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SA02667 SB11148 SB16337 SB22589 SA02658
SA02693 SB11149 SB16338 SB25137 SA02661-62
SB01862 SB30156 SA02664
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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) Penrose, CO 81240	COUNTRY 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.

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME: Estes Model Rocket Engines

PRODUCT NUMBER:

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).

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME: Estes Model Rocket Engines

PRODUCT NUMBER:

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:	CONDITIONS TO AVOID:
Sulfur Odor - See Note for Appearance.	Not applicable.
pH	SPECIFIC GRAVITY (WATER = 1)
Not applicable.	Not applicable
MELTING POINT	SOLUBILITY IN WATER
Not applicable.	Insoluble - some components are soluble in water
FLASH POINT	VISCOSITY
Not applicable.	Not applicable
FLAMMABLE LIMITS	VAPOR DENSITY (AIR = 1)
LEL: None UEL: None	Not applicable.
AUTOIGNITION TEMPERATURE	EVAPORATION RATE (WATER = 1)
NR	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:	CONDITIONS TO AVOID:
Stable under normal temperatures and pressure.	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:	CONDITIONS TO AVOID:
Will not occur.	None related to polymerization.

SECTION 11 - TOXICOLOGICAL INFORMATION

Complete Product

Oral LD ₅₀	Product contents are harmful; ingestion of used product is highly unlikely.
Dermal LD ₅₀	Product is unlikely to cause skin irritation. Ignited particles may cause thermal burns.
Inhalation LC ₅₀	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

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PRODUCT NAME: Estes Model Rocket Engines

PRODUCT NUMBER:

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.



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.

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME: Estes Model Rocket Engines

PRODUCT NUMBER:

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

HEALTH:	1
FLAMMABILITY:	3
PHYSICAL HAZARD:	1

Personal Protective Equipment: See Section 8

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:

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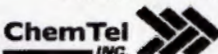


The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is 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.

MATERIAL SAFETY DATA SHEET

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SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Estes Model Rocket Igniter	
PRODUCT NUMBER:	
TRADE NAME: Estes Model Rocket Igniter GENERAL USE: Model Rocket Ignition CHEMICAL FAMILY: Insensitive Explosive / Oxidizer Mix PRODUCT DESCRIPTION: Vee-shaped device made of two chrome-colored wires approximately two inches (5 cm) long with a black tip of pyrogen. Wires may be spanned with tape. No 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 SMALL IGNITING CHARGE. KEEP AWAY FROM FIRE AND HEAT SOURCES. SEVERE MECHANICAL IMPACT MAY DEFORM PRODUCT. Individual igniters may ignite if the unit is exposed to extreme heat as seen with fire conditions. Oxides of Nitrogen and Carbon, 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. Thermal burns may result from touching product during use.

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. Touching product while in use (igniting) 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:
No listings.

SECTION 3 - HAZARDOUS INGREDIENTS

Hazardous Components	% (wt)	CAS #	EINECS #	EU Hazard Symbol(s)	EU RISK PHRASES (Full Text Sections 15 & 16)
Potassium nitrate	NR	7757-79-1	231-818-8	Xn, O	R8, R36/37/38
Carbon	NR	7440-44-0	231-153-3	None	None
Cornstarch	NR	9005-25-8	232-679-6	None	None
Hide Glue	NR	NA	NA	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.

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME: Estes Model Rocket Igniter

PRODUCT NUMBER:

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 treatment for any thermal burns. 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 small amounts of nitrates, which may produce methemoglobinemia. Methylene blue may be required for treatment in unusual cases. Treatment should be aimed at reducing methemoglobin levels, as well as providing respiratory and metabolic support.**

SECTION 5 - FIRE FIGHTING MEASURES

GENERAL HAZARDS:

Flammability Classification: (defined by 29 CFR 1910.1200) Class 1.4 Explosive. Can rapidly burn under fire conditions. Individual devices will randomly burn and. 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 are highly unlikely to cause product to ignite, but strong electrical currents may cause ignition in unusual situations.

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 igniters plus large quantities of engines

UNUSUAL FIRE AND EXPLOSION HAZARDS:

If fire reaches a large quantity of product that is co-located with engines, 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

SECTION 6 - ACCIDENTAL RELEASE MEASURES

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

Model rocket igniters 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 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) .

