

Combined Systems MODEL 2581 CTG. BEAN BAG, KEVLAR

Winchester Australia Ltd

Chemwatch Hazard Alert Code: 4

Chemwatch: 4898-61

Issue Date: 06/06/2014

Version No: 6.1.1.1

Print Date: 19/08/2015

Safety Data Sheet according to WHS and ADG requirements

Initial Date: Not Available
L.GHS.AUS.EN

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

Product Identifier

Product name	Combined Systems MODEL 2581 CTG. BEAN BAG, KEVLAR
Synonyms	Not Available
Proper shipping name	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS†
Other means of identification	Not Available

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

Relevant identified uses	Beanbag impact munition.
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Details of the manufacturer/importer

Registered company name	Winchester Australia Ltd
Address	65 Hays Road Moolap, Geelong 3224 VIC Australia
Telephone	+61 3 5245 2400
Fax	+61 3 5248 2409
Website	Not Available
Email	Not Available

Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	+61 3 5245 2400 (office hours)
Other emergency telephone numbers	04 17 090 554; 04 18 158 337 (AH)

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

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


CHEMWATCH HAZARD RATINGS

	Min	Max	
Flammability	1		
Toxicity	0		
Body Contact	0		
Reactivity	4		
Chronic	0		

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Exempt
GHS Classification [1]	Explosive Division 1.4
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HSIS; 3. Classification drawn from EC Directive 1272/2008 - Annex VI

Label elements

GHS label elements	
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SIGNAL WORD	WARNING
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Hazard statement(s)

H204	Fire or projection hazard
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Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P250	Do not subject to grinding/shock/sources of friction.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P240	Ground/bond container and receiving equipment.

Precautionary statement(s) Response

P370+P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P374	Fight fire with normal precautions from a reasonable distance.
P373	DO NOT fight fire when fire reaches explosives.

Precautionary statement(s) Storage

P401	Store according to local regulations for explosives
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Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration
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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	25-50	<u>nitrocellulose</u>
55-63-0	25-50	<u>nitroglycerin</u>
12403-82-6	<10	<u>lead styphnate, monobasic</u>
84-74-2	<10	<u>dibutyl phthalate</u>
122-39-4	<5	<u>diphenylamine</u>
7757-79-1	<5	<u>potassium nitrate</u>

SECTION 4 FIRST AID MEASURES**Description of first aid measures**

Eye Contact	<p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with water. ▶ If irritation continues, 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"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
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.
Ingestion	<ul style="list-style-type: none"> ▶ Not considered a normal route of entry. <p>Not normally a hazard due to physical form of product.</p>

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES**Extinguishing media**

	▶ WARNING: Deliver water spray or fog from a safe distance only.
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Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.
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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.
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	<ul style="list-style-type: none"> ▶ Prevent re-entry. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ May detonate and burning material may be propelled from fire. ▶ Wear full-body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage and fire effluent from entering drains and water courses. ▶ Fight fire from safe distances and from protected locations. ▶ Use flooding quantities of water. ▶ DO NOT approach containers or packages suspected to be hot. ▶ Cool any exposed containers not involved in fire from a protected location. ▶ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Combustible with explosion hazard. ▶ Detonation may occur from heavy impact or excessive heating. ▶ Heating may cause expansion or violent decomposition. ▶ Heat affected containers remain hazardous. ▶ May emit irritating or corrosive fumes. <p>Decomposition may produce toxic fumes of; nitrogen oxides (NOx) carbon monoxide (CO) carbon dioxide (CO2) metal oxides individual devices will randomly explode. Will not mass explode if multiple devices are involved.</p>

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	<p>WARNING!: EXPLOSIVE 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.
Major Spills	<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. ▶ Use extreme caution to prevent physical shock. ▶ Use only spark-free shovels and explosion-proof equipment. ▶ Collect recoverable material and segregate from spilled material. ▶ Wash spill area with large quantities of water.

