



Extruded Rifle Powders
SAFETY DATA SHEET
February 2022

The following smokeless powder is
distributed by Hodgdon Powder Company.

Benchmark® (**EX-2016090003**)

1.4C EX Approvals in bold parenthesis

Propellant BM2

Australian Munitions (Mulwala)

Chemwatch Hazard Alert Code: 3

Chemwatch: 4693-84

Version No: 5.1.1.1

Safety Data Sheet according to WHS and ADG requirements

Issue Date: 31/01/2019

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S.GHS.AUS.EN

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

Product Identifier

Product name	Propellant BM2
Synonyms	AR2219; H322; AR2210 V02
Proper shipping name	POWDER, SMOKELESS
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Propellant for use in centrefire ammunition.
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Details of the supplier of the safety data sheet

Registered company name	Australian Munitions (Mulwala)
Address	Bayley Street NSW Australia
Telephone	03 5742 2200
Fax	Not Available
Website	www.thalesgroup.com.au
Email	Not Available

Emergency telephone number

Association / Organisation	Thales Australia Mulwala Facility
Emergency telephone numbers	03 5742 2200
Other emergency telephone numbers	Not Available

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

HAZARDOUS CHEMICAL. DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

CHEMWATCH HAZARD RATINGS

	Min	Max	
Flammability	1		
Toxicity	2		0 = Minimum
Body Contact	2		1 = Low
Reactivity	3		2 = Moderate
Chronic	3		3 = High
			4 = Extreme

Poisons Schedule	Not Applicable
Classification ^[1]	Explosive Division 1.3, Acute Toxicity (Oral) Category 4, Acute Toxicity (Dermal) Category 4, Acute Toxicity (Inhalation) Category 4, Germ cell mutagenicity Category 2, Carcinogenicity Category 1B, Reproductive Toxicity Category 2, Specific target organ toxicity - single exposure Category 1, Specific target organ toxicity - repeated exposure Category 2, Chronic Aquatic Hazard Category 2
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HSIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

Label elements

Hazard pictogram(s)	
SIGNAL WORD	DANGER

Hazard statement(s)

H203	Explosive; fire, blast or projection hazard.
H302	Harmful if swallowed.

Continued...

H312	Harmful in contact with skin.
H332	Harmful if inhaled.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H370	Causes damage to organs.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P230	Keep wetted with phlegmatizer.
P250	Do not subject to grinding/shock/sources of friction.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P240	Ground/bond container and receiving equipment.

Precautionary statement(s) Response

P307+P311	IF exposed: Call a POISON CENTER or doctor/physician.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
P370+P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P373	DO NOT fight fire when fire reaches explosives.
P391	Collect spillage.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.

Precautionary statement(s) Storage

P405	Store locked up.
P401	Store according to local regulations for explosives.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
9004-70-0	>60	<u>nitrocellulose</u>
121-14-2	<15	<u>2,4-dinitrotoluene</u>
122-39-4	<1	<u>diphenylamine</u>
Not Available	<5	Ingredients determined not to be hazardous

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor.

Inhalation	<ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay.
Ingestion	<ul style="list-style-type: none"> ▶ IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. ▶ For advice, contact a Poisons Information Centre or a doctor. ▶ Urgent hospital treatment is likely to be needed. ▶ In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. ▶ If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. ▶ If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. <p>Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:</p> <ul style="list-style-type: none"> ▶ INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. <p>NOTE: Wear a protective glove when inducing vomiting by mechanical means.</p>

Indication of any immediate medical attention and special treatment needed

Symptoms of vasodilation and reflex tachycardia may present following organic nitrate overdose; most organic nitrates are extensively metabolised by hydrolysis to inorganic nitrites. Organic nitrates and nitrites are readily absorbed through the skin, lungs, mucosa and gastro-intestinal tract.

Periodic medical examinations, including a complete blood count and liver function tests, are recommended for workers with dinitrotoluene (DNT) exposure.

