Pacific Scientific Energetic Materials Co.

< < < < < MATERIAL SAFETY DATA SHEET > > > > >

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Cartridge Assembly

TRADE NAME(S) / SYNONYM(S): fire extinguisher cartridge; BNCP 1440's FIREX (replaces 2-101440)

PRODUCT NUMBER(S):
2-102630-1 [30903944]
2-101431-1 (in-house, w/o protective features)
2-102630-2 [30903894]
2-101431-2 (in-house, w/o protective features)

MSDS NUMBER / SPECIFYING LETTER: 00233 T

REVISION DATE: 7 June 2001

SHIPPING REFERENCE NUMBER: US DOT Competent Authority: EX-0106015

MANUFACTURER:
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2. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS (* - below required reporting levels per OSHA, 29 CFR § 1900.1200)

COMPONENT NAME / CAS NUMBER: hexanitrostilbene (HNS) / 20062-22-0
WEIGHT PERCENTAGE: < 1 %*

COMPONENT NAME / CAS NUMBER: tetraammine-*cis*-*bis*(5-nitro-2H-tetraazolato-N^2) cobalt^{III} perchlorate (BNCP) / 178959-25-6
WEIGHT PERCENTAGE: < 1 %*

COMPONENT NAME / CAS NUMBER: zirconium, metal powder / 7440-67-7
WEIGHT PERCENTAGE: < 0.1 %*

COMPONENT NAME / CAS NUMBER: potassium perchlorate (KP) / 7778-74-7
WEIGHT PERCENTAGE: < 0.1 %*

COMPONENT NAME / CAS NUMBER: graphite [C] / 7782-42-5
WEIGHT PERCENTAGE: < 0.1 %*

COMPONENT NAME / CAS NUMBER: difluoroethene-hexafluoropropene-tetra-fluoroethene terpolymer / 25190-89-0
WEIGHT PERCENTAGE: < 0.1 %*

NET EXPLOSIVE WEIGHT (NEW): 332 - 362 mg

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING: Explosive Product ! Do not attempt to manually fight fires. Product may be sensitive to shock, impact, friction, electrostatic discharge, high pressure or high temperature. Product may ignite and explode if exposed to any of these conditions, releasing toxic fumes, heat, shock waves and container fragments.

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

EYES: The product is sealed preventing exposure to the hazardous ingredients inside. If product seal ruptures exposing hazardous ingredients inside, discard product avoiding contact with the eyes. Exposure to ignition products may cause eye irritation.

SKIN: The product is sealed preventing exposure to the hazardous ingredients inside. If product seal ruptures, discard product avoiding contact with the skin. Poses little or no immediate hazard. Exposure to ignition products may cause skin irritation.

INHALATION: The product is sealed preventing exposure to the hazardous ingredients inside. Exposure to ignition products may cause respiratory irritation. Ignition products will contain zirconium, cobalt, chlorine and fluorine compounds, plus nitrogen oxides.

INGESTION: Not a hazard in normal industrial use. If product seal ruptures, discard product using proper protection. Some ingredients are highly poisonous by ingestion.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing pulmonary diseases such as emphysema, asthma, etc. may be aggravated by overexposure to ignition products.

CARCINOGENICITY (CANCER) LISTING STATUS

OSHA, NTP & NIOSH: Neither the product nor its hazardous components are listed

IARC: 2B - Limited Evidence [cobalt compound]

ACGIH: A3 - Animal Carcinogen [inorganic cobalt compound, as cobalt]

REFER TO SECTION 11, TOXICOLOGICAL INFORMATION, FOR ADDITIONAL DATA.

4. FIRST AID MEASURES

EYES: If exposed to container fragmentation, bandage eyes and transport. If exposed to ignition byproducts, remove contact lenses immediately, flush with water for at least 15 minutes, occasionally lifting upper and lower eyelids. Seek medical attention if needed.

SKIN: Wash off any residue with soap and warm water. Seek medical attention if irritation develops.

INHALATION: Remove to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, administer oxygen. Seek immediate medical attention.

INGESTION: Seek immediate medical attention.

