COGHLAN'S LTD.
ADDRESS:	121 Irene Street Winnipeg, Manitoba, Canada R3T 4C7
U.N. NUMBER:	UN 1944
U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:	4.1
AUSTRALIAN HAZCHEM CODE:	1Z
BUSINESS PHONE:	1-204-284-9550 (8: 30 am to 4:45 pm Canadian Standard Time)
EMERGENCY PHONE:	1-800-451-8346 (24 hours)
EMAIL ADDRESS:	justinv@coghlan.mb.ca

NOTE: ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, Canadian WHMIS [Controlled Products Regulations], European Union [Regulation (EC) 1907/2006 Annex II], Australian [NOHSC:2011 (2003)], Singapore SPRING Standard Korean Standards and Japanese Industrial Standard (JIS Z 7250: 2005) required information is included in appropriate sections based on the U.S. ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

2. HAZARD IDENTIFICATION

EU/AUSTRALIAN LABELING AND CLASSIFICATION: This product meets the definition of Irritant as defined by the European Union Council Directive 67/548/EEC and subsequent Directives and by the Australian National Occupational Health and Safety Commission [NOHSC(1008:2004)].

Classification: Flammable

Risk Phrases: R: 10

Safety Phrases: S: 2; S: 14; S: 15; S: 16

Annex II Hazard Symbols: F

See Section 16 for full text of Risk and Safety Phrases

EMERGENCY OVERVIEW: Product Description: This product is a natural organic wood fiber impregnated with a combustible, petroleum-based material. **Health Hazards:** Due to the form of this product, minimal health hazard is expected from inhalation, skin or eye contact. Inhalation of fumes or smoke from burning product may be irritating. Contact with ignited product may cause burns. Prolonged skin contact may cause skin irritation or dermatitis from the petroleum-based material. **Flammability Hazards:** This product is combustible and will readily ignite when exposed to spark or direct flame. **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** Although this product is not expected to cause significant harm if released to the environment, all intentional and accidental release should be avoided. **Emergency Response Procedures:** Emergency responders must wear the proper personal protective equipment (and have appropriate fire-suppression equipment) suitable for the situation to which they are responding.

3. COMPOSITION and INFORMATION ON INGREDIENTS

Hazardous Ingredients:	CAS #	EINECS #	Japanese ENC Inventory #	AICS Inventory Listing	Korean ECL #	WT %	Hazard Symbol; Risk Phrases
Natural Organic Wood Fiber Impregnated with a Combustible, Petroleum-Based Material Tip Prepared with a Friction-Sensitive Igniter			Mixture			100%	SELF CLASSIFICATION Hazard Classification: F Risk Phrases: R: 10

See Section 16 for full text of Ingredient Risk and Safety Phrases

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Remove or cover gross contamination to avoid exposure to rescuers. Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of label and MSDS to health professional with victim.

INHALATION: If fumes or smoke from this product are inhaled, remove victim to fresh air. Seek medical attention if adverse effect continues after removal to fresh air.

SKIN EXPOSURE: If skin contact results in adverse effect, begin decontamination with running water. Minimum flushing is for 20 minutes. Do not interrupt flushing. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Contaminated individual must seek medical attention if adverse effect occurs after flushing.

4. FIRST-AID MEASURES (Continued)

EYE EXPOSURE: If this particles from this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 20 minutes. Do not interrupt flushing. Contaminated individual must seek immediate medical attention if adverse effect occurs after flushing.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directly by medical personnel. Have victim rinse mouth with water or give several cupfuls of water, if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.

THERMAL BURNS: In the event of burns from contact, if burns are first degree or second degree with closed blisters, flush area with cold water until pain subsides. Apply loose, moist, sterile dressings, and bandage. Treat for shock. If burns are second degree with open blisters or third degree, apply loose, dry, sterile dressings and bandage. Treat for shock. Transport victim immediately to hospital or emergency center. Burns over an area of 20% or more of body are life-threatening; medical attention should be immediately sought.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin or respiratory conditions may be aggravated by overexposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: 177°C (350°F)

AUTOIGNITION TEMPERATURE: 177°C (350°F)

FLAMMABLE LIMITS (in air by volume, %): Not applicable.

FIRE EXTINGUISHING MATERIALS: Extinguish fires involving this product can be extinguished using carbon dioxide, foam, or dry chemical. Water should be used with care so as to avoid spreading burning product and fire.

