



SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 1 of 14

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

SYNONYMS

CP-0291/1, "RS Components"

PRODUCT USE

Smoke cartridges.

SUPPLIER

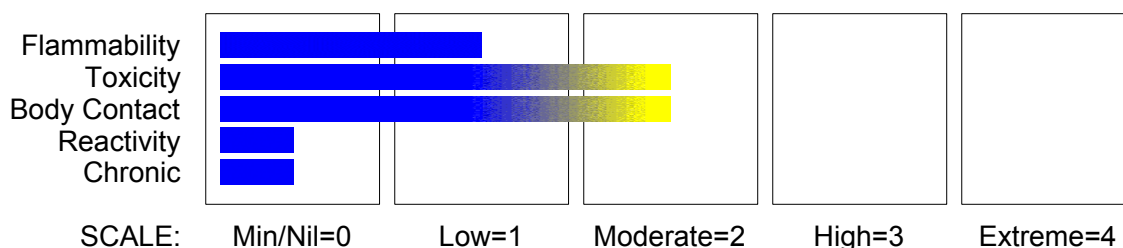
Company: RS Components	Company: RS Components
Address:	Address:
Units 30 & 31	25 Pavesi Street
Warehouse World	Smithfield
761 Great South Road	NSW2164
Penrose Auckland	AUS
	Telephone: 1300 656 636
	Emergency Tel: 1800 039 008
	Emergency Tel: 03 9573 3112
	Fax: 1300 656 696

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to the Criteria of NOHSC, and the ADG Code.

CHEMWATCH HAZARD RATINGS



continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 2 of 14

Section 2 - HAZARDS IDENTIFICATION



POISONS SCHEDULE

S5

RISK

- Harmful by inhalation and if swallowed.
 - Irritating to eyes.
 - Toxic to aquatic organisms may cause long-term adverse effects in the aquatic environment.
 - Cumulative effects may result following exposure*.
 - May produce discomfort of the respiratory system and skin*.
- * (limited evidence).

SAFETY

- Do not breathe dust.
- Avoid contact with eyes.
- Wear suitable protective clothing.

- Use only in well ventilated areas.

- Keep container in a well ventilated place.

- To clean the floor and all objects contaminated by this material use water.
- This material and its container must be disposed of in a safe way.
- Keep away from food drink and animal feeding stuffs.
- In case of contact with eyes rinse with plenty of water and contact Doctor or Poisons Information Centre.
- If swallowed IMMEDIATELY contact Doctor or Poisons Information Centre. (show this container or label).
- Use appropriate container to avoid environmental contamination.
- Avoid release to the environment. Refer to special instructions/Safety data sheets.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
bulk filler		43
potassium chlorate	3811-04-9	29
ammonium chloride	12125-02-9	28

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor.
- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.

Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 3 of 14

Section 4 - FIRST AID MEASURES

- Induce vomiting with fingers down the back of the 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.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- 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 MSDS 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 MSDS.

EYE

■ If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with 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.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

■ If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.
- If irritation or discomfort persists seek medical attention.
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prosthesis 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.

NOTES TO PHYSICIAN

Empty the stomach by lavage and aspiration or by emesis, give demulcents or sweetened drinks and maintain respiration. Pethidine may be given if required. A 1% solution of sodium thiosulfate may be used for lavage and may also be given by intravenous infusion. Haemodialysis, peritoneal dialysis or exchange transfusions may be of value in removing chlorate from the blood. Forced diuresis should not be attempted if there is inadequate urine output.

[Martindale]

■ For chlorates:

For severe intoxication: Empty the stomach by lavage and aspiration or by emesis, give demulcents or sweetened drinks and maintain respiration. Pethidine may be given if required. A 1% solution of sodium thiosulfate may be used for lavage and may also be given by intravenous infusion. Haemodialysis, peritoneal dialysis or exchange perfusions may be of value in removing chlorate from the blood. Forced diuresis should not be attempted if there is inadequate urine input.

MARTINDALE: The Extra Pharmacopoeia, 27th Edition

The high sensitivity of glucose-6-phosphate dehydrogenase to denaturation by chlorate explains the

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 4 of 14

Section 4 - FIRST AID MEASURES

inefficacy of methylene blue to reduce methaemoglobin formed, as the antidotal effect of methylene blue depends on NADPH formed mainly by the oxidation of glucose-6-phosphate. The observed changes occur only in the presence of methaemoglobin which forms a destabilising complex with chlorate. Methaemoglobin thus autocatalytically increases methaemoglobin formation and destruction of the erythrocyte.