In male workers DNT metabolites produced as a result of exposure in a single shift are largely excreted in the urine by the beginning of the following shift. Metabolites include dinitrobenzoic acid (52%), 2-amino-4-nitrobenzoic acid (37.2) and dinitrobenzol glucuronide (9.5%).

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- DANGER:** Deliver media remotely.
- ▶ For minor fires: Flooding quantities only.
 - ▶ For large fires: **Do not attempt to extinguish.**

Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	<p>WARNING: EXPLOSIVE MATERIALS / ARTICLES PRESENT!</p> <ul style="list-style-type: none"> ▶ Evacuate all personnel and move upwind. ▶ Prevent re-entry. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ May be explosively reactive, detonate and release much heat. ▶ Wear full-body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage and fire effluent from entering drains or watercourses. ▶ Fight from safe distances and protected locations. ▶ Use flooding quantities of water. ▶ DO NOT approach containers suspected to be hot. <p>For Division 1.3 Explosives Evacuation is required in case of Emergency. For quantities of up to:</p> <ul style="list-style-type: none"> ▶ 1000 kg, the evacuation distance is 100 metres ▶ 5000 kg, the evacuation distance is 150 metres ▶ 20000 kg, the evacuation distance is 200 metres ▶ 40000 kg, the evacuation distance is 250 metres
Fire/Explosion Hazard	<p>WARNING: EXPLOSION HAZARD!</p> <ul style="list-style-type: none"> ▶ Combustible. ▶ Detonation may occur from heavy impact or excessive heating. ▶ Mixing with incompatible chemicals may cause expansion, decomposition or detonation. ▶ Heat affected containers remain hazardous. ▶ Explosives can supply own oxygen for combustion and smothering action of foam or dry chemical may be ineffective. ▶ Combustion or decomposition produces oxides of nitrogen (NOx), carbon monoxide (CO) and carbon dioxide (CO2).
HAZCHEM	E

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	WARNING: EXPLOSIVE.
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Propellant BM2

	<p>BLAST and/or PROJECTION and/or FIRE HAZARD</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid inhalation of the material and avoid contact with eyes and skin. ▶ Wear impervious gloves and safety glasses. ▶ Remove all ignition sources. ▶ Use spark-free tools when handling. ▶ Sweep into non-sparking containers or barrels and moisten with water. ▶ Place spilled material in clean, sealable, labelled container for disposal. ▶ Flush area with large amounts of water. <p>Environmental hazard - contain spillage.</p>
<p>Major Spills</p>	<p>WARNING: EXPLOSIVE.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ May be violently or explosively reactive. ▶ Wear full body protective clothing with breathing apparatus. ▶ Consider evacuation (or protect in place). ▶ In case of transport accident notify Police, Emergency Authority, Competent Explosives Authority or Manufacturer. ▶ No smoking, naked lights, heat or ignition sources. ▶ Increase ventilation. <p>Environmental hazard - contain spillage.</p> <p>In the case of transport accident notify the State Police, State Explosives Inspector and the Manufacturer, Thales Mulwala Facility. Collect recoverable packages and segregate from loose, spilled material.</p>

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

<p>Safe handling</p>	<ul style="list-style-type: none"> ▶ Handle gently. Use good occupational work practice. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Avoid all personal contact, including inhalation. ▶ Avoid smoking, naked lights, heat or ignition sources. ▶ Explosives must not be struck with metal implements. ▶ Avoid mechanical and thermal shock and friction. ▶ Use in a well ventilated area. ▶ Avoid contact with incompatible materials. ▶ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ▶ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. ▶ Establish good housekeeping practices. ▶ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. ▶ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. ▶ Do not use air hoses for cleaning. ▶ Minimise dry sweeping to avoid generation of dust clouds.
<p>Other information</p>	<ul style="list-style-type: none"> ▶ Store cases in a well ventilated magazine licensed for the appropriate Class, Division and Compatibility Group. ▶ Rotate stock to prevent ageing. Use on FIFO (first in-first out) basis. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Store in a cool place in original containers. ▶ Keep containers securely sealed. ▶ No smoking, naked lights, heat or ignition sources. ▶ Store in an isolated area away from other materials. ▶ Keep storage area free of debris, waste and combustibles.