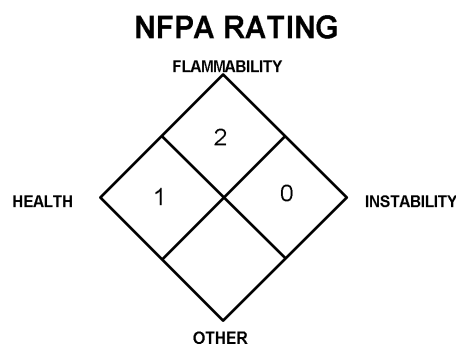
FIRE EXTINGUISHING MATERIALS NOT TO BE USED: None known.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is a combustible solid. This substance must be viewed as a potentially capable of causing temporary incapacitation. If involved in a fire, this product will release smoke, acrid vapors and toxic gases (e.g. carbon, oxides of nitrogen, trace amounts of sulfur dioxide).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: If dusts of this product are created, they may be ignited by static discharge.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. If protective equipment is contaminated by this product, it should be thoroughly washed with running water prior to removal of SCBA respiratory protection. Firefighters whose protective equipment becomes contaminated should thoroughly shower with warm, soapy water and should receive medical evaluation if they experience any adverse effects. Move fire-exposed containers, if it can be done without risk to firefighters. If possible, prevent runoff water used for cooling containers from entering storm drains, bodies of water, or other environmentally sensitive areas.



Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

6. ACCIDENTAL RELEASE MEASURES

RELEASE RESPONSE: Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. Eliminate all sources of ignition before cleanup begins.

Small Spills: Pick-up or sweep-up spilled material avoiding generation of dusts, wearing gloves, goggles and apron. Do not use water to clean area spill. Place spilled material in appropriate container for disposal, sealing tightly. Remove all residue before decontamination of spill area.

Large Spills: Minimum Personal Protective Equipment should be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus**. For large spills, dike or otherwise contain spill and sweep-up or vacuum spilled material with explosion-proof vacuum, avoiding generation of dusts. Decontaminate the area thoroughly with flooding quantities of water. Monitor area for combustible vapor levels from spill and confirm product levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

Prevent material from entering sewer or confined spaces. Place all spill residue in an appropriate container and seal. Do not mix with wastes from other materials. For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). If necessary, decontaminate spill-response equipment and spill area with soap and water solution.

7. HANDLING and USE

SAFE WORK AND HYGIENE PRACTICES: Practice good hygiene when handling these products. Wash thoroughly after handling these products. Eye wash stations or safety showers should be near areas where these products are stored or handled in event of particulate matter entering the eyes. As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing airborne dusts generated by this product.

SPECIAL USE PROCEDURES: Under no circumstances must this product be used to ignite any flammable liquid such as petrol, industrial solvent, etc., as this creates serious hazard of flashback and spread of fire to surrounding materials, as well as present a burn hazard. When striking product against friction strip, ensure it is done with a smooth and steady stroke away from body and close to medium to be set alight.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Keep containers tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, or sources of intense heat. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Containers should be separated from oxidizing materials by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high having a fire-resistance rating of at least 0.5 hours.

Storage areas should be made of fire resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Storage areas must meet national electrical codes for Class 1 Hazardous Areas. Refer to NFPA 654, *Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids* for additional information on storage. Have appropriate extinguishing equipment in the storage area (e.g., sprinkler system, portable fire extinguishers). Use closed ventilation systems, approved equipment, and appropriate electrical systems. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged.

SPECIFIC USE(S): This product is used for starting fires. Follow all industry standards for use of this product.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely, if necessary. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures and appropriate Canadian standards.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation is necessary when using this product.

EXPOSURE LIMITS:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	IDLH mg/m ³	
Wood Fiber impregnated with Petroleum-Based material Exposure limits are for wood dusts		1 (inhalable fraction)	NE	NE	NE	NE	NE	NE	NE

NE = Not Established.