Treatment regime for bromates may also act as a guide for chlorate poisonings.

- Syrup of ipecac or gastric lavage with tap water or perhaps a 1% solution of sodium thiosulfate
- Administer a demulcent and an analgesic like meperidine (Demerol). Avoid morphine.
- If readily available, the prompt use of haemodialysis or peritoneal lavage may serve to remove absorbed but unreacted chlorate in significant amounts.
- Administer oxygen. If methaemoglobinaemia becomes severe a replacement transfusion with whole blood may become necessary.
- DO NOT attempt to correct methaemoglobinaemia with methylene blue as the dye may enhance the toxicity.
- Sodium thiosulfate solution (100 to 500 ml of 1%) by intravenous drip has been recommended by some authors.
- Correct dehydration by infusing intravenously a glucose solution (5% in water). Avoid electrolytes (except as above) unless acid-base imbalance or shock becomes severe.
- Supportive treatment of acute renal failure. [GOSSELIN et al, Clinical Toxicology of Commercial Products, Fifth Edition].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Jets of water.
- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.

FIRE/EXPLOSION HAZARD

- Combustible.

Slight fire hazard when exposed to heat or flame.

Combustion products include: carbon dioxide (CO₂), carbon monoxide (CO), ammonia and chlorides.

FIRE INCOMPATIBILITY

- Avoid reaction with oxidising agents.

HAZCHEM: None

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

PVC chemical resistant type.

Respirator:

Type K-P Filter of sufficient capacity

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 5 of 14

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Refer to major spills. Clean up all spills immediately.

MAJOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
Avoid contact with skin and eyes.
Control personal contact by using protective equipment.
Use dry clean up procedures and avoid generating dust.
Place in suitable containers for disposal.
Refer to supplier and appropriate Waste Disposal Authority for disposal of spillage.

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid generating and breathing dust
- Avoid contact with skin and eyes.
- Wear nominated personal protective equipment when handling.
- Use in a well-ventilated area.
- Use good occupational work practices.
- Observe manufacturer's storing and handling recommendations.

SUITABLE CONTAINER

Canister with an intrinsic wick.

- Packaging as recommended by manufacturer.

STORAGE INCOMPATIBILITY

- Segregate from organic materials / compounds.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Store below 40 deg.C.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 6 of 14

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m ³	STEL mg/m ³
Australia Exposure Standards	ammonium chloride (Ammonium chloride (fume))	10	20

The following materials had no OELs on our records

• potassium chlorate:

CAS:3811- 04- 9

MATERIAL DATA

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200:

- None assigned. Refer to individual constituents.

POTASSIUM CHLORATE:

■ It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

AMMONIUM CHLORIDE:

Based on moderate inhalation the TLV-TWA is thought to be protective against irritation of the respiratory tract.

PERSONAL PROTECTION

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 7 of 14

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION



EYE

- 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 lens 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].

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear.

OTHER

- Overalls.
- Eyewash unit.

RESPIRATOR

- Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	K- AUS P	-
1000	50	-	K- AUS P
5000	50	Airline *	-
5000	100	-	K- 2 P
10000	100	-	K- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

- Use in a well-ventilated area.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:
solvent, vapours, degreasing etc., evaporating

Air Speed:
0.25- 0.5 m/s (50- 100 f/min)

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 8 of 14

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

from tank (in still air).

aerosols, fumes from pouring operations, 0.5- 1 m/s (100- 200 f/min.)

intermittent container filling, low speed
conveyer transfers, welding, spray drift,
plating acid fumes, pickling (released at low
velocity into zone of active generation)
direct spray, spray painting in shallow booths,
drum filling, conveyer loading, crusher dusts,
gas discharge (active generation into zone of
rapid air motion)

1- 2.5 m/s (200- 500 f/min.)

grinding, abrasive blasting, tumbling, high
speed wheel generated dusts (released at high
initial velocity into zone of very high rapid
air motion).

2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to
capture

2: Contaminants of low toxicity or of nuisance
value only.

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

3: High production, heavy use

4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

A smoke generator in the form of white or orange plastic tubes. 85% soluble in water. Odourless or perfumed. Dense white smoke is evolved on ignition but no flame is evolved.