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

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▶ Avoid smoking, naked lights, heat or ignition sources <p>Must not be struck by metal implements. Avoid shock and friction. Avoid thermal shock. Under normal handling, no exposure to harmful materials will occur. Product may produce physical injury if mishandled.</p>
Other information	<ul style="list-style-type: none"> ▶ Store cases in a well ventilated magazine licenced 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. ▶ Protect containers against physical damage. ▶ Check regularly for spills and leaks <p>NOTE: If explosives need to be destroyed contact the Competent Authority.</p>

Conditions for safe storage, including any incompatibilities

Suitable container	Packaging shall be in accordance to Packaging instruction 130 of the Australian Explosives Code (AEC).
Storage incompatibility	<ul style="list-style-type: none"> ▶ Reacts with acids producing flammable / explosive hydrogen (H2) gas ▶ Avoid reaction with oxidising agents ▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates. strong alkalis



X

+

X

X

X

X

X

- X** — Must not be stored together
0 — May be stored together with specific preventions
+ — May be stored together

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	nitrocellulose	Fume (thermally generated) (respirable dust)(g)	2 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	nitroglycerin	Nitroglycerin (NG)	0.46 mg/m3 / 0.05 ppm	Not Available	Not Available	Sk
Australia Exposure Standards	dibutyl phthalate	Dibutyl phthalate	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	diphenylamine	Diphenylamine	10 mg/m3	Not Available	Not Available	Not Available

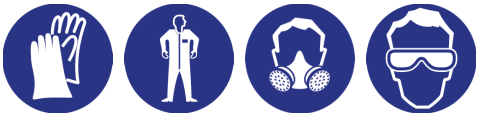
EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
nitrocellulose	Pyroxylin; (Cellulose tetranitrate)	15 mg/m3	170 mg/m3	990 mg/m3
nitroglycerin	Nitroglycerin	0.1 mg/m3	2 mg/m3	500 mg/m3
dibutyl phthalate	Dibutyl phthalate	15 mg/m3	31 mg/m3	9300 mg/m3
diphenylamine	Diphenylamine	30 mg/m3	65 mg/m3	220 mg/m3
potassium nitrate	Potassium nitrate	0.074 mg/m3	0.82 mg/m3	600 mg/m3

Ingredient	Original IDLH	Revised IDLH
nitrocellulose	Not Available	Not Available
nitroglycerin	500 mg/m3	75 mg/m3
lead styphnate, monobasic	700 mg/m3	100 mg/m3
dibutyl phthalate	9,300 mg/m3	4,000 mg/m3
diphenylamine	Not Available	Not Available
potassium nitrate	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Use in a well-ventilated area Local exhaust ventilation is recommended if significant dusting occurs or fumes are generated.
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields; or as required. ▶ 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	See Hand protection below
Hands/feet protection	None under normal operating conditions.
Body protection	See Other protection below
Other protection	Ear protection.
Thermal hazards	Not Available

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:

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Material	CPI
BUTYL	A
NATURAL RUBBER	A
NATURAL+NEOPRENE	A

Respiratory protection

Type A-P Filter of sufficient capacity (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter, the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2

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NEOPRENE	A
NEOPRENE/NATURAL	A
NITRILE	A
PE/EVAL/PE	A
PVA	A
VITON	A

up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face

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)

* 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.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Dark grey solid.		
Physical state	Manufactured	Relative density (Water = 1)	Not Applicable
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Applicable	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Applicable	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	Not Applicable
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water (g/L)	Not Applicable	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	Not Applicable	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 open flame Cartridge may detonate if case is punctured or severely damaged.
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	Not normally a hazard due to physical form of product.
Ingestion	Not normally a hazard due to physical form of product.
Skin Contact	Not normally a hazard due to physical form of product.
Eye	Not normally a hazard due to physical form of product.
Chronic	Explosive components are completely sealed within the metal alloy cartridge. Under normal handling of this product, no exposure to harmful materials will occur. Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