NOTE TO PHYSICIAN: Supportive care. Product ignition produces small quantities of zirconium, cobalt, chlorine and fluorine compounds, plus nitrogen oxides. Treatment based on judgement of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: not applicable
METHOD USED: not applicable
LOWER FLAMMABLE LIMIT: self-oxidizing
UPPER FLAMMABLE LIMIT: self-oxidizing

AUTOIGNITION TEMPERATURE: ≥ 480°F (≥ 250°C) [BNCP]

FIRE AND EXPLOSION HAZARD: WARNING - Explosive Product ! Product may be sensitive to shock, impact, friction, electrostatic discharge, high pressure or high temperature. Must not be confined if burning. Product may deflagrate or detonate if exposed releasing toxic fumes, heat, shock waves and container fragments.

EXTINGUISHING MEDIA: Permanently-installed, automatic water sprinkler / deluge system is recommended.

FIRE FIGHTING INSTRUCTIONS: Do not attempt to manually fight fires. In case of fire, personnel should immediately evacuate the area, using as much protective cover as possible and activate deluge and alarm systems.

HAZARDOUS COMBUSTION PRODUCTS: Extreme heat and toxic gases containing zirconium, cobalt, chlorine and fluorine compounds; plus nitrogen oxides may be emitted during ignition.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: If product seal ruptures, barricade area, eliminate ignition sources, use a soft bristle brush and a conductive rubber pan or rubber shovel to clean-up spills. Use conductive containers and ground all containers when transferring the spilled material. Refer to Section 9 for the proper desensitizing agent to wet and desensitize the spilled material.

LARGE SPILL

SOIL SPILL: Remove all contaminated soil to dispose of as hazardous waste.

AIR RELEASE: Not applicable

WATER SPILL: Flush with copious amounts of water. Collect water to dispose of as hazardous waste.

OCCUPATIONAL SPILL: If product seal ruptures, barricade area and eliminate ignition sources. Refer to SMALL SPILL above.

7. HANDLING AND STORAGE

HANDLING: Handling and use of explosives and related dangerous materials must be limited to personnel who are specifically authorized and trained in this area.

Refer to the Department of Defense Contractors Safety Manual number DOD4145.26M, including sources listed within, and any other appropriate information for detailed instructions regarding proper handling, storage, use and disposal of explosives and related dangerous material.

STORAGE: Store in approved storage magazines only. Storage and handling must conform to appropriate quantity / distance requirements, barricading, grounding and personnel material limits. Keep product cool and dry in storage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT (PPE)

EYE PROTECTION: Industrial safety glasses or goggles must be worn when handling any type of explosive product.

SKIN PROTECTION

GLOVES: Impervious, static-dissipative gloves are recommended if product seal ruptures.

CLOTHING: High cotton-content clothing and underclothing, as well as conductive shoes or legstat(s), wristat(s) and a static-dissipative coat, are recommended to avoid static electricity build-up.

EMERGENCY WASH FACILITY: Eye washing capability is required.

RESPIRATORY PROTECTION: Appropriate NIOSH / MSHA-approved respiratory protection is recommended if exposed to particulate matter, and, for protection against toxic gaseous ignition products, but should not be necessary with normal handling.

OTHER PROTECTION: None indicated.

ENGINEERING CONTROLS: Effective shielding is recommended for personnel when handling these devices. Humidity control (i.e. higher relative humidity, > 60% as recommended by DOD) reduces or prevents static electricity build-up. Explosion-proof equipment is required when operating with exposed explosive materials.

VENTILATION

LOCAL: Not required.

SPECIAL: Explosion-proof electrical is required, where applicable.

MECHANICAL: General-coverage, moderate-flow, is recommended for particulate and ignition product removal.

EXPOSURE GUIDELINES:

COMPONENT: tetraammine-*cis-bis*(5-nitro-2H-tetrazolato-N^2) cobalt^{III} perchlorate (BNCP)

OSHA TWA:	0.1 mg/m^3	[cobalt (Co) dust / fume]
OSHA STEL:	not found	
ACGIH TWA:	0.02 mg/m^3	[as cobalt (Co), inorganic compound]
ACGIH STEL:	not found	

OTHER(S): **NIOSH TWA:** 0.05 mg/m^3 [cobalt (Co) dust / fume]
IDLH: 20 mg/m^3 [as cobalt (Co)]

COMPONENT: zirconium, metal powder [Zr]

OSHA TWA: 5 mg/m^3
OSHA STEL: not found

ACGIH TWA: 5 mg/m^3
ACGIH STEL: 10 mg/m^3

OTHER: **NIOSH TWA:** 5 mg/m^3
NIOSH STEL: 10 mg/m^3

IDLH: 50 mg/m^3

COMPONENT: graphite [C]