PHYSICAL PROPERTIES

Solid.

Mixes with water.

Molecular Weight: Not applicable

Specific Gravity (water=1): Not available

pH (1% solution): 1.4

Evaporation Rate: Not available

Lower Explosive Limit (%): Not available

Boiling Range (°C): Not applicable

Solubility in water (g/L):
Miscible

Vapour Pressure (kPa): Not available

Relative Vapour Density (air=1):
Not available

Upper Explosive Limit (%): Not available

Melting Range (°C): Not available

pH (as supplied): Not applicable

Volatile Component (%vol): Not available

Flash Point (°C): Not available

Autoignition Temp (°C): 250-280

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 9 of 14

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Decomposition Temp (°C): Not available

State: Divided solid

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of heat source and ignition source.
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material is moderately discomforting to the gastro-intestinal tract and may be harmful if swallowed. Overexposure to chlorates may result in methaemoglobinemia (lack of oxygen in blood) and cyanosis (bluish discolouration of skin and mucous membranes). Effects may be delayed. Coma, convulsions, liver and kidney damage and eventual kidney failure may also result. As sodium chlorate is used as a weed killer, several cases of chlorate poisoning in humans have been reported. Nausea and vomiting are almost always apparent after chlorate poisonings usually with epigastric pain (gastritis). Diarrhoea may also occur. The mean lethal dose of a chlorate salt taken by mouth has been established as 20-30 gms in human adults although others use a figure as low as 8 gm. Chlorates are nephrotoxic (cause kidney damage) and death in man and animals appears to be due to acute renal failure. Animal studies on chlorate suggest an increase in the utilisation or metabolism of thyroid hormones

Chlorates are readily absorbed by the gastrointestinal tract following ingestion. The chlorate ion is not metabolised to another compound, and elimination is exclusively by the kidneys. The acute toxic effects of potassium chlorate appear to be cumulative because of slow excretion of the chlorate ion

Albuminuria and other evidence of impaired kidney function may persist for several days or weeks after.

Severe intravascular haemolysis (blood cell damage), haemoglobinuria and methaemoglobinaemia are prominent features of chlorate poisonings although they may not be apparent until several hours have elapsed. Renal insufficiency may also result. Potassium chlorate has produced renal tubular necrosis in animals.

High levels can interfere with the ability of the blood to carry oxygen (methaemoglobinaemia), causing headache, dizziness. Ingestion may produce gastrointestinal distress, and may damage the kidneys. The primary mechanism of chlorate toxicity is rupture of the red blood cell membranes with intravascular haemolysis. The formation of methaemoglobin is secondary to lysis of red blood cells, and is caused by autooxidation of the free hemoglobin. The formation of methaemoglobin from free hemoglobin is irreversible, and may cause life-threatening effects. (Within the red blood cells, methaemoglobin is rapidly reduced by methaemoglobin reductase, but this activity is lost with cell lysis). Signs of chlorate intoxication may also include dark urine secondary to methaemoglobin formation.

Chlorates induce the formation of Heinz Bodies in the erythrocyte. Gross deformation of this cell may occur with premature splenic phagocytosis or haemolysis.

Central nervous system effects may also be secondary to hypoxia Potassium chlorate is also a relatively powerful irreversible inhibitor of catalase.

Infants (and presumably the fetus) are much more sensitive than adults to intracellular methemoglobin inducers. This is due to a relative deficiency in methaemoglobin reductase in red blood cells of newborns, because the fetal form of haemoglobin is more sensitive to reducing agents, and because the fetus has a greater oxygen demand. However, it is not clear whether the newborn or the fetus may be more sensitive to the haemolytic effect of chlorates than adults. The extracellular autooxidative formation of methaemoglobin from lysed cells is irreversible and complete in both adults and fetuses, so there would be no difference in sensitivity in this step.

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 10 of 14

Section 11 - TOXICOLOGICAL INFORMATION

Persons with pre-existing blood conditions, especially anemia, or those with kidney diseases, might be more sensitive. Persons with genetic diseases such as hereditary methaemoglobinemia and glucose-6-phosphate dehydrogenase deficiency (which increases the haemolytic susceptibility of humans to oxidising agents), and other persons who may be unusually susceptible to oxidants may also be at greater risk than the general population.