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KEVLAR	Not Available	Not Available
nitrocellulose	TOXICITY	IRRITATION
	Oral (rat) LD50: >5000 mg/kg ^[2]	Not Available
nitroglycerin	TOXICITY	IRRITATION
	dermal (rat) LD50: >9 mg/kg ^[1]	Not Available
	Oral (rat) LD50: 105 mg/kg ^[2]	
lead styphnate, monobasic	TOXICITY	IRRITATION
	Not Available	Not Available
dibutyl phthalate	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >21000 mg/kg ^[2]	Not Available
	Inhalation (mouse) LC50: 25 mg/L/2H ^[2]	
	Oral (rat) LD50: 6279 mg/kg ^[1]	
diphenylamine	TOXICITY	IRRITATION
	Oral (hamster) LD50: ca.600 mg/kg ^[1]	Not Available
potassium nitrate	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg ^[1]	Nil reported
	Oral (rat) LD50: >2000 mg/kg ^[1]	
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.
NITROGLYCERIN	<p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>Substance has been investigated as a tumorigen, mutagen and reproductive effector. Equivocal tumorigen by RTECS criteria. Reproductive effector in rats.</p>
LEAD STYPHNATE, MONOBASIC	<p>The following information refers to contact allergens as a group and may not be specific to this product.</p> <p>Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.</p> <p>No significant acute toxicological data identified in literature search.</p>
DIBUTYL PHTHALATE	<p>For dibutyl phthalate (DBP):</p> <p>In studies on rats, DBP is absorbed through the skin, although in <i>in vitro</i> studies human skin has been found to be less permeable than rat skin to this compound. Studies in laboratory animals indicate that DBP is rapidly absorbed from the gastrointestinal tract, distributed primarily to the liver and kidneys of rats and excreted in urine as metabolites following oral or intravenous administration. Following inhalation, it was consistently detected at low concentrations in the brain. Available data indicate that in rats, following ingestion, DBP is metabolised by nonspecific esterases mainly in the small intestine to yield mono- <i>n</i>-butyl phthalate (MBP) with limited subsequent biochemical oxidation of the alkyl side chain of MBP. MBP is stable and resistant to hydrolysis of the second ester group. Accumulation has not been observed in any organ. The profile of effects following exposure to DBP is similar to that of other phthalate esters, which, in susceptible species, can induce hepatomegaly, increased numbers of hepatic peroxisomes, foetotoxicity, teratogenicity and testicular damage.</p> <p>Acute toxicity: The acute toxicity of DBP in rats and mice is low. Signs of acute toxicity in laboratory animals include depression of activity, laboured breathing and lack of coordination. In a case of accidental poisoning of a worker who ingested approximately 10 grams of DBP, recovery was gradual within two weeks and complete after 1 month.</p> <p>On the basis of limited available data in animal species, DBP appears to have little potential to irritate skin or eyes or to induce sensitization. In humans, a few cases of sensitization after exposure to DBP have been reported, although this was not confirmed in controlled studies of larger numbers of individuals reported only in secondary accounts</p> <p>Repeat dose toxicity: In short-term repeated-dose toxicity studies, effects at lowest levels in rats after oral administration for 5 to 21 days included peroxisome proliferation and hepatomegaly at doses of 420 mg/kg body weight per day or more. In longer-term studies, the effects in rats observed following ingestion of DBP for periods up to 7 months included reduced rate of weight gain at doses of 250 mg/kg body weight per day or more. Increase in relative liver weight has been observed at doses of 120 mg/kg body weight or more. Peroxisomal proliferation with increased peroxisomal enzyme activity has been observed at doses of 279 mg/kg body weight per day or more. Necrotic hepatic changes in Wistar rats have been reported at doses of 250 mg/kg body weight per day or more but not in F-344 or Sprague-Dawley rats exposed to up to 2500 mg/kg body weight per day. Alteration in testicular enzymes and degeneration of testicular germinal cells of rats have been observed at doses of 250 and 571 mg/kg body weight per day. There are considerable species differences in effects on the testes following exposure to DBP, minimal effects being observed in mice and hamsters at doses as high as 2000 mg/kg body weight per day. In mice, effects on body and organ weights and histological alterations in the liver indicative of metabolic stress have been reported in a recent subchronic bioassay, for which the no-observed-effect-level (NOEL) was 353 mg/kg body weight per day.</p> <p>Developmental toxicity: In a continuous breeding protocol, which included cross-over mating and offspring assessment phases, rats were exposed to 0, 1000, 5000 or 10 000 mg DBP/kg in the diet (equivalent to 0, 66, 320 and 651 mg/kg body weight per day). In the first generation the reduction in pup</p>

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weight in the mid-dose group, in the absence of any adverse effect on maternal weight, could be regarded as a developmental toxicity effect. There was also a significant reduction of live litter numbers at all three dose levels. The effects in the second generation were more severe, with reduced pup weight in all groups including the low-dose group, structural defects (such as prepuce/ penile malformations, seminiferous tubule degeneration, and absence or underdevelopment of the epididymides) in the mid- and high-dose groups, and severe effects on spermatogenesis in the high-dose group that were not seen in the parent animals. These results suggest that the adverse effects of DBP are more marked in animals exposed during development and maturation than in animals exposed as adults only. No clear NOEL was established in this study. The lowest-observed-adverse-effect-level (LOAEL) was considered to be 66 mg/kg body weight per day. The available studies show that DBP generally induces foetotoxic effects in the absence of maternal toxicity. Available data also indicate that DBP is teratogenic at high doses and that susceptibility to teratogenesis varies with developmental stage and period of administration. In mice, DBP caused dose-dependent increases in the number of resorptions and dead fetuses at oral doses of 400 mg/kg body weight per day or more. Dose-dependent decreases in fetal weights and number of viable litters were also observed in mice at these doses. Adequate carcinogenesis bioassays for DBP have not been conducted. The weight of the available evidence indicates that DBP is not genotoxic.