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME: Estes Model Rocket Igniter			
PRODUCT NUMBER:			
SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION			
Hazardous Components	CAS #	ACGIH Exposure Limits	OSHA Exposure Limits
Potassium nitrate	7757-79-1	NE	NE
Carbon	7440-44-0	2 mg/m3	2.5 mg/m3 (respirable dust)
Cornstarch	9005-25-8	NE	5 mg/m3 (respirable nuisance dust)
Hide Glue	NA	NE	NE
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:		CONDITIONS TO AVOID:	
Vee-shaped wire device - no odor. See Notes.		Not applicable.	
pH		SPECIFIC GRAVITY (WATER = 1)	
Not applicable.		Not applicable	
MELTING POINT		SOLUBILITY IN WATER	
Not applicable.		Insoluble - some components are soluble in water	
FLASH POINT		VISCOSITY	
Not applicable.		Not applicable	
FLAMMABLE LIMITS		VAPOR DENSITY (AIR = 1)	
LEL: None UEL: None		Not applicable.	
AUTOIGNITION TEMPERATURE		EVAPORATION RATE (WATER = 1)	
NR		Not applicable.	
VOLATILE ORGANIC COMPOUND (VOC) INFORMATION			
Not applicable.			
NOTES: Vee-shaped device made of two chrome-colored wires approximately two inches (5 cm) long with a black tip of pyrogen. Wires may be spanned with tape. No odor.			
SECTION 10 - STABILITY AND REACTIVITY			
STABILITY:		CONDITIONS TO AVOID:	
Stable under normal temperatures and pressure.		Extreme heat; extreme mechanical impacts, strong electrical currents.	
INCOMPATIBILITY (MATERIALS TO AVOID):			
Acids, Class A & B explosives, strong oxidizers. Combustible or flammable liquids			
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:			
Carbon Monoxide, Carbon Dioxide, Nitrous Oxides under fire conditions only.			
HAZARDOUS POLYMERIZATION:		CONDITIONS TO AVOID:	
Will not occur.		None related to polymerization.	
SECTION 11 - TOXICOLOGICAL INFORMATION			
Complete Product			
Oral LD₅₀	Product contents are harmful; ingestion of product by humans is unlikely.		
Dermal LD₅₀	Product is unlikely to cause skin irritation. Thermal burns may occur from handling product during use.		
Inhalation LC₅₀	Unused product is harmless. Vapors/particles from ignited 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

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PRODUCT NAME: Estes Model Rocket Igniter

PRODUCT NUMBER:

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
Carbon	7440-44-0	Not Established	Not Established
Cornstarch	9005-25-8	Not Established	Not Established
Hide Glue	NA	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

No data is available on this product, but both unused and used igniters may be harmful if ingested by animals. Collection and careful disposal of spent igniters is highly advisable; simply 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 for at least 5 minutes, then dispose of remnants in an ordinary manner. Optionally, simply fire igniter and discard (do not hold igniter during firing). 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 or UN0454

LABEL: Flammable Solid or Explosives 1.4S

NOTES: Shipped via the United States Postal Service via Surface Mail

HAZARD SYMBOLS: See notes for correct symbols

Only as: Toy Propellant Devices, NA 0454, Class 1.4S/ PG II.



INTERNATIONAL SHIPPING

PROPER SHIPPING NAME: Igniter, UN 0454, Div. 1.4S, PG II

IMDG HAZARD CLASS / Pack Group: Class 1.4S (Category 05) EmS: F-B, S-X

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

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

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

REFERENCE: IMDG, IATA, RID/ADR, TDG

UN / NA IDENTIFICATION NUMBER: UN 0454

LABEL: Explosive, Class 1.4S

NOTES: For igniters Not Contained in Engines and shipped under UN 0454, 25kg is the maximum load for passenger aircraft, 100 kg is the maximum for CAO.

HAZARD 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.

MATERIAL SAFETY DATA SHEET

Page 5 of 5

PRODUCT NAME: Estes Model Rocket Igniter
PRODUCT NUMBER:

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:	NO
Reactive:	NO		

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: No listings.

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

R8: Contact with combustible material may cause fire.

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

HEALTH:	1
FLAMMABILITY:	3
PHYSICAL HAZARD:	1
Personal Protective Equipment: See Section 8	

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): 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




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.