Several studies have reported adverse effects (significant organ and body weight reductions, haematological effects, changes in pituitary and thyroid glands) in rats exposed via drinking water to sodium and/or potassium chlorate.

High chlorate levels were found in the testes of rats after oral administration of potassium chlorate, but it is not known if chlorate can affect male fertility.

EYE

■ The dust may produce eye discomfort causing transient smarting, blinking. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

■ The material is moderately discomforting to the skin and is capable of causing skin reactions which may lead to dermatitis.

INHALED

■ The dust may be discomforting to the upper respiratory tract.

CHRONIC HEALTH EFFECTS

■ Primary route of exposure is usually by skin contact and inhalation of vapour.
■ As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

TOXICITY AND IRRITATION

■ Not available. Refer to individual constituents.

POTASSIUM CHLORATE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 1870 mg/kg

IRRITATION

Nil Reported

AMMONIUM CHLORIDE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 1650 mg/kg

Intraperitoneal (rat) LD50: 3250 mg/kg

IRRITATION

Eye (rabbit): 500 mg/24h SEVERE

Eye (rabbit): 100 mg SEVERE

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

POTASSIUM CHLORATE:

AMMONIUM CHLORIDE:

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 11 of 14

Section 12 - ECOLOGICAL INFORMATION

- DO NOT discharge into sewer or waterways.

POTASSIUM CHLORATE:

- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters. Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
- Chlorate is highly soluble in water (95.7 g/100 ml at 20 deg. C) and will therefore be uniformly distributed in groundwater or surface waters and be readily presented to aquatic organisms.
- The high solubility of chlorate implies that it does not easily adsorb to particulates nor bioaccumulate in biota.
- The chlorate anion is chemically stable under environmental conditions.
- Chlorate is a nitrate analogue, i.e., once chlorate is in the marine environment, it can be taken up by microalgae and macroalgae using the same mechanism as nitrate

The above combination of chlorate solubility, stability, and mobility creates the potential for both localised and area-wide potential effects of ecotoxicological interest.

Chlorate can easily be removed under anoxic conditions by mixed microbial cultures. There are numerous strains of micro-organisms capable of reducing both chlorate and perchlorate under anoxic conditions. Chlorate is non-toxic to wastewater bacterial assemblages at concentrations <1,000 mg/L. Due to the low oxygen concentration in anoxic selector basins, facultative anaerobic bacteria use the oxygen bound in chlorate for respiration, and reduce chlorate in the process. Under anaerobic conditions, chlorate (ClO_3^-) is first converted to chlorite (ClO_2^-) by the enzyme chlorate reductase, which is present in perchlorate- and chlorate-reducing bacteria. In the second step, chlorite is disproportionated to chloride (Cl^-) and molecular oxygen (O_2) by the non-respiratory enzyme chlorite dismutase, which catalyses the reaction. The presence of chlorite dismutase is a prerequisite for the growth of perchlorate- and chlorate reducing bacteria as chlorite is toxic due to its high reactivity. The chlorite dismutase enzyme is present in all dissimilatory perchlorate- and chlorate reducing bacteria

In the environment, because chlorate is a strong oxidizing agent (oxidation state V), it gets reduced to chlorine species in lower oxidation states, such as the oxyanions chlorite (ClO_2^- -oxidation state III) and hypochlorite (ClO^- , oxidation state I), chlorine dioxide (oxidation state IV), and chloride (oxidation state -I). Thus, at least some, and possibly a substantial, reduction of the chlorate resulting from the application of chlorate is likely to occur in the field prior to any runoff to surface water. Under environmental (terrestrial field) redox conditions, and based on chemical equilibria alone, the thermodynamically favored, end reduction product of chlorate in soil and in water is the chloride anion. Any intermediate chlorine dioxide that may form under environmental conditions will undergo photochemical reactions when exposed to sunlight. The chlorine oxyanions, chlorite and hypochlorite (other possible more reduced intermediates in the ultimate reduction of chlorate to chloride), are strong oxidizers in themselves; thus, they are also reduced and/or undergo disproportionation reactions. Although reduction reactions of chlorate, chlorite, and hypochlorite are said to occur very fast, how fast they occur is not known (i.e., the actual rate constants in the environment are not known). Therefore, at any given time the distribution of reduced species (type and concentration) cannot be estimated. However, it is unlikely that a single reduced species would be present for any length of time.