See Section 16 for Definitions of Other Terms Used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-07), standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand/body protection, and CR 13464:1999 for face/eye protection), standards of Australia (including AS/NZS 1715:1994 for respiratory PPE, AS/NZS 4501.2:2006 for protective clothing, AS/NZS 2161.1:2000 for glove selection, and AS/NZS 1336:1997 for eye protection), or standards of Japan (including JIS T 8116:2005 for glove selection, JIS T 8150:2006 for respiratory PPE, JIS T 8147:2003 for eye protectors, and JIS T 8030:2005 for protective clothing) and standards of Korean and Singapore. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: None normally needed under normal circumstances of use and handling. If use and handling creates dusts or fumes, maintain airborne contaminant concentrations below exposure limits listed above if applicable. If respiratory protection is needed, use only respiratory protection authorized in appropriate country standards as referenced above. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: None normally needed under normal circumstances of use and handling. If use or handling creates dusts, splinters or other particulates, use safety glasses. If necessary, refer to appropriate country standards as referenced above.

HAND PROTECTION: None normally needed under normal circumstances of use and handling. If prolonged skin contact is expected, use butyl rubber, Teflon, Viton, Saranex, or Responder gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS. If necessary, refer to appropriate country standards as referenced above.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

BODY PROTECTION: None normally needed under normal circumstances of use and handling. Use body protection appropriate for task. If necessary, refer to appropriate country standards as referenced above. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-M1984, *Protective Footwear*.

9. PHYSICAL and CHEMICAL PROPERTIES

FLAMMABLE LIMITS (in air by volume, %): Not applicable.

AUTOIGNITION TEMPERATURE: 177°C (350°F) **FLASH POINT:** 177°C (350°F)

VAPOR DENSITY (water = 1): Not applicable.

SPECIFIC VOLUME: Not applicable.

BOILING POINT: Not applicable.

FREEZING/MELTING POINT: Not applicable.

SPECIFIC GRAVITY (water = 1): Not established.

pH: Not applicable.

SOLUBILITY IN WATER: Insoluble.

MOLECULAR WEIGHT: Not applicable.

EVAPORATION RATE (n-BuAc = 1): Not applicable.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE: Not applicable.

LOG COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

APPEARANCE, ODOR AND COLOR: This product is a natural organic wood fiber impregnated with a combustible, petroleum-based material.

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance may act as an identifying property for this material in event of an accidental release.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Combustion: Thermal decomposition products include oxides of carbon, oxides of nitrogen, trace amounts of sulfur dioxide. Hydrolysis: None.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to extreme temperatures.

11. TOXICOLOGICAL INFORMATION

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The symptoms of overexposure to this product, via route of entry, are as follows:

INHALATION: This product presents no hazard by inhalation under normal circumstances of use and handling. Inhalation of smoke generated when ignited may be irritating to the respiratory system.

CONTACT WITH SKIN or EYES: Under normal circumstances of use and handling this product presents no hazard to the eyes. If particles from the product enter the eyes, mechanical irritation may occur. Repeated skin contact may cause dermatitis (dry, red skin).

SKIN ABSORPTION: It is not currently known whether this compound can be absorbed via intact skin. Skin contact should be minimized.

INGESTION: Ingestion is not anticipated to be a likely route of exposure to this product. If this product is swallowed, stomach pains and vomiting may occur. Ingestion of large quantity may cause renal failure.

INJECTION: Not expected to be a significant route of exposure.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Overexposure to this product may cause the following health effects:

ACUTE: Inhalation of smoke from ignition of this product may cause irritation. Particles entering the eyes may cause mechanical irritation. Ignition may result in burns. Ingestion of this product may be harmful.

CHRONIC: Prolonged skin contact may cause dermatitis.

TARGET ORGANS: ACUTE: Skin and eyes. CHRONIC: Skin.

TOXICITY DATA: Toxicological data for components of this product are not applicable to the product.

CARCINOGENIC POTENTIAL: Components of this product are not found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, IARC, GERMAN MAK, and ACGIH, and are therefore not considered to be, nor suspected to be, cancer-causing agents by these agencies.



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
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FLAMMABILITY HAZARD	(RED)	2
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PHYSICAL HAZARD	(YELLOW)	0
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PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
3 = Serious 4 = Severe * = Chronic hazard

11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT: Smoke from ignition may be irritating to the respiratory system. Prolonged skin contact may cause dermatitis.

SENSITIZATION TO THE PRODUCT: No information is available on possible human sensitization effects of the components of this product.

REPRODUCTIVE TOXICITY INFORMATION: This product presents no hazard to the human reproductive system.

Mutagenicity: Not applicable.

Embryotoxicity: Not applicable.

