



MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Estes Model Rocket Engines	
PRODUCT NUMBER:	
TRADE NAME: Estes Model Rocket Engines GENERAL USE: Model Rocket Propulsion CHEMICAL FAMILY: Insensitive Explosive (Class 1.4) PRODUCT DESCRIPTION: Kraft paper cylinder with light gray clay at ends, one end has a small orifice with black material inside. Sulfur odor.	
MANUFACTURED FOR: Estes-Cox Corp. d/b/a Estes Industries	DATE PREPARED: January 7, 2011 SUPERSEDES: August 5, 2010
ADDRESS (NUMBER, STREET, P.O. BOX) P.O. Box 227, 1295 H Street	TELEPHONE NUMBER FOR GENERAL INFORMATION 719-372-6565
(CITY, STATE AND ZIP CODE) COUNTRY Penrose. CO 81240 USA	CHEMTEL 24-HOUR EMERGENCY TELEPHONE NUMBER  1-800-255-3924 01-813-248-0585 North America Toll Free International

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING! THIS DEVICE CONTAINS A FAST BURNING CHARGE. KEEP AWAY FROM FIRE AND HEAT SOURCES. SEVERE MECHANICAL IMPACT MAY DEFORM PRODUCT. Individual cartridges may ignite if the unit is exposed to extreme heat as seen with fire conditions. Oxides of Nitrogen, Carbon, and Sulfur may be formed. Keep out of the reach of young children and pets. Adult supervision is strongly encouraged when product is used, especially by young children. Product contents are harmful by ingestion. Ignition of product when confined may lead to an explosion.

POTENTIAL HEALTH EFFECTS

INHALATION:
 Normal handling of the unused product poses no exposure hazards. When the product is used, particles and vapors may be generated which may cause temporary slight irritation to the respiratory tract; this is a rare occurrence when the product is used as directed..

SKIN:
 Unlikely to cause irritation to skin. Particles from ignited product may cause thermal burns.

EYES:
 Unlikely to cause irritation to eyes; In unusual cases, particulates from used product may cause irritation.

INGESTION:
 Ingestion of product is highly unlikely. Components of product are harmful and will cause irritation to gastro-intestinal tract.

CARCINOGENICITY:
 Product contains silica, which is considered carcinogenic by the State of California (Proposition 65).

SECTION 3 - HAZARDOUS INGREDIENTS

Hazardous Components	% (wt)	CAS #	EINECS #	EU Hazard Symbol(s)	EU RISK PHRASES (Full Text Sections 15 & 16)
Potassium nitrate	60-80	7757-79-1	231-818-8	Xn, O	R8, R36/37/38
Sulfur	10-20	7704-34-9	231-722-6	F, Xi	R11, R36/37/38
Charcoal	10-20	16291-96-6	240-383-3	None	None
Graphite	NR	7782-42-5	231-955-3	None	None

NOTES: This Material Safety Data Sheet is prepared to comply with the United States Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200), the Canadian Workplace Hazardous Materials Information System (WHMIS), and European Union Directives. Hazard symbols and risk phrases are based on maximum listed concentration of each hazardous ingredient. Unlisted ingredients are not "hazardous" per the OSHA Hazard Communication Standard (29 CFR 1910.1200), the Canadian Workplace Hazardous Materials Information System (WHMIS) or the European (GHS) directives and are considered trade secrets under US Federal Law (29CFR and 40CFR), Canadian Law (Health Canada Legislation), and European Union Directives.

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SECTION 4 - FIRST AID MEASURES

INHALATION:

If symptoms of lung irritation occur (coughing, wheezing or breathing difficulty), remove from exposure area to fresh air immediately. Get medical attention in the unusual event of severe distress.

EYES:

Remove contact lenses, then wash for 15 minutes with clean potable water lifting upper and lower lids occasionally. Seek medical attention if irritation persists.

SKIN:

Wash with plenty of soap and water. Seek medical attention if delayed dermatitis develops (a rare condition).