Dietary exposure (food only) to inorganic chlorates as the chlorate ion (ClO_3^-) may be expected from the translocation of very small amounts of chlorate ion by plants (translocation of significant amounts would be phytotoxic to plants) from the environment which may be present as a result of inorganic chlorate uses.

Chlorate is a thyroid toxicant producing thyroid gland follicular cell hypertrophy in rats and mice following chronic exposures, and may produce follicular cell tumors in rats. The lack of mutagenicity indicates that the thyroid tumors are induced by a non-mutagenic mechanism and are therefore not likely to be carcinogenic. The effects may be attributed to changes in levels of thyroid hormones seen after administration of high doses of sodium chlorate. In female mice there was equivocal and marginal evidence of increased pancreatic islet carcinoma. Sodium chlorate was negative in most bacterial gene mutation assays and in several cytogenetics tests, including a hypoxanthineguanine phosphoribosyl-transferase (HGPRT) assay in Chinese hamster ovaries and a micronucleus assay.

Based on the very low vapor pressure and very high solubility of chlorate ion in water,

chlora

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 12 of 14

Section 12 - ECOLOGICAL INFORMATION

expected to volatilize from soil or water. In addition, the low log n-octanol/water partition coefficient indicates that chlorates have low potential to bioaccumulate.

Inorganic chlorates are generally completely ionized in water, producing chlorate (ClO_3^-) anion. Anions do not bind readily to soil or sediment particulates and, therefore, are expected to be very mobile. Assuming that chlorate does not undergo any redox reactions, it is expected to be very mobile and to partition predominantly into the water. However, extensive redox reactions are expected to occur in the environment that will reduce the concentration of chlorate in the water column. The redox chemistry of chlorate affects its behavior in soils and natural water. Therefore, identification of the conditions under which chlorate and other oxyanions of chlorine may predominate is an important consideration in the environmental fate and risk assessment of chlorate. The oxidation-reduction reactions of chlorate with organic matter and other inorganic chemical species are very complex and depend on the redox conditions of the media, nature and concentration of reductants, chlorate concentration, temperature, pH, and degree of moisture (soils). For example, chlorate is generally more stable under alkaline than acidic conditions; however, when a chemical element (chlorine) can exist in two or more oxidation states (i.e., chlorite and chlorate), the redox potential of the media also effects the predominance of the reduction products. Nitrate concentrations in soil and water (as well as other physical and chemical properties of soil and water) play an important role in the redox chemistry of chlorate in the environment. The duration of residual activity for sodium chlorate in soil was 3-4 months after using 1,000 liters of a 1% solution/ha. Sodium chlorate may persist in soil for 6 months to 5 years, depending on rate applied, soil type, fertility, organic matter, moisture, and weather conditions. Toxicity in soil is decreased considerably by a high nitrate content, alkaline conditions, and high soil temperatures. Decomposition of the compound occurs more readily in moist soils above 20 degrees C.

Plants absorb sodium chlorate through both roots and leaves. Chlorate is carried downward through the xylem since it kills the phloem tissue. It also increases the rate of respiration, decreasing catalase activity, and depleting the plant's food reserves. Chlorate-injured plants are more susceptible to frost. Sodium chlorate is 30-50 times more toxic to plants than sodium chloride (table salt)

Chlorate is nontoxic (acute toxicity > 100 mg/l) to most of the freshwater and marine species examined. However, chlorate is highly toxic (acute toxicity < 0.1 mg/l) to certain macro brown algal species. The toxicity of chlorate is coupled to its reduction to chlorite and this reduction is linked to an active, functioning nitrate reductase system. Chlorite is toxic to the algae, which do not contain the enzyme chlorite dismutase to convert chlorite into innocuous chloride and oxygen

Sodium chlorate is considered non-toxic to fish. The possible 48-hour LC50 for various species of fish is as high as 10,000 mg/l; other reported literature values confirm low toxicities, e.g.:

- Fish (freshwater) LC50: 7.3-1100 mg/l; NOEC 600-1000 mg/l
- Invertebrates (freshwater) LC50: 2100 - 4100 mg/l; NOEC 52-1000 mg/l
- Aquatic Plants LC50: 133-444 mg/l; NOEC 50-3137 mg/l

Chlorites produced as a result of the reduction of chlorates exhibit low to high environmental toxicity. Environmental conditions dictate the rate and extent of conversion.