MATERIAL SAFETY DATA SHEET

Page 1 of 5

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Estes Pro Series II Model Rocket Motors	
PRODUCT NUMBER:	
TRADE NAME: Estes Pro Series II Model Rocket Motors	
GENERAL USE: Model Rocket Propulsion	
CHEMICAL FAMILY: Insensitive Explosive (Class 1.4)	
PRODUCT DESCRIPTION: Plastic black cylinders with little odor.	
MANUFACTURED FOR: Estes-Cox Corp. d/b/a Estes Industries	DATE PREPARED: November 14, 2011
ADDRESS (NUMBER, STREET, P.O. BOX): 1295 H Street, PO Box 227	SUPERSEDES: New Issue
(CITY, STATE AND ZIP CODE): Penrose, CO 81240	TELEPHONE NUMBER FOR GENERAL INFORMATION: 719-372-6665
COUNTRY: 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. Metal oxides and chlorides, oxides of nitrogen, carbon, and hydrogen chloride may be formed. Keep out of the reach of young children and pets. Adult supervision is strongly encouraged when product is used. Product contents are harmful by ingestion. Ignition of product when confined may lead to pressure rupture. Use only in the appropriate manner as directed by supplier.

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:
Hexavalent Chromium is present in trace amounts. (IARC Group I, California Proposition 65, NTP)

SECTION 3: HAZARDOUS INGREDIENTS

Hazardous Components	% (wt)	CAS #	EINECS #	EU Hazard Symbol(s)	EU RISK PHRASES (Full Text Sections 15 & 16)
Ammonium Perchlorate	NR	7790-98-9	232-235-1	E, O+	R2, R9
Aluminum Metal	NR	7429-90-6	231-072-3	F	R15, R17
Magnesium Metal	NR	7439-95-4	231-104-6	F	R15, R17
Zinc Metal	NR	7440-66-6	231-175-3	N+	R50/53
Copper Chromite	NR	12018-10-9	234-634-6	O, Xn, Xi	R8, R20/22, R36/37/38
Potassium nitrate	NR	7757-79-1	231-818-8	O, Xi	R8, R36/37/38
Sulfur	NR	7704-34-9	231-722-6	F, Xi	R11, R36/37/38
Charcoal	NR	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.

MATERIAL SAFETY DATA SHEET

Page 2 of 5

PRODUCT NAME: Estes Pro Series II Model Rocket Motors
PRODUCT NUMBER:

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. **Notes to Physician:** This product contains nitrates and perchlorates, as well as copper and chromium salts. This combination poses potential toxicity for a variety of organs; the kidneys, thyroid, liver, and hematopoietic systems are especially vulnerable in acute poisonings. The use of gastric lavage and/or dialysis may be of value, especially as these substances are bound within a polymer.

SECTION 5: FIRE FIGHTING MEASURES

GENERAL HAZARDS:

Flammability Classification: (defined by 29 CFR 1910.1200) Class 1.4 Explosive. Can rapidly burn and/or rupture containers under fire conditions. Individual devices will randomly burn and/or deflagrate. 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 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 a deflagrator. 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, Nitrogen Oxides, Hydrogen Chloride, Metal Oxides, Metal Chlorides

SECTION 6: ACCIDENTAL RELEASE MEASURES

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

Model rocket motors are devices in a solid state. Simply pick up and place in containers approved for storage and transport. Wipe up any dust with a wet cloth. 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/rupture if exposed to extreme heat. Do not smoke while handling product. DO NOT ATTEMPT TO DISMANTLE PRODUCT!! Do not eat or drink while handling this 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. Do not store with foodstuffs. Do not store with flammable liquids or other incompatible materials (see Section 10).

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

MATERIAL SAFETY DATA SHEET

Page 3 of 5

PRODUCT NAME: Estes Pro Series II Model Rocket Motors
PRODUCT NUMBER:

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Hazardous Components	CAS #	ACGIH Exposure Limits	OSHA Exposure Limits
Aluminum Metal	7429-90-5	1 mg/m3	5 mg/m3
Copper Chromite	12018-10-9	NE	5 mg/m3 as Chromium
Sulfur	7704-34-9	15 mg/m3	15 mg/m3
Graphite	7782-42-5	2 mg/m3	2.5 mg/m3 (respirable dust)
Zinc	7440-66-6	0.1 mg/m3 respirable, 2 mg/m3 inhalable per DFG (Germany)	

Note: Components not listed have no Exposure Limits published by ACGIH and/or OSHA.