INGESTION:

Contact medical authorities immediately. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs naturally, have victim lean forward to avoid aspiration of regurgitant. Give 1-2 glasses of water to victim if victim is conscious and able to swallow and seek immediate medical assistance. Never give anything by mouth to an unconscious person. **Note to Physician: This product contains nitrates, which may produce methemoglobinemia. Methylene blue may be required for treatment. Treatment should be aimed at reducing methemoglobin levels, as well as providing respiratory and metabolic support. As product contains charcoal, gastric lavage may be of benefit within 30-60 minutes post-ingestion.**

SECTION 5 - FIRE FIGHTING MEASURES

GENERAL HAZARDS:

Flammability Classification: (defined by 29 CFR 1910.1200) Class 1.4 Explosive. Can rapidly burn or explode (if confined in metal or similar situations) under fire conditions. Individual devices will randomly burn and/or explode. Product will not mass explode if multiple devices are involved. Burning material may produce toxic and irritating vapors. See Emergency Response Guidebook for further information. Mechanical impacts or electrical discharges are highly unlikely to cause product to ignite.

EXTINGUISHING MEDIA:

Where large quantities are affected, flood area with water; if fire is already consuming product, incident command should base fire-fighting decisions on capabilities and total quantity of product. If no water is available, carbon dioxide, dry chemical or earth may be used.

FIRE FIGHTING PROCEDURES:

In case of fire, use normal fire fighting equipment. Protection concerns must also address the potential of the physical characteristic of this product as explosive. Quarantine area for fires involving large quantities of product.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

If fire reaches a large quantity of product, consider a withdrawal of personnel to a safe distance. Evacuate all persons, including emergency responders from the area for at least 500 feet (1/10 mile) in all directions.

HAZARDOUS COMBUSTION PRODUCTS:

Carbon Monoxide, Carbon Dioxide, Nitrous Oxides, Sulfur Oxides

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Model rocket engines are devices in a solid state. Simply pick up and place in containers approved for storage and transport. Wipe up any dust with wet cloths. **IF PRODUCT IS DAMAGED, DO NOT USE PRODUCT; DISCARD IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS. SEE SECTION 13.**

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

HANDLING: Product may burn/explode if exposed to extreme heat. Do not smoke while handling product. **DO NOT ATTEMPT TO DISMANTLE PRODUCT!!**

STORAGE: Avoid storage near extreme heat, ignition sources or open flame. Store at 32° - 140° F (0°-60° C). Store away from living quarters.

CONDITIONS TO AVOID: Heat/flame/sparks, Severe mechanical impact (which may deform product, rendering it unsafe for use).

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PRODUCT NAME: Estes Model Rocket Engines			
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SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION			
Hazardous Components	CAS #	ACGIH Exposure Limits	OSHA Exposure Limits
Potassium nitrate	7757-79-1	NE	NE
Sulfur	7704-34-9	15 mg/m3	15 mg/m3
Charcoal	16291-96-6	NE	NE
Graphite	7782-42-5	2 mg/m3	2.5 mg/m3 (respirable dust)
PERSONAL PROTECTION			
RESPIRATORY PROTECTION: A vapor respirator may be advisable or required under emergency conditions.			
PROTECTIVE GLOVES: None generally required.			
EYE PROTECTION: Always follow the National Association of Rocketry (NAR) Model Rocketry Safety Code and all applicable laws and regulations.			
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Not required when product is used as directed by manufacturer.			
WORK / HYGIENIC PRACTICES: Avoid breathing fumes from ignition. Do not smoke while handling product; eating and drinking are also to be avoided.			
SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES			
DESCRIPTION: Sulfur Odor - See Note for Appearance.		CONDITIONS TO AVOID: Not applicable.	
pH Not applicable.		SPECIFIC GRAVITY (WATER = 1) Not applicable	
MELTING POINT Not applicable.		SOLUBILITY IN WATER Insoluble - some components are soluble in water	
FLASH POINT Not applicable.		VISCOSITY Not applicable	
FLAMMABLE LIMITS LEL: None UEL: None		VAPOR DENSITY (AIR = 1) Not applicable.	
AUTOIGNITION TEMPERATURE NR		EVAPORATION RATE (WATER = 1) Not applicable.	
VOLATILE ORGANIC COMPOUND (VOC) INFORMATION Not applicable.			
NOTES: Appearance and Odor: Kraft paper cylinder with light gray clay at ends, one end has a small orifice with black material inside			
SECTION 10 - STABILITY AND REACTIVITY			
STABILITY: Stable under normal temperatures and pressure.		CONDITIONS TO AVOID: Extreme heat; extreme mechanical impacts.	
INCOMPATIBILITY (MATERIALS TO AVOID): Acids, Class A & B explosives, strong oxidizers.			
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Carbon Monoxide, Carbon Dioxide, Nitrous Oxides, Sulfur Oxides under fire conditions only.			
HAZARDOUS POLYMERIZATION: Will not occur.		CONDITIONS TO AVOID: None related to polymerization.	
SECTION 11 - TOXICOLOGICAL INFORMATION			
Complete Product			
Oral LD₅₀	Product contents are harmful; ingestion of used product is highly unlikely.		
Dermal LD₅₀	Product is unlikely to cause skin irritation. Ignited particles may cause thermal burns.		
Inhalation LC₅₀	Unused product is harmless. Vapors/particles from deployed product may be irritating.		
Irritation	Not a skin or eye irritant in unused form. Particulates and vapors from ignited product are possibly irritating to eyes and respiratory system in unusual cases.		