Biological uptake of chlorate by phytoplankton appears to be a potential and significant sink for effluent-derived chlorate. Since chlorate is an analogue of nitrate, chlorate will be taken up by the phytoplankton. Once chlorate is in the marine environment, it can be taken up by macroalgae using the same mechanism as nitrate. In brown algae, the uptake of nutrients is an active process and does not simply rely on the slow diffusion of seawater. Nitrate and chlorate are structurally analogous to each other and may potentially be incorporated into the same enzyme active site, as is evidenced by the fact that chlorate can be used as a substrate by various nitrate reductases. There is competition for the active sites on the enzyme system and if nitrate is abundant, it prevents too much chlorate from being reduced. If nitrate concentrations are just high enough to induce the nitrate reductase system, but not high enough to out-compete chlorate for all the active sites, then chlorate may be reduced to chlorite at a maximal rate.

Chlorite toxicity to various aquatic species has been reported:

- Fish (freshwater) LC50: 50.6-420 mg/l; NOEC 32-216 mg/l
- Fish (estuarine/ marine) LC50: 75 mg/l; NOEC 13.9 mg/l
- Invertebrates (freshwater) EC50: 0.027-1.4 mg/l; NOEC 0.003 - 0.4 mg/l
- Invertebrates (estuarine/ marine) EC50: 0.576 - 21.4 mg/l; NOEC 14.3 mg/l
- Aquatic Plants EC50: 1.32 mg/l; NOEC <0.62 mg/l

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 13 of 14

Section 12 - ECOLOGICAL INFORMATION

The long-term toxicity of sodium chlorate to birds resulted in reduced egg production and fertility.

AMMONIUM CHLORIDE:

■ Daphnia magna EC50 (48hr.) (mg/l): 161

■ In air ammonia is persistent whilst, in water, it biodegrades rapidly to nitrate, producing a high oxygen demand. Ammonia is strongly adsorbed to soil. Ammonia is non-persistent in water (half-life 2 days) and is moderately toxic to fish under normal temperature and pH conditions. Ammonia is harmful to aquatic life at low concentrations but does not concentrate in the food chain.

Drinking Water Standards:

0.5 mg/l (UK max.)

1.5 mg/l (WHO Levels)

Soil Guidelines: none available.

Air Quality Standards: none available.

■ The material is classified as an ecotoxin* because the Fish LC50 (96 hours) is less than or equal to 0.1 mg/l

* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

Toxicity Fish TLm (96h): 50mg/l

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
Smoke Cartridges: Classic, Perfume, Orange #201- 3200		No data		
potassium chlorate	HIGH	No data	LOW	HIGH
ammonium chloride		No data	LOW	

Section 13 - DISPOSAL CONSIDERATIONS

- Consult manufacturer for recycling options and recycle where possible .
 - Consult State Land Waste Management Authority for disposal.
 - Incinerate residue at an approved site.
 - Recycle containers if possible, or dispose of in an authorised landfill.
- DO NOT incinerate unopened containers because of explosion hazard.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None (ADG6)

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE: S5

REGULATIONS

Regulations for ingredients

continued...

SMOKE CARTRIDGES: CLASSIC, PERFUME, ORANGE #201-3200

Chemwatch Independent Material Safety Data Sheet

Issue Date: 19-Feb-2008

NA317TC

CHEMWATCH 4525-60

Version No:2.0

CD 2009/3 Page 14 of 14

Section 15 - REGULATORY INFORMATION

potassium chlorate (CAS: 3811-04-9) is found on the following regulatory lists;

"Australia Hazardous Substances", "Australia Inventory of Chemical Substances (AICS)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 2", "Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5", "OECD Representative List of High Production Volume (HPV) Chemicals"

ammonium chloride (CAS: 12125-02-9,152128-19-3) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia Therapeutic Goods Administration (TGA) Substances that may be used as active ingredients in Listed medicines", "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP", "GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships", "IMO Provisional Categorization of Liquid Substances - List 1: Pure or technically pure products", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

No data for Smoke Cartridges: Classic, Perfume, Orange #201-3200 (CW: 4525-60)

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
ammonium chloride	12125- 02- 9, 152128- 19- 3

■ 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/references.

■ 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.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: 19-Feb-2008

Print Date: 5-Feb-2010

This is the end of the MSDS.