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: Little or No 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. Explosive if confined under fire conditions	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: Plastic black cylinders with little odor.

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, Toxic substances, Class A, K & L explosives, Strong oxidizers,	
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Carbon Monoxide, Carbon Dioxide, Nitrogen Oxides, Hydrogen Chloride, Metal Oxides, Metal Chlorides under fire conditions only.	
HAZARDOUS POLYMERIZATION: Will not occur.	CONDITIONS TO AVOID: None related to polymerization.

SECTION 11 - TOXICOLOGICAL INFORMATION

Complete Product	
Oral LD ₅₀	Product contents are harmful; ingestion of used product is highly unlikely.
Dermal LD ₅₀	Product is unlikely to cause skin irritation. Ignited particles may cause thermal burns.
Inhalation LC ₅₀	Unused product is harmless. Vapors/particles from deployed product may be irritating or harmful.
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

Page 4 of 5

PRODUCT NAME: Estes Pro Series II Model Rocket Motors

PRODUCT NUMBER:

SECTION 11 - TOXICOLOGICAL INFORMATION Continued

Product Components

Hazardous Component	CAS #	LD50 of Ingredient (Oral, Rat - unless otherwise specified)	LC50 of Ingredient (Inhalation, Rat - unless otherwise specified)
Ammonium Perchlorate	7790-98-9	4200 mg/kg	Not Established
Sulfur	7704-34-9	> 8437 mg/kg	Not Established

Note: Components not listed have no LD50 or LC50 data published

SECTION 12 - ECOLOGICAL INFORMATION

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

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:

The user of this material has the responsibility to dispose of unused motors and spent motor casings in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Damaged motors may pose a danger. For disposal of large quantities of Pro Series II model rocket motors, incineration in a licensed facility is preferable. Small numbers of damaged or defective motors may be disposed of as follows: 1. Dig a small hole in the ground. 2. Place motor, nozzle pointing skyward into the hole and pack the hole with dirt to restrain the motor. 3. Ignite the motor from a minimum distance of 30 feet away using an electrical model rocket motor ignition system. Never place any part of your body above the motor nozzle during the disposal process. 4. Wait for five minutes to allow the motor casing to cool before removing and disposing of it. 5. Soak spent casings in water, then discard in normal trash. Residual materials should be treated as potentially hazardous until soaked.

SECTION 14 - TRANSPORT INFORMATION

DOMESTIC SHIPPING WITHIN THE USA

PROPER SHIPPING NAME: Model Rocket Motors, NA0323, Class 1.4S/ PG II for E30 series motors only. All other motors will use Model Rocket Motors, NA0276, Class 1.4C (See note for USPS rules)

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

REFERENCE: 49CFR

LABEL: Explosives 1.4S or 1.4 C

HAZARD SYMBOLS: See notes for correct symbols



UN / NA IDENTIFICATION NUMBER: NA 0323 (1.4S) / NA 0276 (1.4C)

NOTES: Shipped via the United States Postal Service via Surface Mail Only as: Toy Propellant Devices, NA0323, Class 1.4S/ PG II for E30 series motors only. All other motors will use NA0276, Class 1.4C / PG II for shipping and may not be shipped by the USPS. Contact manufacturer to confirm specific shipping requirements for an individual product.

INTERNATIONAL SHIPPING

PROPER SHIPPING NAME: Articles, Explosive, n.o.s., UN0349, Div. 1.4S, PG II (E30 series motors)
Articles, Explosive, n.o.s., UN0351, Div. 1.4C, PG II (motors except G80 & E30 series)
Articles, Explosive, n.o.s., UN0471, Div. 1.4E, PG II (G80 series motors)

IMDG HAZARD CLASS / Pack Group: Class 1.4S / 1.4C / 1.4E PG II (Category 05 - UN0349, 06 - UN0351/0471) EmS: F-B, S-X

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

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

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

REFERENCE: IMDG, IATA, RID/ADR, TDG

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

HAZARD SYMBOLS: See notes for correct symbols






UN / NA IDENTIFICATION NUMBER: UN 0349 / UN 0276 / UN 0351

NOTES: motors with >30g propellant (Class 1.4C/E) may not be shipped on a passenger aircraft; 75 kg is the maximum load per Cargo Only Aircraft (CAO). For motors with ≤30 g of propellant, 26kg is the maximum load for passenger aircraft, 100 kg is the maximum for CAO. Contact manufacturer to confirm specific shipping requirements for an individual product.