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: Estes Model Rocket Engines
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SECTION 11 - TOXICOLOGICAL INFORMATION Continued

Product Components

Hazardous Components	CAS #	LD50 of Ingredient (Oral, Rat - unless otherwise specified)	LC50 of Ingredient (Inhalation, Rat - unless otherwise specified)
Potassium nitrate	7757-79-1	Not Established	Not Established
Graphite	7782-42-5	Not Established	Not Established
Charcoal	16291-96-6	Not Established	Not Established
Sulfur	7704-34-9	> 8437 mg/kg	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

No data is available on this product, but both unused and used engines may be harmful if ingested by animals. Collection and careful disposal of spent engines is highly advisable; soak used engines in water until disintegration occurs, then discard with normal trash.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:

The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous. Damaged materials may pose a danger. To dispose of a small quantity of product, soak in water until the engine disintegrates, then dispose of remnants in an ordinary manner. For large quantities, incineration in a licensed facility is preferable.

SECTION 14 - TRANSPORT INFORMATION

DOMESTIC SHIPPING WITHIN THE USA

PROPER SHIPPING NAME: Flammable solid, organic, n.o.s. (Model rocket kits containing motors with or without un-installed igniters), UN 1325, Div. 4.1, PG II (CARGO AIRCRAFT ONLY if shipped by air)

DOT HAZARD CLASS / Pack Group: Class 4.1 / PG II

REFERENCE: DOT SP-7887

UN / NA IDENTIFICATION NUMBER: UN1325

LABEL: Flammable Solid or Explosives 1.4S

NOTES: Shipped via the United States Postal Service via Surface Mail Only as: Toy Propellant Devices, NA0323, Class 1.4S/ PG II for engines with ≤30 g of propellant. Engines with more than 30g of propellant may not be shipped by the USPS.

HAZARD SYMBOLS: See notes for correct symbols



INTERNATIONAL SHIPPING

PROPER SHIPPING NAME: Articles, Pyrotechnic, UN 0432, Div. 1.4S, PG II (Engines with ≤30 g of propellant)
Cartridges, Power Device, UN 0276, Div. 1.4C, PG II (Engines with >30 g of propellant)

IMDG HAZARD CLASS / Pack Group: Class 1.4S or 1.4C PG II (Category 05 - UN 0432; Category 06 - UN 0276) EmS: F-B, S-X

IATA HAZARD CLASS / Pack Group: Class 1.4S / PG II or 1.4C PG II (See Notes)

RID/ADR HAZARD CLASS / Pack Group: Class 1.4S / PG II or 1.4C PG II, EAC=1Y

TDG (Canada) HAZARD CLASS / Pack Group: Class 1.4S / PG II or 1.4C PG II

REFERENCE: IMDG, IATA, RID/ADR, TDG

UN / NA IDENTIFICATION NUMBER: UN 0432 or UN 0276

LABEL: Explosive, Class 1.4 (C or S), CAO (1.4C only)




NOTES: Engines with >30g propellant (Class 1.4C) may not be shipped on a passenger aircraft; 75 kg is the maximum load per Cargo Only Aircraft (CAO). For engines with ≤30 g of propellant, 25kg is the maximum load for passenger aircraft, 100 kg is the maximum for CAO.