Teratogenicity: Not applicable.

Reproductive Toxicity: Not applicable.

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no ACGIH Biological Exposure Indices (BEIs) determined for the components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil. It is not expected to be mobile.

PERSISTENCE AND BIODEGRADABILITY: No specific data are available this material. It is expected to biodegrade over time.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential.

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All release to terrestrial, atmospheric and aquatic environments should be avoided.

OTHER ADVERSE EFFECTS: This compound is not listed as having ozone depletion potential.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55 gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials. Dispose of in accordance with applicable Federal, State, and local procedures and standards

U.S. EPA WASTE NUMBER: Wastes of this material should be tested to see if they meet the criteria for D001 (Characteristic-Ignitability).

EWC WASTE CODE: Not applicable.

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION 49 CFR 172.101: This material is classified as Dangerous Goods, per regulations of the DOT. The following classification must be used when product is shipped in excess of 23 kg (50 lb), outer packaging.

PROPER SHIPPING NAME:	Matches, safety
HAZARD CLASS NUMBER and DESCRIPTION:	4.1 (Flammable Solid)
UN IDENTIFICATION NUMBER:	UN 1944
PACKING GROUP:	III
DOT LABEL(S) REQUIRED:	Class 4.1 (Flammable Solid)
EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2008:	133

MARINE POLLUTANT: The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

Per 49 CFR 173.186, limited quantities of this product when the inner packagings of product are not over 5.0 kg (11 lb) net capacity each, are not subject to the above requirements, except marking. The total weight of the outer packaging cannot exceed 23 kg (50 lb).

PROPER SHIPPING NAME:	Consumer commodity
HAZARD CLASS NUMBER and DESCRIPTION:	ORM-D
UN IDENTIFICATION NUMBER:	Not Applicable
PACKING GROUP:	Not Applicable
DOT LABEL(S) REQUIRED:	None
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2008):	171

14. TRANSPORTATION INFORMATION (Continued)

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is classified as Dangerous Goods, per regulations of Transport Canada. The following classification must be used when product is shipped in excess of 23 kg (50 lb), outer packaging.

PROPER SHIPPING NAME:	Matches, safety
HAZARD CLASS NUMBER and DESCRIPTION:	4.1 (Flammable Solid)
UN IDENTIFICATION NUMBER:	UN 1944
PACKING GROUP:	III
HAZARD LABEL(S) REQUIRED:	Class 4.1 (Flammable Solid)
SPECIAL PROVISIONS:	None
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX:	5
ERAP INDEX:	None
PASSENGER CARRYING SHIP INDEX:	None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX:	25
MARINE POLLUTANT:	Not Applicable

Per 1.17 SOR2008-34 limited quantities of this product when the inner packagings of product are not over 5.0 kg (11 lb) net capacity each, are not subject to the above requirements, except marking. The total weight of the outer packaging cannot exceed 30 kg (66 lb). Refer to SOR2008-34 for any further requirements.

PROPER SHIPPING NAME:	Consumer commodity
HAZARD CLASS NUMBER and DESCRIPTION:	4.1 (Flammable Solid)
UN IDENTIFICATION NUMBER:	UN 1944
PACKING GROUP:	Not Applicable
HAZARD LABEL(S) REQUIRED:	Class 4.1 (Flammable Solid)
SPECIAL PROVISIONS:	None
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX:	5
ERAP INDEX:	None
PASSENGER CARRYING SHIP INDEX:	None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX:	25
MARINE POLLUTANT:	Not Applicable

In addition, each outer container must be marked as follows:

- (a) each means of containment is marked on one side, other than a side on which it is intended to rest or to be stacked during transport, with
 - (i) the words "Limited Quantity" or "quantité limitée",
 - (ii) the abbreviation "Ltd. Qty." or "quant. ltée", or
 - (iii) the words "Consumer Commodity" or "bien de consommation"; and
- (b) the words or abbreviations are visible and legible and displayed on a contrasting background.

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is classified as dangerous goods, per the International Air Transport Association. The following classification must be used when product is shipped in excess of 23 kg (50 lb), outer packaging.

