PACIFIC SCIENTIFIC

Pacific Scientific Energetic Materials Co.

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

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Pressure Cartridge Dual Bridgewire

TRADE NAME(S) / SYNONYM(S): dual-bridge initiator; N_2 release actuator; *igniters {DOT}*

PRODUCT / PART NUMBER(S): **103377-71 [30903925-1, 52000735-(1,2)]**
[ref. 29025949, 900523 & 65665-1]
2-102019-1 [equivalent s/a, w/o protective features]

MSDS NUMBER / SPECIFYING LETTER: 00012 B1

REVISION DATE: 14 October 2005

SHIPPING REFERENCE NUMBER: US DOT Competent Authority: EX1985020243

MANUFACTURER:
Danaher Corporation -
Pacific Scientific Energetic Materials Co. [PSEMC]
7073 West Willis Road, #5002
Chandler, Arizona 85226-5111

TELEPHONE NUMBERS:
(480) 763-3000 [6am-4pm MST]
(520) 796-1243 FAX
(800) 535-5053 Infotrac [24-hr]
[website - www.psemc.com]

2. COMPOSITION / INFORMATION ON INGREDIENTS

NET EXPLOSIVE WEIGHT (NEW): 114 mg maximum

HAZARDOUS INGREDIENTS
The following table contains the hazardous materials that are below the required reporting levels per OSHA, 29 CFR § 1900.1200 (< 1 % or < 0.1 %, if carcinogenic):

COMPONENT NAME	CAS NUMBER
cyclonite (RDX, cyclotrimethylenetrinitramine)	121-82-4
diphenylamine (DPA)	122-39-4
zirconium [Zr] (metal powder)	7440-67-7
potassium perchlorate (KP) [$KClO_4$]	7778-74-7
nitrocellulose (NC)	9004-70-0
boron nitride [BN]	10043-11-5
difluoroethene-hexafluoropropene-tetrafluoroethene terpolymer	25190-89-0

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 and fluorine compounds, plus nitrogen oxides and potassium chloride dust. Boron nitride will be ejected, when it is contained in the device.

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, IARC, NTP, NIOSH and ACGIH: Neither the product nor any hazardous components are listed

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 products, 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 and fluorine compounds, plus nitrogen oxides and potassium chloride dust. Boron nitride will be ejected, when it is contained in the device. 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: • 400°F (• 205°C) [RDX]

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 and fluorine compounds, plus nitrogen oxides and potassium chloride dust may be emitted during ignition. Boron nitride will be ejected, when it is contained in the device.

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-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:

Measurable exposure is not likely for this product in normal handling.

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:	• 400°F (• 205°C) by auto-ignition [RDX]
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:	negligible

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, or 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 BYPRODUCTS: Extreme heat and toxic gases containing zirconium and fluorine compounds, plus nitrogen oxides and potassium perchlorate dust may be emitted during ignition. Boron nitride will be ejected, when it is contained in the device.

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.

The small quantities of the hazardous components involved in each device is unlikely to cause any chronic health effects or even notable acute effects, if released.

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: Igniters / UN0454

UN CLASSIFICATION CODE: 1.4S

PACKAGING GROUP: II

LABEL(S) REQUIRED: EXPLOSIVE 1.4S

APPLICABLE PACKAGING SECTION: 49 CFR § 173.62 non-bulk [PI-142]

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 "*2004 Emergency Response Guidebook*" or 2004ERG, **GUIDE NUMBER 114.**

15. REGULATORY INFORMATION

U.S. REGULATIONS

FEDERAL

OSHA: Regulated under 29 CFR § 1910.1200

TSCA: All hazardous components are 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: Not regulated

STATES

CALIFORNIA PROPOSITION 65: No components are on their list.

NEW JERSEY RIGHT-TO-KNOW: The product (as EXPLOSIVES C) and the components, cyclonite, diphenylamine, zirconium and potassium perchlorate, 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, cyclonite, diphenylamine, zirconium, potassium perchlorate and graphite, are on the Hazardous Substance List. Diphenylamine is listed as an Environmental Hazard. 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 determined

REVISION HISTORY

Initial issue: 5 April 93, ANSI Z400.1

(SDI - Aerospace & PSEMC West LLC issues may have been generated for some products before this date.)

PREPARED BY: J. Geving - Environmental Health & Safety [(480) 763-3043, jgeving@psemc.com]

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