HAZARD SYMBOLS: See notes for correct symbols



Note: Transportation information provided is for reference only. Client is urged to consult CFR 49 parts 100 - 177, IMDG, IATA, EU, United Nations TDG, and WHMIS (Canada) TDG information manuals for detailed regulations and exceptions covering specific container sizes, packaging materials and methods of shipping.

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PRODUCT NAME: Estes Model Rocket Engines							
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SECTION 15 - REGULATORY INFORMATION							
TSCA (USA - Toxic Substance Control Act): Components are listed under Section 8b.							
SARA TITLE III (USA - Superfund Amendments and Reauthorization Act):							
Acute Health: YES	Chronic Health: NO						
Fire: YES	Sudden Release of Pressure:* YES						
Reactive: NO	* - Only if confined under fire conditions						
SARA 313 REPORTABLE INGREDIENTS: None							
CERCLA (USA - Comprehensive Response Compensation and Liability Act): Potassium Nitrate is CERCLA reportable.							
California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986: WARNING: This product contains silica, a chemical known to the state of California to cause cancer.							
State Right To Know Laws: This product contains chemicals listed on the RTK Laws of CA, FL, MA, MI, MN, NJ, PA, & RI.							
CPR (Canadian Controlled Products Regulations): Exempt under WHMIS regulations as explosive.							
IDL (Canadian Ingredient Disclosure List): Components are listed in Section 2.							
DSL / NDSL (Canadian Domestic Substances List / Non-Domestic Substances List): Listed or exempt on both CDSL and NDSL.							
EINECS (European Inventory of Existing Commercial Chemical Substances): Referenced							
WGK Water Quality Index: NA for product.							
EUROPEAN (GHS) HAZARD SYMBOLS							
							
EU RISK PHRASES							
R2: Risk of explosion by shock, friction, fire or other sources of ignition.							
R22: Harmful if swallowed.							
EU SAFETY PHRASES							
S1/2: Keep locked up and out of the reach of children.							
SECTION 16 - OTHER INFORMATION							
HMIS HAZARD RATINGS							
0 = INSIGNIFICANT , 1 = SLIGHT 2 = MODERATE, 3 = HIGH 4 = EXTREME	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #e6f2ff;"> <td style="width: 80%;">HEALTH:</td> <td style="width: 20%; text-align: center;">1</td> </tr> <tr style="background-color: #ffe6e6;"> <td>FLAMMABILITY:</td> <td style="text-align: center;">3</td> </tr> <tr style="background-color: #ffe6cc;"> <td>PHYSICAL HAZARD:</td> <td style="text-align: center;">1</td> </tr> </table> <p style="text-align: center;">Personal Protective Equipment: See Section 8</p>	HEALTH:	1	FLAMMABILITY:	3	PHYSICAL HAZARD:	1
HEALTH:	1						
FLAMMABILITY:	3						
PHYSICAL HAZARD:	1						
Legend:							
ACGIH - American Congress of Government Industrial Hygienists , CAS - Chemical Abstracts Service							
EINECS- European Inventory of Existing Commercial Chemical Substances							
HMIS - Hazardous Materials Identification System, IARC - International Agency for Research on Cancer							
NA - Not Available , ND - Not Determined, NE - Not Established, NR - Not Reported							
NIOSH - National Institute for Occupational Safety and Health, NTP - National Toxicology Program							
OSHA - Occupational Safety and Health Administration							
Full R-Phrases (Not listed in Section 15): R8 Contact with combustible material may cause fire. R11 Highly Flammable. R36/37/38 Irritating to eyes, respiratory system and skin.							
REVISION SUMMARY: Revised 1/4/2011 - LB.							
MSDS Prepared by: ChemTel Inc. 1305 North Florida Avenue Tampa, Florida USA 33602-2902 Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573 Website: www.chemtelinc.com							
<p>The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.</p>							