The material may produce peroxisome proliferation. Peroxisomes are single, membrane limited, cytoplasmic organelles that are found in the cells of animals, plants, fungi and protozoa. Peroxisome proliferators include certain hypolipidaemic drugs, phthalate ester plasticisers, industrial solvents, herbicides, food flavours, leukotriene D4 antagonists and hormones. Numerous studies in rats and mice have demonstrated the hepatocarcinogenic effects of peroxisome proliferators, and these compounds have been unequivocally established as carcinogens. However it is generally conceded that compounds inducing proliferation in rats and mice have little, if any, effect on human liver except at very high doses or extreme conditions of exposure.

Transitional Phthalate Esters: produced from alcohols with straight-chain carbon backbones of C4 to C6. This subcategory also includes a phthalate produced from benzyl alcohol as one ester group with the second ester composed of an alkyl group with a C5 carbon backbone and butyrate group. Phthalate esters containing >10% C4 to C6 molecules were conservatively included in this subcategory. Branched C7 and C8 isomers (di-iso-heptyl, di-iso-octyl and diethylhexyl phthalates) in contrast to linear dihexyl and dioctyl phthalate are members of this family.

Transitional phthalates have varied uses, but are largely used as plasticisers for PVC. Physicochemical properties also vary in that the lower molecular weight transitional phthalates are more water-soluble than higher molecular weight transitional phthalates, but none would be characterised as highly water soluble. Transitional phthalates have lower water solubility than the low molecular weight phthalates and except for butylbenzyl phthalate (BBP), existing data suggest they do not exhibit acute or chronic aquatic toxicity. What distinguishes some of the transitional phthalates from others is their greater mammalian toxicity potential, particularly with regard to reproductive and developmental effects, compared to either the low or high molecular weight phthalate subcategories.

Acute Toxicity. The available data on phthalates spanning the carbon range from C4 to C6 indicate that phthalate esters in the transitional subcategory are minimally toxic by acute oral and dermal administration. The oral LD50 value for BBP exceeds 2 g/kg, and for materials with higher molecular weights, the LD50 values exceed the maximum amounts which can be administered to the animals in a manner consistent with the principles of responsible animal use.

One member of this subcategory, diethylhexyl phthalate (DEHP), has been tested for acute inhalation toxicity. It did not cause an effect at the highest concentration tested. Further, considering the low volatility of these substances, inhalation exposure at toxicologically significant levels is not anticipated.

Repeated Dose Toxicity. Several substances in the C4 to C6 range, including BBP, have been tested for repeated dose toxicity in studies ranging from 3 weeks to 2 years. The principal effects found in these studies were those associated with peroxisome proliferation including liver enlargement and induction of peroxisomal enzymes. As shown in a comparative study of liver effects, the strongest inducers of peroxisome proliferation are diisononyl phthalate (DINP) and di-iso-decyl phthalate (DIDP) with substances of shorter chain length (e.g., BBP) showing much less pronounced effects. Thus it is reasonable to conclude that other members of this subcategory would show effects similar to BBP and less pronounced than DINP or DIDP. It should also be noted that the relevance of these findings to human health is, at best, questionable. It has been shown that these effects are mediated through the peroxisome proliferation-activated receptor alpha (PPARα) and that levels of PPARα are much higher in rodents than they are in humans. Thus one would expect humans to be substantially less responsive than rodents to peroxisome proliferating agents. Empirical evidence that this is true is provided by studies in primates in which repeated administration of DINP had no effects on liver, kidney or testicular parameters.