Conditions for safe storage, including any incompatibilities

<p>Suitable container</p>	<ul style="list-style-type: none"> ▶ All packaging for Class 1 Goods shall be in accordance with the requirements of the relevant Code for the transport of Dangerous Goods. ▶ Class 1 is unique in that the type of packaging used frequently has a very decisive effect on the hazard and therefore on the assignment to a particular division <p>Packaging for explosive substances shall meet the test requirements for Packaging Group II. Explosives Code Packing Instruction P114(b) or 114(b) General packaging provisions of 4.1.1, 4.1.3 and special provision 4.1.5 are to be met. For UN 0160, 0161 - If outer packaging is drum then inner packaging is not required. For UN 0160, 0161 - If outer packaging is 1A2 or 1B2 metal drums then drum construction shall be such that risk of explosion, by reason of increase by internal pressure from internal or external causes, is prevented. For UN 0077, 0132, 0234, 0235, 0236, packagings are to be lead free, otherwise: Inner Packagings: Bags: Paper Kraft, Plastics, Textiles - sift proof, Woven Plastic - sift proof Receptacles: Fibreboard, Metal, Paper, Plastic, Woven Plastic - sift proof Intermediate Packagings: Not necessary Outer Packagings: Boxes: Natural Wood (4C1), Natural Wood -sift proof (4C2), Plywood (4D), Reconstituted Wood (4F), Fibreboard (4G) Drums: Steel, Removable Head (1A2), Aluminium, removable head (1B2), Plywood (1D), Fibre (1G), Plastic, removable head (1H2)</p> <ul style="list-style-type: none"> ▶ Packaging as recommended by manufacturer. <p>Check containers are clearly labelled.</p>
<p>Storage incompatibility</p>	<ul style="list-style-type: none"> ▶ Avoid contact with other explosives, pyrotechnics, solvents, adhesives, paints, cleaners and unauthorized metals, plastics, packing equipment and materials. ▶ Avoid contamination with acids, alkalis, reducing agents, amines and phosphorus. <p>Store drums on end and invert them regularly (at least monthly) to avoid separation of the desensitising liquid. Keep dampened. Do NOT allow to dry.</p> <ul style="list-style-type: none"> ▶ Avoid reaction with oxidising agents, bases and strong reducing agents. ▶ Avoid strong acids, bases. ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA


Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	diphenylamine	Diphenylamine	10 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
2,4-dinitrotoluene	Dinitrotoluene, 2,4-	0.6 mg/m3	12 mg/m3	200 mg/m3
diphenylamine	Diphenylamine	30 mg/m3	180 mg/m3	220 mg/m3

Ingredient	Original IDLH	Revised IDLH
nitrocellulose	Not Available	Not Available
2,4-dinitrotoluene	Not Available	Not Available
diphenylamine	Not Available	Not Available

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <ul style="list-style-type: none"> ▶ Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area. ▶ Work should be undertaken in an isolated system such as a "glove-box". <p>Engineering controls for explosive substances are designed to reduce or eliminate fragmentation and/or blast effects either by suppression of the source of detonation or by protection at the exposed location, or both. Barricades, shields, contained detonation chambers, and "zero quantity-distance (Q-D)" magazines are examples of engineering controls.</p> <p>Engineering controls are designed and tested in a rigorous fashion. The construction of the engineering control must be carefully duplicated in field applications to assure it will function properly.</p> <p>It is thus imperative that engineering controls be built exactly in accordance with the design package, and that they be used only for the substances for which they are authorised.</p> <p>Adequate ventilation should be provided to keep dust concentrations below acceptable exposure limits. Discharge from the ventilation system should comply with applicable air pollution control regulations. Use a local mechanical ventilation system if needed, preferably with explosion proof construction, and with a suitable dust filter installed at inlet to suction piping to the system to prevent accumulation of explosive dust in ventilation piping and blower.</p>
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	<p>See Hand protection below</p> <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p>
Hands/feet protection	<p>Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> - frequency and duration of contact, - chemical resistance of glove material, - glove thickness and - dexterity <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> - Non-sparking or conductive footwear essential. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms. Conductive shoes should be stored in lockers close to the room in which they are worn. Personnel who have been issued conductive footwear should not wear them from