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.

MATERIAL SAFETY DATA SHEET

Page 5 of 5

PRODUCT NAME: Estes Pro Series II Model Rocket Motors	
PRODUCT NUMBER:	
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: Potassium Nitrate, Ammonium perchlorate, aluminum powder	
CERCLA (USA - Comprehensive Response Compensation and Liability Act): RQ=5000 pounds for product as Nitrates.	
California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986: Hexavalent chromium in trace amounts only.	
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): 9003-55-8 not listed in EINECS or NLP.	
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.	
R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	
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	HEALTH
2 = MODERATE, 3 = HIGH	FLAMMABILITY
4 = EXTREME	PHYSICAL HAZARD
Personal Protective Equipment: See Section 8	
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. R9 Explosive when mixed with combustible material. R11 Highly flammable. R15 Contact with water liberates extremely flammable gases. R17 Spontaneously flammable in air. R20/22 Harmful by inhalation and if swallowed. R36/37/38 Irritating to eyes, respiratory system and skin. R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	
REVISION SUMMARY: New Issue 10/20/2011. 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 use that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendors or third persons proximately caused by the material if reasonable safety procedures are not followed 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>	

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
OSHA GHS

Printing date 12.12.2014


Revision: 12.12.2014

SECTION 1: Identification of the substance/mixture and of the company/undertaking

- **1.1 Product identifier**
- **Trade name:** **Estes Model Rocket Engines / Motors (> 30g propellant)**
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
Pyrotechnic article to propel a recoverable aeromodel.
- **Application of the substance / the mixture** Model Rocketry
- **1.3 Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
Estes-Cox Corp. d/b/a Estes Industries
1295 H Street, P.O. Box 227
Penrose, CO 81240 USA
Tel (719) 372-6565
- **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585



SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**
Classifications listed also are applicable to the OSHA GHS Hazard Communication Standard (29CFR1910.1200).
-  exploding bomb
Expl. 1.4 H204 Fire or projection hazard.
- **Classification according to Directive 67/548/EEC or Directive 1999/45/EC** Not applicable.
- **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
- **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.
- **2.2 Label elements**
- **Labelling according to Regulation (EC) No 1272/2008**
The product is additionally classified and labelled according to the Globally Harmonized System within the United States (GHS).
The product is classified and labelled according to the CLP regulation.

(Contd. on page 2)

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
OSHA GHS

Printing date 12.12.2014

Revision: 12.12.2014

Trade name: Estes Model Rocket Engines / Motors (> 30g propellant)

(Contd. of page 1)

Hazard pictograms



GHS01

Signal word Warning

Hazard statements

H204 Fire or projection hazard.

Precautionary statements

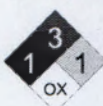
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P374 Fight fire with normal precautions from a reasonable distance.

Hazard description:

WHMIS-symbols: Exempt under WHMIS.

NFPA ratings (scale 0 - 4)



Health = 1
Fire = 3
Reactivity = 1

HMIS-ratings (scale 0 - 4)

HEALTH	1	Health = 1
FIRE	3	Fire = 3
REACTIVITY	1	Reactivity = 1

HMIS Long Term Health Hazard Substances

None of the ingredients are listed.

2.3 Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Description: Mixture of substances listed below with nonhazardous additions.