Several of the substances in the transitional phthalate esters subcategory, however, have been shown to produce testicular atrophy when given to juvenile rats at high levels. Testicular atrophy has been associated with BBP and other substances with C4 to C6 linear carbon chains. However, molecules with fewer than 4 or more than 6 carbons did not produce testicular atrophy in these studies. Although the relevance of these data are uncertain, as the testes is not a target organ for diethylhexyl phthalate (DEHP) in primates, these data do provide one of the distinguishing toxicological characteristics of this subcategory and are one of the underlying reasons supporting the differentiation of phthalate esters on the basis of length of the linear region of the carbon chain.

Genetic Toxicity (Salmonella). A number of the substances in this subcategory including the reference substance BBP has been assessed in the Salmonella and mouse lymphoma assays. All of these substances were inactive in these assays.

Chromosomal Aberrations. BBP and dihexyl phthalate (DHP) were inactive in micronucleus assays in mice. DEHP was inactive in a cytogenetics assay in rat bone marrow. Diisoheptyl phthalate was inactive in CHO cells, in vitro.

Reproductive toxicity: A series of studies assessed the structure-activity relationship of the effects of phthalate esters on fertility using a continuous breeding protocol. The test substances included in these studies were diethyl-, dipropyl-, dibutyl-, dipentyl-, di-n-hexyl-, di-2(ethylhexyl)-, and di-n-octyl phthalates. The most profound effects were on fertility (i.e., number of females delivering/ number mated) and number of live births. The substance showing the greatest activity was DEHP which produced effects at dietary levels of 0.1% with a no effect level of 0.01%. The next most active compounds were di-n-hexyl- and di-n-pentyl phthalate which showed effects in the range of 0.3 to 0.5%; no effect levels were not experimentally defined. Dipropyl phthalate had an effect on live birth index at 2.5% but produced no effects at 1.25%. Diethyl phthalate and di-n-octyl phthalate were inactive at the highest levels tested, 2.5% and 5.0%, respectively. These data demonstrated that molecules with linear alkyl chains of 4 to 6 carbons profoundly affect fertility in rodents, with DEHP being the most active. Molecules with longer or shorter side chains are essentially inactive in these assays. These data were also a basis for the separation of phthalates into three categories based on length of side chain.

In addition to these data there are reproductive toxicity studies on BBP and DEHP.

A 2-generation reproductive study was conducted in rats in which BBP was administered via the diet. Parental effects were limited to changes in body weight, weight gain, and increased absolute and relative liver weights. In the F1 parents, treatment with BBP affected mating and fertility indices and sperm number and motility. The F1 male offspring exhibited shortened anogenital distance, delayed acquisition of puberty and retention of nipples and areolae as well as reproductive effects. The NOAEL of the study was reported to be 3750 mg/kg for reproductive effects. However, for male F1 and F2 offspring, the NOEL for reproductive effects was reported to be 50 mg/kg based on reductions in anogenital distance. These studies along with previous data provide a good basis to assess the reproductive effects of C4 to C6 phthalate esters. Although several substances (diheptyl, heptyl nonyl, heptyl undecyl) have ester side chain constituents that predominately fall in the high molecular weight subcategory, these substances are conservatively assumed to exhibit reproductive effects similar to other transitional phthalates.

Developmental toxicity: There have been extensive studies of the developmental toxicity of BBP and DEHP. These substances produce structural malformations and also affect male reproductive development. No effect levels are in the range of 50 to 300 mg/kg bw/day. There is also an unpublished developmental toxicity study of di-isoheptyl phthalate (DIHP). The results of these studies are broadly consistent with the structure-activity relationships previously described, i.e., that phthalate esters with linear carbon chains of C4 to C6 carbons produce much more profound effects than either shorter or longer molecules.

Phthalate esters with >10% C4 to C6 isomers were conservatively placed in the transitional subcategory. This conclusion is supported by developmental test data on "711P" (which showed structural malformations in rats at 1000 mg/kg/day with a NOAEL of 200 mg/kg/day. "711P" is an equal composition mixture of six phthalate esters consisting of linear and methyl-branched C7, C9, and C11 ester side chains. This test substance is considered by EPA under the following CAS Numbers: 68515-44-6 (di C7), 68515-45-7 (di C9), 3648-20-2 (di C11), 111381-89-6 (C7, C9), 111381-90-9 (C7, C11), and 111381-91-0 (C9, C11). The overall content of C4 to C6 isomers in "711P" is approximately 10%, based on the contribution from methyl-branched C7 isomers e.g., di C7 (30% C4-C6); C7, C9 (15% C4-C6); and C7, C11 (15% C4-C6). Test data on 711P were used selectively as read-across data to the C7-containing substances in the mixture, based on the C4 to C6 content of each substance in the mixture.