UN IDENTIFICATION NUMBER:	UN 1944
PROPER SHIPPING NAME:	Matches, safety
HAZARD CLASS NUMBER and DESCRIPTION:	4.1 (Flammable Solid)
PACKING GROUP:	III
HAZARD LABEL(S) REQUIRED:	Class 4.1 (Flammable Solid)
PASSENGER & CARGO AIRCRAFT PACKING INSTRUCTION:	404
PASSENGER & CARGO AIRCRAFT MAXIMUM NET QUANTITY/PKG:	25 kg
CARGO AIRCRAFT ONLY PACKING INSTRUCTION:	404
CARGO AIRCRAFT ONLY MAXIMUM NET QUANTITY/PKG:	100 kg
SPECIAL PROVISIONS:	A125
ERG CODE:	3L

Per Section 2.8, limited quantities of this product can be shipped when the inner packagings of product do not exceed 50 books, are not subject to the above requirements, except marking. The maximum quantity of each outer package cannot exceed 10 kg. The gross weight of the completed package cannot exceed 30 kg (66 lb). Other packaging requirements apply as per packing instruction Y404. Packages must be marked "LIMITED QUANTITY" or 'LTD QTY'.

UN IDENTIFICATION NUMBER:	UN 1944
PROPER SHIPPING NAME:	Matches, safety
HAZARD CLASS NUMBER and DESCRIPTION:	4.1 (Flammable Solid)
PACKING GROUP:	Not Applicable
HAZARD LABEL(S) REQUIRED:	see note below
LIMITED QUANTITY PASSENGER & CARGO AIRCRAFT PACKING INSTRUCTION:	Y404
LIMITED QUANTITY PASSENGER & CARGO AIRCRAFT MAXIMUM NET QUANTITY/PKG:	10 kg
SPECIAL PROVISIONS:	A125
ERG CODE:	3L

Note: Packages containing dangerous goods in limited quantities need not be marked with the proper shipping name of the contents, provided they are marked with the UN number of the contents (preceded by the letters 'UN') placed within a diamond. Combination packages (when allowed) must have the relevant UN number of each hazardous material within the diamond. Other details are contained in Section 2.8.

14. TRANSPORTATION INFORMATION (Continued)

INTERNATIONAL MARITIME ORGANIZATION (IMO): This product is classified as follows, per rules of the IMO. The following classification must be used when product is shipped in excess of 25 kg, outer packaging.

UN IDENTIFICATION NUMBER: UN 1944
PROPER SHIPPING NAME: Matches, safety
CLASS: 4.1
SUBSIDIARY RISK: None
PACKING GROUP: III
SPECIAL PROVISIONS: 293, 294
HAZARD LABEL(S) REQUIRED: Class 4.1 (Flammable Solid)
LIMITED QUANTITIES: 5 kg
PACKING INSTRUCTION: P407
EmS: F-A, S-Q
STOWAGE AND SEGREGATION: Category A

Per Chapter 3.3, limited quantities of this product when the inner packagings of product are not over 5.0 kg (11 lb) net capacity each, are not subject to the above requirements, except marking when packaged per packing instruction P407. The total weight of the outer packaging cannot exceed 25 kg. Packages must be marked "Limited Quantity".

UN IDENTIFICATION NUMBER: LQ UN 1944
PROPER SHIPPING NAME: Matches, safety
CLASS: 4.1
SUBSIDIARY RISK: None
PACKING GROUP: Not Applicable
SPECIAL PROVISIONS: 293, 294
HAZARD LABEL(S) REQUIRED: None
LIMITED QUANTITIES: 293, 294
PACKING INSTRUCTION: P407
EmS: F-A, S-Q
STOWAGE AND SEGREGATION: Category A

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This is classified as follows, per regulations of the U.N. Economic Commission for Europe. The following classification must be used when product is shipped in excess of 30 or 20 kg, outer packaging (see below).

UN NUMBER: UN 1944
NAME AND DESCRIPTION: Matches, safety
CLASS: 4.1
CLASSIFICATION CODE: F1
PACKING GROUP: III
LABELS: 4.1
SPECIAL PROVISIONS: 293
LIMITED QUANTITIES: LQ9
PACKING INSTRUCTION: P407, R001
MIXED PACKING INSTRUCTION: MP11
HAZARD IDENTIFICATION NUMBER: None

Per Part 3 and Chapter 3.4, limited quantities of this product when the inner packagings of product are not over 6.0 kg (combination packaging) or 3 kg (in shrink-wrapped or stretch-wrapped trays) net capacity each, are not subject to the above requirements, except marking. The total weight of the outer packaging cannot exceed 30 kg for combination packagings and 20 kg for shrink-wrapped packagings. The special UN label, per 3.4.4, must be used on shipments of Limited Quantities.