Propellant BM2

	their place of work to their homes and return.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] ▶ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] ▶ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely. ▶ Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. ▶ Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood. <p>For handling explosives or explosive compositions:</p> <ul style="list-style-type: none"> ▶ Wear close-fitting flame-protection treated clothing closed at the neck and sleeves. ▶ Cotton underwear, socks and conductive shoes are recommended to avoid human static discharge. <p>Manufacture may require:</p> <ul style="list-style-type: none"> ▶ Non-static flame retardant treated clothing ▶ Access to deluge Safety shower ▶ Barrier cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

Propellant BM2

Material	CPI
SARANEX-23	A

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	- -	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3 Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

If inhalation risk of exposure to dinitrotoluenes (DNT) or trinitrotoluenes (TNT) exists, wear air-supplied breathing apparatus. In confined spaces or at elevated temperatures, where mist of fumes are present, an impervious suit ventilated by a supply of clean, cooled air may be required.

- ▶ Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- ▶ The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- ▶ Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- ▶ Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- ▶ Use approved positive flow mask if significant quantities of dust becomes airborne.
- ▶ Try to avoid creating dust conditions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Dark grey tubules in various shapes and colours, insoluble in water, sinks in water.		
Physical state	Divided Solid	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	170
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	Not Available	Taste	Not Available

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Propellant BM2

Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Presence of shock and friction ▶ Presence of heat source and ignition source ▶ Product is considered stable under normal handling conditions. ▶ Stable under normal storage conditions. ▶ Hazardous polymerization will not occur. ▶ Avoid contact with other explosives, pyrotechnics, solvents, adhesives, paints, cleaners and unauthorized metals, plastics, packing equipment and materials. ▶ Avoid contamination with acids, alkalis, reducing agents, amines and phosphorus.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	<p>Inhalation of dusts, generated by the material, during the course of normal handling, may be harmful. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.</p>
Ingestion	<p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia).</p> <p>Symptoms include cyanosis (a bluish discoloration skin and mucous membranes) and breathing difficulties. Symptoms may not be evident until several hours after exposure.</p> <p>At about 15% concentration of blood methaemoglobin there is observable cyanosis of the lips, nose and earlobes. Symptoms may be absent although euphoria, flushed face and headache are commonly experienced. At 25-40%, cyanosis is marked but little disability occurs other than that produced on physical exertion. At 40-60%, symptoms include weakness, dizziness, lightheadedness, increasingly severe headache, ataxia, rapid shallow respiration, drowsiness, nausea, vomiting, confusion, lethargy and stupor. Above 60% symptoms include dyspnea, respiratory depression, tachycardia or bradycardia, and convulsions.</p>
Skin Contact	<p>Skin contact with the material may be harmful; systemic effects may result following absorption.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
Eye	<p>There is some evidence to suggest that this material can cause eye irritation and damage in some persons.</p>
Chronic	<p>Strong evidence exists that this substance may cause irreversible mutations (though not lethal) even following a single exposure.</p> <p>There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information.</p> <p>Harmful: danger of serious damage to health by prolonged exposure if swallowed.</p> <p>This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.</p> <p>Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.</p> <p>Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung.</p> <p>This material contains a substantial amount of polymer considered to be of low concern. These are classified under having MWs of between 1000 to 10000 with less than 25% of molecules with MWs under 1000 and less than 10% under 500; or having a molecular weight average of over 10000.</p>

Propellant BM2	TOXICITY	IRRITATION
	Not Available	Not Available
nitrocellulose	TOXICITY	IRRITATION
	Oral (rat) LD50: >5000 mg/kg ^[2]	Not Available