DIPHENYLAMINE

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the

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diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. 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. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Acute toxicity: Diphenylamine and its substituted derivatives all show a slight to moderate order of toxicity following oral administration, with LD50 values ranging from >500 to >34,000 mg/kg. Overall, the acute dermal LD50 for these materials was greater than the 2000 mg/kg limit dose indicating a very low order of toxicity.

Mutagenicity: Of five substituted diphenylamines tested, there was one weakly positive mutagenic response with in the bacterial mutagenicity test, with diphenylamine (122-39-4). Overall weight of evidence for this material, as well as the category indicates a negative evaluation for bacterial mutagenicity. Substituted diphenylamines have been tested for mutagenicity in tests for gene mutations and chromosomal aberrations. The assays included point mutations in bacterial cells, *in vitro* chromosomal aberrations in mammalian cells, and *in vivo* chromosomal aberrations. With one exception, the data consistently demonstrate no evidence of genotoxicity for this category of materials. This suggests that all members of the category lack genotoxicity due to their similarity in chemical structures and physicochemical properties.

Repeat Dose Toxicity: Diphenylamine (122-39-4) was tested in a 28 day oral study with rats. A NOAEL of 111 mg/kg/day was identified. Diphenylamine is not only the common precursor for the materials of this category, but also theoretically the most toxic of the class since it is the smallest member of the class. The addition of alkyl groups onto the diphenylamine molecule results in even lower water solubility and, therefore, becomes less bioavailable.

Diphenylamine, styrenated (68442-68-2) was tested in a 28day oral gavage study in rats. A NOAEL of 100 mg/kg/day was identified. Diphenylamine styrenated was tested in a 28-day gavage study in rats; 100 mg/kg/day was selected as the NOAEL. Diphenylamine-, reaction products with styrene and 2,4,4-trimethylpentene (68921-45-9) was tested in a 64 week rat dietary study; a LOEL of 2500 ppm was identified.

Reproductive and Developmental Toxicity: Diphenylamine was administered in feed at 0.1, 0.25 or 0.5% (ca. 67, 167 or 333 mg/kg/day) to rats in a two-generation reproductive toxicity study. In general, the average size of the litters decreased as the concentration of dietary diphenylamine increased. A NOEL was not established. A developmental study was also conducted with diphenylamine in rabbits. The test article was administered by gavage at dose levels of 0, 33, 100 and 300 mg/kg/day for gestation days 7-19. The test article produced minimal effects (decreased food consumption and mean body weight) to maternal rats at 300 mg/kg during pregnancy; there were no other signs of maternal toxicity. NOAEL for maternal toxicity was established at 100 mg/kg/day. The NOAEL for teratogenicity/developmental effects was greater than 300 mg/kg/day.

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 required to make classification available
✘ – Data available but does not fill the criteria for classification
☉ – Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

NOT AVAILABLE

Ingredient	Endpoint	Test Duration	Effect	Value	Species	BCF
nitrocellulose	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
nitroglycerin	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
lead styphnate, monobasic	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
dibutyl phthalate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
diphenylamine	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
potassium nitrate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

DO NOT discharge into sewer or waterways.

|Not biodegradable. |Lead is toxic to waterfowl. |Bullets may fragment and decompose in soil leading to accumulation of lead.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
nitroglycerin	LOW (Half-life = 14 days)	LOW (Half-life = 0.73 days)
dibutyl phthalate	LOW (Half-life = 23 days)	LOW (Half-life = 3.08 days)
diphenylamine	LOW (Half-life = 56 days)	Not Available
potassium nitrate	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
dibutyl phthalate	LOW (BCF = 176)
diphenylamine	LOW (BCF = 253)
potassium nitrate	LOW (LogKOW = 0.209)

Mobility in soil

Ingredient	Mobility

Continued...

dibutyl phthalate	LOW (KOC = 1460)
diphenylamine	LOW (KOC = 1887)
potassium nitrate	LOW (KOC = 14.3)


SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> Explosives must not be thrown away, buried, discarded or placed with garbage. Explosives which are surplus, deteriorated or considered unsafe for transport, storage or use shall be destroyed and the statutory authorities shall be notified. This material may be disposed of by burning or detonation but the operation may only be performed under the control of a person trained in the safe destruction of explosives.
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SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG)