UN NUMBER: LQ UN 1944
NAME AND DESCRIPTION: Matches, safety
CLASS: 4.1
CLASSIFICATION CODE: F1
PACKING GROUP: Not Applicable
LABELS: UN Limited Quantity Label (see 3.4.4)
SPECIAL PROVISIONS: 293
LIMITED QUANTITIES: LQ9
PACKING INSTRUCTION: P407, R001
MIXED PACKING INSTRUCTION: MP11
HAZARD IDENTIFICATION NUMBER: None

14. TRANSPORTATION INFORMATION (Continued)

AUSTRALIAN FEDERAL OFFICE OF ROAD SAFETY CODE FOR THE TRANSPORTATION OF DANGEROUS GOODS

BY ROAD OR RAIL: This product is considered as dangerous goods, per regulations of the Federal Office of Road Safety. The following classification must be used when product is shipped in excess of 30 kg, outer packaging.

U.N. NUMBER: UN 1944
NAME OF SUBSTANCE: Matches, safety
HAZARD CLASS: 4.1
PACKING GROUP: III
LABELS: Class 4.1 (Flammable Solid)
SPECIAL PROVISIONS: 293, 294
LIMITED QUANTITIES: 5 kg
HAZCHEM CODE: 1Z
PACKAGING CODE: P407

Per Chapter 3.4, limited quantities of this product when the inner packagings of product are not over 5.0 kg (11 lb) net capacity each, are not subject to the above requirements, except marking when packaged per packing instruction P407. The total weight of the outer packaging cannot exceed 25 kg. Shipments by road do not require the words 'Limited Quantity' to be marked on outer packagings; however, shipments by air or sea are required to be marked "Limited Quantity' or Ltd. Qty'.

U.N. NUMBER: LQ UN 1944
NAME OF SUBSTANCE: Matches, safety
HAZARD CLASS: 4.1
PACKING GROUP: Not Applicable
LABELS: see note below
SPECIAL PROVISIONS: 293, 294
HAZCHEM CODE: Not Applicable
PACKAGING CODE: P407

Note: Packages containing dangerous goods in limited quantities need not be marked with the proper shipping name of the contents, provided they are marked with the UN number of the contents (preceded by the letters 'UN') placed within a diamond. Combination packages (when allowed) must have the relevant UN number of each hazardous material within the diamond. Other details are contained in Chapter 3.4.8.

15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: Components of this product are on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

- This product is not subject to the reporting requirements of Section 112(r) of the Clean Air Act.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals (29 CFR 1910.119) are not applicable to this product.
- This product does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- This product is not listed as Regulated Substances per 40 CFR, Part 68 of the Risk Management for Chemical Release Prevention.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The components of this product are not on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS: The components of this product are not on the CEPA Priority Substances Lists.

CANADIAN WHMIS CLASSIFICATION AND SYMBOLS: This compound would be classified as a Controlled Product, Hazard Class B4, Flammable Solids as per the Controlled Product Regulations.



15. REGULATORY INFORMATION (Continued)

ADDITIONAL UNITED STATES REGULATIONS:

ADDITIONAL EUROPEAN UNION REGULATIONS:

EU LABELING AND CLASSIFICATION: This product is classified as F (Flammable) as defined by the European Union Council Directive 67/548/EEC or subsequent Directives.

EU CLASSIFICATION: F [Flammable]

EU RISK PHRASES: [R: 10]: Flammable.

EU SAFETY PHRASES: [S: 2]: Keep away from children. [S: 14]: Keep away from oxidizers. [S: 15]: Keep away from heat. [S: 16]: Keep away from sources of ignition - No smoking.

EU SYMBOL:



ADDITIONAL SINGAPORE REGULATIONS:

CODE OF PRACTICE ON POLLUTION CONTROL REQUIREMENTS: No information is available on the components of this product are subject to the requirements under the Singapore Code of Practice on Pollution Control.

ADDITIONAL AUSTRALIAN REGULATIONS:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: No information is available on the components of this product as being listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

ADDITIONAL JAPANESE REGULATIONS:

JAPANESE EXISTING AND NEW CHEMICAL SUBSTANCE LIST (ENCS) STATUS: No information is available on the components of this product as being listed on the Japanese ENCS List.