2,4-dinitrotoluene	TOXICITY	IRRITATION
	dermal (rat) LD50: >2500 mg/kg ^[2] Oral (rat) LD50: 268 mg/kg ^[2]	Skin (rabbit): 500 mg/24h - mild
diphenylamine	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg ^[2] Oral (rat) LD50: 1120 mg/kg ^[2]	Not Available

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

NITROCELLULOSE	No significant acute toxicological data identified in literature search.
2,4-DINITROTOLUENE	For dinitrotoluene (dinitromethylbenzene; DNT): In humans, heavy DNT exposure causes signs of methaemoglobin in the blood, which are reversible 2-3 days after removal from exposure. Signs of disturbances in liver function and exposure-dependent toxic effects on the kidney tubules were additionally found in exposed workers. In humans, DNT is absorbed after inhalation and skin contact, and is rapidly metabolized and excreted in urine. Acute toxicity: Animal testing indicates that DNT has relatively low acute toxicity by skin contact and moderately toxic by swallowing. DNT is not considered to irritate the human eye. There is inadequate data to evaluate the sensitizing potential of DNT. Repeat dose toxicity: Animal testing showed that chronic feeding of DNT led to blood changes (especially methaemoglobin in the blood), and toxicity to the liver, kidney, adrenal glands and testicles. No safe level has been defined. Genetic toxicity: Based on testing results, technical grade DNT shows the potential to cause genetic toxicity. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
	WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
DIPHENYLAMINE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production. Diphenylamine and all its substituted derivatives show slight to moderate acute toxicity. Overall, it is not considered to cause mutations or genetic toxicity. In animal testing, higher concentrations appear to reduce the number of viable offspring. ADI: 0.02 mg/kg/day NOEL: 1.5 mg/kg/day

Acute Toxicity	✓	Carcinogenicity	✓
Skin Irritation/Corrosion	✗	Reproductivity	✓
Serious Eye Damage/Irritation	✗	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✓
Mutagenicity	✓	Aspiration Hazard	✗

Legend: ✗ - Data either not available or does not fill the criteria for classification
✓ - Data available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Propellant BM2	Not Available	Not Available	Not Available	Not Available	Not Available
nitrocellulose	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	EC50	96	Algae or other aquatic plants	579mg/L	4
2,4-dinitrotoluene	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	1.416mg/L	3
	EC50	48	Crustacea	26.2mg/L	4
	EC50	96	Algae or other aquatic plants	0.08mg/L	4
	BCF	696.0	Fish	0.6135mg/L	4
	NOEC	504	Crustacea	0.02mg/L	4
diphenylamine	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	3.287mg/L	3
	EC50	48	Crustacea	0.31mg/L	4
	EC50	72	Algae or other aquatic plants	0.048mg/L	1
	BCF	768	Fish	0.0437mg/L	4

Continued...

NOEC	504	Crustacea	0.16mg/L	1
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Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms.
May cause long-term adverse effects in the aquatic environment.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
2,4-dinitrotoluene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 118.33 days)
diphenylamine	LOW (Half-life = 56 days)	Not Available

Bioaccumulative potential

Ingredient	Bioaccumulation
2,4-dinitrotoluene	HIGH (BCF = 2507)
diphenylamine	LOW (BCF = 253)

Mobility in soil

Ingredient	Mobility
2,4-dinitrotoluene	LOW (KOC = 363.8)
diphenylamine	LOW (KOC = 1887)


SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product. <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> ▶ Reduction ▶ Reuse ▶ Recycling ▶ Disposal (if all else fails) <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted.</p> <p>Small quantities of dinitrotoluenes (DNT) may be destroyed by burning, but the operation should be performed by a person competent in destruction of explosives.</p> <ul style="list-style-type: none"> ▶ Explosives which are surplus, deteriorated or considered unsafe for transport, storage or use shall be destroyed and the statutory authorities shall be notified. ▶ Explosives must not be thrown away, buried, discarded or placed with garbage. ▶ This material may be disposed of by burning or detonation but the operation must be performed under the control of a person competent in the destruction of explosives. <p>Disposal by detonation:</p> <ul style="list-style-type: none"> ▶ The explosives to be destroyed must be placed in direct contact with fresh priming charge in a hole which is at least 0.6 metre deep and then adequately stemmed. ▶ No detonators shall be inserted into defective explosives. ▶ Personnel must be evacuated to a safe distance prior to initiation/firing of the charge. <p>Disposal by burning:</p> <ul style="list-style-type: none"> ▶ Make a sawdust bed or trail adequate for the quantity of explosives to be burned, approximately 400 mm wide and 40 mm deep, upon which the explosive will be laid. ▶ If sawdust is not available, newspaper may be used. ▶ Normal precautions shall be taken to avoid the spread of fire. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Where in doubt contact the responsible authority.
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SECTION 14 TRANSPORT INFORMATION

Labels Required



Marine Pollutant	
HAZCHEM	E

Land transport (ADG)

UN number	0161
UN proper shipping name	POWDER, SMOKELESS
Transport hazard class(es)	Class : 1.3C Subrisk : Not Applicable
Packing group	Not Applicable
Environmental hazard	Not Applicable
Special precautions for user	Special provisions : Not Applicable Limited quantity : Not Applicable

Air transport (ICAO-IATA / DGR)

UN number	0161
UN proper shipping name	Powder, smokeless
Transport hazard class(es)	ICAO/IATA Class : 1.3C ICAO / IATA Subrisk : Not Applicable ERG Code : 1L
Packing group	Not Applicable
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions : Not Applicable Cargo Only Packing Instructions : Forbidden Cargo Only Maximum Qty / Pack : Forbidden Passenger and Cargo Packing Instructions : Forbidden Passenger and Cargo Maximum Qty / Pack : Forbidden Passenger and Cargo Limited Quantity Packing Instructions : Forbidden Passenger and Cargo Limited Maximum Qty / Pack : Forbidden

Sea transport (IMDG-Code / GGVSee)

UN number	0161
UN proper shipping name	POWDER, SMOKELESS
Transport hazard class(es)	IMDG Class : 1.3C IMDG Subrisk : Not Applicable
Packing group	Not Applicable
Environmental hazard	Marine Pollutant
Special precautions for user	EMS Number : F-B , S-Y Special provisions : Not Applicable Limited Quantities : 0

Transport in bulk according to Annex II of MARPOL and the IBC code
Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

|| NITROCELLULOSE(9004-70-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List
Australia Dangerous Goods Code (ADG Code) - Goods Too Dangerous To Be Transported
Australia Explosives Code (AE Code)
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix A
International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Chinese)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)

2,4-DINITROTOLUENE(121-14-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List
Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
IMO IBC Code Chapter 17: Summary of minimum requirements

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Chinese)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)

DIPHENYLAMINE(122-39-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List
Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes
Australia Exposure Standards
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix B (Part 3)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
GESAMP/EHS Composite List - GESAMP Hazard Profiles
IMO IBC Code Chapter 17: Summary of minimum requirements
IMO MARPOL (Annex II) - List of Noxious Liquid Substances Carried in Bulk
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Chinese)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)

National Inventory Status

National Inventory	Status
Australia - AICS	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
Canada - DSL	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
Canada - NDSL	No (2,4-dinitrotoluene; nitrocellulose; diphenylamine; Ingredients determined not to be hazardous) Non-disclosed ingredients
China - IECSC	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
Europe - EINEC / ELINCS / NLP	No (nitrocellulose; Ingredients determined not to be hazardous) Non-disclosed ingredients
Japan - ENCS	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
Korea - KECI	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
New Zealand - NZIoC	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
Philippines - PICCS	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
USA - TSCA	No (Ingredients determined not to be hazardous) Non-disclosed ingredients
Legend:	Yes = All ingredients are on the inventory No = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Revision Date	31/01/2019
Initial Date	02/04/2009

SDS Version Summary

Version	Issue Date	Sections Updated
2.1.1.1	11/05/2016	Classification
5.1.1.1	31/01/2019	Classification

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit.

Propellant BM2

IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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