UN number	0012				
Packing group	Not Applicable				
UN proper shipping name	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS†				
Environmental hazard	No relevant data				
Transport hazard class(es)	<table border="0"> <tr> <td>Class</td> <td>1.4S</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>	Class	1.4S	Subrisk	Not Applicable
Class	1.4S				
Subrisk	Not Applicable				
Special precautions for user	<table border="0"> <tr> <td>Special provisions</td> <td>364</td> </tr> <tr> <td>Limited quantity</td> <td>5 kg</td> </tr> </table>	Special provisions	364	Limited quantity	5 kg
Special provisions	364				
Limited quantity	5 kg				

Air transport (ICAO-IATA / DGR)

UN number	0012														
Packing group	Not Applicable														
UN proper shipping name	Cartridges for weapons, inert projectile; Cartridges, small arms														
Environmental hazard	No relevant data														
Transport hazard class(es)	<table border="0"> <tr> <td>ICAO/IATA Class</td> <td>1.4S</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>3L</td> </tr> </table>	ICAO/IATA Class	1.4S	ICAO / IATA Subrisk	Not Applicable	ERG Code	3L								
ICAO/IATA Class	1.4S														
ICAO / IATA Subrisk	Not Applicable														
ERG Code	3L														
Special precautions for user	<table border="0"> <tr> <td>Special provisions</td> <td>Not Applicable</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>130</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>100 kg</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>130</td> </tr> <tr> <td>Passenger and Cargo Maximum Qty / Pack</td> <td>25 kg</td> </tr> <tr> <td>Passenger and Cargo Limited Quantity Packing Instructions</td> <td>Forbidden</td> </tr> <tr> <td>Passenger and Cargo Limited Maximum Qty / Pack</td> <td>Forbidden</td> </tr> </table>	Special provisions	Not Applicable	Cargo Only Packing Instructions	130	Cargo Only Maximum Qty / Pack	100 kg	Passenger and Cargo Packing Instructions	130	Passenger and Cargo Maximum Qty / Pack	25 kg	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden
Special provisions	Not Applicable														
Cargo Only Packing Instructions	130														
Cargo Only Maximum Qty / Pack	100 kg														
Passenger and Cargo Packing Instructions	130														
Passenger and Cargo Maximum Qty / Pack	25 kg														
Passenger and Cargo Limited Quantity Packing Instructions	Forbidden														
Passenger and Cargo Limited Maximum Qty / Pack	Forbidden														

Sea transport (IMDG-Code / GGVSee)

UN number	0012				
Packing group	Not Applicable				
UN proper shipping name	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS				
Environmental hazard	Not Applicable				
Transport hazard class(es)	<table border="0"> <tr> <td>IMDG Class</td> <td>1.4S</td> </tr> <tr> <td>IMDG Subrisk</td> <td>Not Applicable</td> </tr> </table>	IMDG Class	1.4S	IMDG Subrisk	Not Applicable
IMDG Class	1.4S				
IMDG Subrisk	Not Applicable				

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Special precautions for user	EMS Number	F-B , S-X
	Special provisions	364
	Limited Quantities	5 kg

Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	dibutyl phthalate	X
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	diphenylamine	Y

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 Exposure Standards	Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists	International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft

NITROGLYCERIN(55-63-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards	Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists	International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft

LEAD STYPHNATE, MONOBASIC(12403-82-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Hazardous Substances Information System - Consolidated Lists	International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
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DIBUTYL PHTHALATE(84-74-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards	Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists	

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

Australia Exposure Standards	Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists	

POTASSIUM NITRATE(7757-79-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)	
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National Inventory	Status
Australia - AICS	N (lead styphnate, monobasic)
Canada - DSL	N (lead styphnate, monobasic)
Canada - NDSL	N (nitrocellulose; nitroglycerin; diphenylamine; potassium nitrate; dibutyl phthalate)
China - IECSC	N (lead styphnate, monobasic; nitroglycerin)
Europe - EINEC / ELINCS / NLP	N (nitrocellulose)
Japan - ENCS	N (lead styphnate, monobasic)
Korea - KECI	Y
New Zealand - NZIoC	N (lead styphnate, monobasic)
Philippines - PICCS	N (lead styphnate, monobasic)
USA - TSCA	Y
Legend:	Y = All ingredients are on the inventory N = 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

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.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net

The (M)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.

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