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: No information is available on the components of this product as being listed as a Class I Specified Chemical Substance, Class II Specified Chemical Substance, or Designated Chemical Substance by the Japanese MITI.

JAPANESE POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: The components of this product are not on the Japanese Lists of Poisonous and Deleterious Substances.

ADDITIONAL KOREAN REGULATIONS:

KOREAN EXISTING CHEMICALS LIST (ECL) STATUS: No information is available on the components of this product as being listed on the Korean ECL List.

16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
PO 1961, Hilo, HI 96721, (800) 441-3365 • (808) 469-4846
Fax on Demand: 1-800/231-1366

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Coghlan's Ltd.'s knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

DFG MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. 2: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals.

DFG MAK Germ Cell Mutagen Categories (continued): 3A: Substances which have been shown to induce genetic damage in germ cells of human or animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. 3B: Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are no *in vivo* data, but which are clearly mutagenic *in vitro* and structurally related to known *in vivo* mutagens. 4: Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) 5: Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

EXPOSURE LIMITS IN AIR (continued):

DFG MAK Pregnancy Risk Group Classification: **Group A:** A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can cause damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend.

IDLH-Immediately Dangerous to Life and Health: This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

LOQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

DEFINITIONS OF TERMS (Continued)

EXPOSURE LIMITS IN AIR (continued):

NIOSH RELS: NIOSH's Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule ([Federal Register](#): 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD: 0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat:* < 20 mg/L; 1 (Slight Hazard: Minor reversible injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L; 2 (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, < 25. *Oral Toxicity LD₅₀ Rat:* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L; 3 (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.05-0.5 mg/L; 4 (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation:* Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* ≤ 0.05 mg/L).

FLAMMABILITY HAZARD: 0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes; 1 (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; 2 (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of coarse dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); 3 (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); 4 (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric]).

PHYSICAL HAZARD: 0 (Water Reactivity: Materials that do not react with water. Organic Peroxides: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives:* Substances that are Non-Explosive. *Unstable Compressed Gases:* No Rating. *Pyrophorics:* No Rating. *Oxidizers:* No "0" rating allowed. *Unstable Reactives:* Substances that will not polymerize, decompose, condense or self-react);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

PHYSICAL HAZARD (continued): 1 (Water Reactivity: Materials that change or decompose upon exposure to moisture. Organic Peroxides: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives:* Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases:* Pressure below OSHA definition. *Pyrophorics:* No Rating. *Oxidizers:* Packaging Group III; *Solids:* any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. *Liquids:* any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives:* Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); 2 (Water Reactivity: Materials that may react violently with water. Organic Peroxides: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives:* Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases:* Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packaging Group II *Solids:* any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. *Liquids:* any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Reactives:* Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); 3 (Water Reactivity: Materials that may form explosive reactions with water. Organic Peroxides: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives:* Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases:* Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packaging Group I *Solids:* any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. *Liquids:* Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives:* Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); 4 (Water Reactivity: Materials that react explosively with water without requiring heat or confinement. Organic Peroxides: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives:* Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases:* No Rating. *Pyrophorics:* Add to the definition of Flammability "4". *Oxidizers:* No "4" rating. *Unstable Reactives:* Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: 0 (Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. 1 (Materials that, under emergency conditions, can cause significant irritation): gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. 2 (Materials that, under emergency conditions, can cause temporary incapacitation or residual injury): gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers.

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HEALTH HAZARD (continued): 3 (materials that, under emergency conditions, can cause serious or permanent injury): gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/l but less than or equal to 2 mg/l. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. 4 (Materials that, under emergency conditions, can be lethal): gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: 0 Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand; Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. 1 Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the *Method of Testing for Sustained Combustibility*, per 49 CFR 173, Appendix H or the UN *Recommendation on the Transport of Dangerous Goods, Model Regulations* (current edition) and the related *Manual of Tests and Criteria* (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed up flash point of the solvent. Most ordinary combustible materials. 2 Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. 3 Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. 4 Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. 1 Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. 2 Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100 W/mL. 3 Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. 4 Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the national fire protection association (NFPA). **Flash point** - minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature:** the minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program; **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

ECOLOGICAL INFORMATION:

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}**, and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA:

This section explains the impact of various laws and regulations on the material. **ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.