Dangerous components:

CAS: 7757-79-1 EINECS: 231-818-8	potassium nitrate	O R8 Ox. Sol. 2, H272	60-80%
CAS: 7704-34-9 EINECS: 231-722-6 Index number: 016-094-00-1	sulfur	Xi R38 Skin Irrit. 2, H315	10-20%

(Contd. on page 3)

Safety Data Sheet
 according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
 OSHA GHS

Printing date 12.12.2014

Revision: 12.12.2014

Trade name: Estes Model Rocket Engines / Motors (> 30g propellant)

(Contd. of page 2)

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

SECTION 4: First aid measures

- **4.1 Description of first aid measures**
 - **General information:** No special measures required.
 - **After inhalation:** Supply fresh air; consult doctor in case of complaints.
 - **After skin contact:**
In case of minor burns, flush with cool water.
Seek immediate medical help for blistering or open wounds.
 - **After eye contact:**
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
 - **After swallowing:**
Unlikely route of exposure.
Rinse out mouth and then drink plenty of water.
Do not induce vomiting. Seek medical attention.
- **4.2 Most important symptoms and effects, both acute and delayed**
Adverse health effects are not reasonably expected from normal use of product.
Methaemoglobinaemia
- **Hazards** Hazards only apply to cases of ingestion.
- **4.3 Indication of any immediate medical attention and special treatment needed**
Contains nitrates. Consult literature for specific antidotes.

SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:**
Water in flooding quantities.
Fight fire with normal precautions from a reasonable distance.
- **For safety reasons unsuitable extinguishing agents:** None.
- **5.2 Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
- **5.3 Advice for firefighters**
- **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
- **Additional information**
Eliminate all ignition sources if safe to do so.
Cool endangered receptacles with water in flooding quantities.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
Keep away from ignition sources.

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- **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **6.3 Methods and material for containment and cleaning up:**
 Pick up manually.
 Send for recovery or disposal in suitable receptacles.
 Dispose contaminated material as waste according to item 13.
- **6.4 Reference to other sections**
 See Section 7 for information on safe handling.
 See Section 8 for information on personal protection equipment.
 See Section 13 for disposal information.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling** Handle with care.
- **Information about fire - and explosion protection:**
 Keep ignition sources away - Do not smoke.
 Emergency cooling must be available in case of nearby fire.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
 Avoid storage near extreme heat, ignition sources or open flame.
 Protect from humidity and water.
- **Information about storage in one common storage facility:**
 Store away from flammable substances.
 Do not store together with acids.
 Protect from humidity and water.
- **Further information about storage conditions:**
 Store in a cool place.
 Storage Temperatures : 32-140 ° F / 0-60 °C.
 Store in dry conditions.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **8.1 Control parameters**
- **Ingredients with limit values that require monitoring at the workplace:**
 The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **DNELs** No further relevant information available.
- **PNECs** No further relevant information available.
- **Additional information:** The lists valid during the making were used as basis.

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8.2 Exposure controls

Personal protective equipment:

General protective and hygienic measures:

The usual precautionary measures are to be adhered to when handling chemicals.

Information is only applicable to product contents, and not to product as normally supplied. This information is applicable to damaged, leaking, or spilled product as contact with contents is possible under these conditions.

• **Respiratory protection:** Not required under normal conditions of use.

Protection of hands:

Gloves not required under normal conditions of use.

Wear protective gloves to handle contents of damaged or leaking units.

• **Eye protection:** Follow OSHA or EU guidelines concerning the use of protective eyewear.

• **Body protection:** Not required under normal conditions of use.

Limitation and supervision of exposure into the environment

No further relevant information available.

Risk management measures

See Section 7 for additional information.

No further relevant information available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:

Form:

Kraft colored paper cylinders with grey nozzle at one end.

Colour:

Light grey

• Odour:

Sulfurous

• Odour threshold:

Not determined.

• pH-value:

Not applicable.

Change in condition

Melting point/Melting range:

Not Determined.

Boiling point/Boiling range:

Undetermined.

• Flash point:

Not applicable.

• Flammability (solid, gaseous):

Contact with combustible material may cause fire.

• Auto/Self-ignition temperature:

540 °F / 282 °C

• Decomposition temperature:

Not determined.

• Self-igniting:

Product is not self-igniting.

• Danger of explosion:

Not determined.

• Explosion limits:

Lower:

Not determined.

Upper:

Not determined.