OSHA TWA: 15 million parts / ft^3 [2.5 mg/m^3 (respirable frxn) - 1989 vacated PEL]
OSHA STEL: not found

ACGIH TWA: 2 mg/m^3 [respirable fraction]
ACGIH STEL: not found

OTHER: **NIOSH TWA:** 2.5 mg/m^3 [respirable fraction]

IDLH: 1250 mg/m^3

COMPONENTS: hexanitrostilbene (HNS)
potassium perchlorate
difluoroethene-hexafluoropropene-tetrafluoroethene terpolymer

OSHA TWA: 15 mg/m^3 [total],
5 mg/m^3 [respirable dust fraction] (PNOR)

OSHA STEL: not found

ACGIH TWA: 10 mg/m^3 [inhalable particulate],
3 mg/m^3 [respirable particulate] (PNOS)

ACGIH STEL: not found

OTHER: none found

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: metallic ordnance hardware
ODOR: odorless
PHYSICAL STATE: solid
pH @ 25°C: not determined
VAPOR PRESSURE: not applicable, sealed product
VAPOR DENSITY: not applicable, sealed product
BOILING POINT: not applicable

MELTING POINT:	not applicable
SOLUBILITY IN H_2O:	negligible
SPECIFIC GRAVITY (H_2O=1):	greater than 1
BULK DENSITY:	greater than 1, identical to specific gravity
CHEMICAL FAMILY:	not applicable
MOLECULAR WEIGHT:	not applicable
MOLECULAR FORMULA:	not applicable
VISCOSITY:	not applicable
EVAPORATION RATE:	not applicable, sealed product
DECOMPOSITION TEMP:	≥ 480°F (≥ 250°C) by auto-ignition [BNCP]
DESENSITIZING AGENT:	CAUTION: The product may only be desensitized if large volumes of water or mineral oil come in contact with the explosive components inside. Sealed units should be shunted and disposed of in accordance with Section 13.
VOC CONTENT:	none

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: This explosive product is stable if handled properly. Avoid conditions listed below.

CONDITIONS TO AVOID: Shock, impact, friction, electrostatic discharge, high pressure, high temperature, open flame and chemical or physical contamination.

INCOMPATIBILITY WITH OTHER MATERIALS: The product is sealed preventing exposure to the hazardous ingredients inside. If the seal ruptures, remove all other hazardous materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Extreme heat and toxic gases containing zirconium, cobalt, chlorine and fluorine compounds, plus nitrogen oxides may be emitted during ignition.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

HEALTH HAZARDS / TOXICOLOGY: The product is sealed preventing exposure to the hazardous ingredients inside. If the seal ruptures, remove all other hazardous materials.

HNS and BNCP (as a nitro compound of an aromatic hydrocarbon): Skin absorption and inhalation are usual routes of entry for these materials. The effects of acute exposure are the reduction of oxygen-carrying power of the blood and depression of the nervous system. Chronic exposure may cause anemia, moderate cyanosis, fatigue, slight dizziness, headache, insomnia and weight loss. Prolonged chronic exposure may lead further to liver and/or kidney damage, manifesting as acute yellow atrophy and toxic hepatitis or fatty degeneration of the kidneys.

LD_{50}: no data found

BNCP (as a cobalt compound): Low toxicity by ingestion. Ingestion of soluble salts produces nausea and vomiting by local irritation; possibly can cause liver and kidney damage. Locally, cobalt has been shown to cause dermatitis and hypersensitivity of the skin. Animal carcinogen (AGCIH) and suspected human carcinogenicity. Further reports, state both confirmed and questionable carcinogen with experimental neoplastigenic and tumorigenic data.

LD_{50}: no data found

potassium perchlorate and BNCP (as a perchlorate): Severe irritant to skin, eyes and mucous membranes. Implicated in aplastic anemia. Absorption can cause methemoglobinemia and kidney injury. An experimental teratogen.

LD_{50}: no data found

zirconium: Inhalation may lead to lung granulomas. Fine zirconium powder readily generates respirable dust, which is retained in the lungs. Fine powder imbeds in skin, eyes and other exposed tissues.

LD_{50}: no data found

graphite: Moderately toxic by intravenous route. Experimental reproductive effects.