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- | | |
|---|--|
| · Oxidising properties | Oxidizer |
| · Vapour pressure: | Not applicable. |
| · Density: | Not determined. |
| · Relative density | Not determined. |
| · Vapour density | Not applicable. |
| · Evaporation rate | Not applicable. |
| · Solubility in / Miscibility with water: | Partly soluble. |
| · Partition coefficient (n-octanol/water): | Not determined. |
| · Viscosity: | |
| Dynamic: | Not applicable. |
| Kinematic: | Not applicable. |
| · 9.2 Other information | No further relevant information available. |

SECTION 10: Stability and reactivity

- **10.1 Reactivity**
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
 No decomposition if used and stored according to specifications.
 Avoid temperatures above 140 °F / 60 °C.
- **10.3 Possibility of hazardous reactions**
 Reacts with acids.
 Reacts with flammable substances.
 Flammable.
- **10.4 Conditions to avoid** Keep ignition sources away - Do not smoke.
- **10.5 Incompatible materials:** No further relevant information available.
- **10.6 Hazardous decomposition products:**
 Carbon monoxide and carbon dioxide
 Nitrogen oxides
 Sulphur oxides (SOx)

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Not determined.
- **on the eye:** Not determined.
- **Sensitisation:** No sensitising effects known.

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· **Additional toxicological information:**

When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.

SECTION 12: Ecological information

· **12.1 Toxicity**

· **Aquatic toxicity:** No further relevant information available.

· **12.2 Persistence and degradability** No further relevant information available.

· **12.3 Bioaccumulative potential** No further relevant information available.

· **12.4 Mobility in soil** No further relevant information available.

· **Additional ecological information:**

· **General notes:**

This statement was deduced from the properties of the single components.

Due to available data on eliminability/decomposition and bioaccumulation potential a prolonged damage of the environment is unlikely.

Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water

· **12.5 Results of PBT and vPvB assessment**

· **PBT:** Not applicable.

· **vPvB:** Not applicable.

· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**

· **Recommendation**

To dispose of a small quantity of product, soak in water for at least 24 hours, then dispose of remnants in an ordinary manner. For large quantities, contact manufacturer or incinerate.

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.

SECTION 14: Transport information

· **14.1 UN-Number**

· **DOT**

· **ADR, IMDG, IATA**

· **14.2 UN proper shipping name**

· **DOT**

· **ADR, IMDG, IATA**

UN1325 (DOT SP-7887) or NA0276

UN0276

Flammable Solid, Organic n.o.s. (Model rocket kits containing motors with or without un-installed igniters)

Cartridges, power device

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14.3 Transport hazard class(es)

DOT



Class

4.1 Flammable solids, self-reactive substances and solid desensitised explosives.

Label

4.1

ADR, IMDG, IATA



Class

1.4

Label

1.4C

14.4 Packing group

DOT, ADR, IMDG, IATA

II

14.5 Environmental hazards:

Marine pollutant:

No

Special Marking (DOT)

May not be shipped via the USPS.

Special marking (IATA):

Marking required when shipped under UN1325 only.



Cargo Aircraft Only.

14.6 Special precautions for user

Not applicable.

EMS Number:

F-B,S-X

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

UN "Model Regulation":

UN0276, Cartridges, power device, 1.4C, II

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

United States (USA)

SARA

Section 355 (extremely hazardous substances):

None of the ingredients are listed.

Section 313 (Specific toxic chemical listings):

None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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· **Proposition 65 (California):**· **Chemicals known to cause cancer:**

1317-95-9 Silica-Crystalline Tripoli

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

· **Carcinogenic Categories**· **EPA (Environmental Protection Agency)**

None of the ingredients are listed.

· **IARC (International Agency for Research on Cancer)**

None of the ingredients are listed.

· **TLV (Threshold Limit Value established by ACGIH)**

None of the ingredients are listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients are listed.

· **Canada**· **Canadian Domestic Substances List (DSL)**

All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

None of the ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

None of the ingredients are listed.

· **Other regulations, limitations and prohibitive regulations**· **Substances of very high concern (SVHC) according to REACH, Article 57**

None of the ingredients are listed.

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.**SECTION 16: Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.
 Model rocketry is regulated in most states in accordance with NFPA 1122, Code for Model Rocketry.

· **Relevant phrases**

H272 May intensify fire; oxidiser.

H315 Causes skin irritation.

R38 Irritating to skin.

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R8 Contact with combustible material may cause fire.**Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

DNEL: Derived No-Effect Level (REACH)

PNEC: Predicted No-Effect Concentration (REACH)

Expl. 1.4: Explosives, Division 1.4

Ox. Sol. 2: Oxidising Solids, Hazard Category 2

Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2