LD_{50}: 440 mg/kg; intravenous; mouse

difluoroethene-hexafluoropropene-tetrafluoroethene terpolymer: ACGIH recommends that air concentrations of thermal decompositon products (fumes) of PTFE, a closely-related fluoropolymer, be controlled at 'as low as possible' levels. No toxicological information found, except references to 'polymer fume fever'.

LD_{50}: no data found

12. ECOLOGICAL INFORMATION

The product is sealed preventing exposure to the hazardous ingredients inside. If the seal ruptures, the small amount of hazardous ingredients inside should have no ecological impact.

13. DISPOSAL CONSIDERATIONS

RCRA HAZARDOUS WASTE CODES (product as manufactured):
D003 - reactive characteristic

WASTE DISPOSAL METHOD: Explosives or related dangerous material should be destroyed by open burning / open detonation in an approved incinerator, or by another approved method such as chemical treatment / destruction. Contaminated property must not be buried.

REGULATIONS GOVERNING TREATMENT, STORAGE AND DISPOSAL OF HAZARDOUS WASTE IS SUBJECT TO CHANGE AND REINTERPRETATION. SINCE THE OWNER OF THE WASTE IS RESPONSIBLE FOR PROPER DISPOSAL, CHECK WITH FEDERAL, STATE AND LOCAL ENVIRONMENTAL AGENCIES IF IN DOUBT OF THE REQUIREMENTS OF APPLICABLE LAWS, RULES AND REGULATIONS. TREATMENT, STORAGE AND DISPOSAL MUST BE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION: This product is regulated as a US DOT Hazardous Material. Applicable regulations are found in title 49 of the Code of Federal Regulations. An authorized carrier in full compliance with these regulations must be used to transport this product. This product may not be mailed through the US Postal system.

UN PROPER SHIPPING NAME / NUMBER: Cartridges, power device / UN0276

UN CLASSIFICATION CODE: 1.4C

PACKAGING GROUP: II

LABEL(S) REQUIRED: EXPLOSIVE 1.4C, CARGO AIRCRAFT ONLY

APPLICABLE PACKAGING SECTION: 49 CFR § 173.62 non-bulk [PI-134], plus special provision 110 per 49 CFR § 172.102

DOT REPORTABLE QUANTITY (RQ): 100 lbs. (45.4 kg) per 49 CFR § 172.101, Appendix (D003 reactivity)

OTHER TRANSPORTATION INFORMATION: For general emergency response guidance, actions, and potential hazards, refer to the "2000 Emergency Response Guidebook" or 2000ERG, **GUIDE NUMBER 114.**

15. REGULATORY INFORMATION

U.S. REGULATIONS

FEDERAL

OSHA: Regulated under 29 CFR § 1910.1200

TSCA: All hazardous components should be reported on the inventory.

CERCLA RQ: 100 lbs. (45.4 kg) [D003 reactivity]

SARA - SECTION 302 TPQ: Not an Extremely Hazardous Substance.

- SECTION 304 RQ: See CERCLA RQ.

- SECTION 313: Reportable [cobalt compound]

STATES

CALIFORNIA PROPOSITION 65: The product and its hazardous components are not on their list.

NEW JERSEY RIGHT-TO-KNOW: The product (as EXPLOSIVES C) and the components, zirconium, potassium perchlorate, HNS and BNCP (as a cobalt compound and a perchlorate, inorganic, n.o.s.), are on the Right-to-Know Hazardous Substance List (rev. 3/93), which consists of both the Workplace Hazardous Substance List and the Environmental Hazardous Substance List. Zirconium and potassium perchlorate are on the Special Health Hazard Substance List.

PENNSYLVANIA RIGHT-TO-KNOW: The components that are listed, zirconium, potassium perchlorate, graphite and BNCP (as a cobalt compound), are on the Hazardous Substance List. Cobalt compounds are included as Environmental Hazards. None are included as Special Hazardous Substances.

INTERNATIONAL REGULATIONS

To be determined

16. OTHER INFORMATION

HMIS RATINGS (Sealed product rating):

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 4

PERSONAL PROTECTION: A + X

CERCLA or NFPA RATINGS (SCALE 0-4): not yet determiined

REVISION HISTORY

Initial issue: 24 June 99, ANSI Z400.1

PREPARED BY: J. Geving - Environmental, Health & Safety

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