

Critical Design Review Report

Windward Community College – University of Hawaii 2009-2010

Appendix A: Material Safety Data Sheets (MSDS)

BUEHLER LTD -- 20-3100 PHENOLIC POWDER-BLACK -- 9330-00-166-0250
===== Product Identification =====

Product ID:20-3100 PHENOLIC POWDER-BLACK

MSDS Date:01/01/1985

FSC:9330

NIIN:00-166-0250

MSDS Number: BDDZJ

=== Responsible Party ===

Company Name:BUEHLER LTD

Address:41 WAUKEGAN RD

Box:1

City:LAKE BLUFF

State:IL

ZIP:60044-1687

Country:US

CAGE:09410

=== Contractor Identification ===

Company Name:BUEHLER LTD.

Address:41 WAUKEGAN RD.

Box:City:LAKE BLUFF

State:IL

ZIP:60044-1687

Country:US

Phone:847-295-8500

CAGE:09410

===== Composition/Information on Ingredients =====

Ingred Name:PHENOL

CAS:108-95-2

RTECS #:SJ3325000

Fraction by Wt: 3%

OSHA PEL:S, 5 PPM

ACGIH TLV:S, 5 PPM; 8990

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

Ingred Name:NON HAZARDOUS INGREDIENTS (AS SPECIFIED BY MFR)

Fraction by Wt: 97%

===== Hazards Identification =====

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Effects of Overexposure:NONE SPECIFIED BY
MFR.POSS.SKIN,EYE,RESPIRATORY
IRRIT DUE TO DUST

===== First Aid Measures
=====

First Aid:SKIN:WASH W/SOAP & WATER.EYES:FLUSH W/WATER FOR 15
MIN. AVOID
INGESTION.CONSULT A DR.

===== Fire Fighting Measures =====

Extinguishing Media:DRY CHEMICAL,WATER,CARBON DIOXIDE
Fire Fighting Procedures:SELF CONT BREATHING GEAR IN ENCLOSED
AREA
Unusual Fire/Explosion Hazard:AVOID DUST ACCUMULATIONS OR DUST-
LADEN
ATMOSPHERES-DUST/AIR MIXTURES ARE EXPLOSIVE

===== Accidental Release Measures =====

Spill Release Procedures:VACUUM OR SWEEP WITH SAWDUST,SAND OR
SWEEPING
COMPOUND.AVOID GENERATING DUST.

===== Handling and Storage
=====

Handling and Storage Precautions:AVOID TEMP EXTREMES & MOISTURE-
CAN
AFFECT PRODUCT PERFORMANCE.AVOID PROLONGED OR REPEATED
SKIN & EYE
CONTACT OR BREATHING OF VAPORS.
Other Precautions:USE ADEQUATE VENTILATION.USE GOOD PERSONAL
HYGIENE.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH APPROVED RESPIRATORS RECOMMENDED
FOR
NUISANCE DUST
Ventilation:LOCAL RECOMMENDED TO REMOVE DUST & FUMES
Protective Gloves:RECOMMENDED
Eye Protection:SAFETY GLASSES

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Other Protective Equipment:AS NECESSARY FOR GOOD HYGIENE & CLEAN WORK

ENVIRONMENT.

Supplemental Safety and Health

EXPLOSIVE LIMITS (AS POWDER) EQUALS 0.030 OZ/CU FT.

===== Physical/Chemical Properties =====

HCC:T3

NRC/State Lic Num:EXPLOSIVE LIMIT

Boiling Pt:B.P. Text:NONE

Solubility in Water:NEGLIGIBLE

Appearance and Odor:GRANULAR-SLIGHT PHENOLIC ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

NONE SPECIFIED BY MFR

Hazardous Decomposition

Products:CO*2,CO,PHENOLS,AMMONIA,FORMALDEHYDE

===== Disposal Considerations =====

Waste Disposal Methods:BURY OR INCINERATE IN ACCORDANCE WITH
LOCAL,STATE OR FEDERAL REGS.

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particular situation.

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CHEMRAY COATING CORP -- VARNISH, SPAR, PHENOLIC RESIN -- 8010-00-251-6980

===== Product Identification =====

Product ID: VARNISH, SPAR, PHENOLIC RESIN

MSDS Date: 10/27/1989

FSC: 8010

NIIN: 00-251-6980

MSDS Number: BHVZW

=== Responsible Party ===

Company Name: CHEMRAY COATING CORP

Address: 209 N MICHIGAN AVE

City: KENILWORTH

State: NJ

ZIP: 07033

Country: US

Info Phone Num: 201-245-1111

Emergency Phone Num: 800-424-9300 (CHEMTREC)

Preparer's Name: FRED ARMSTRONG

CAGE: 33832

=== Contractor Identification ===

Company Name: CHEMRAY COATING CORP

Address: 209 N MICHIGAN AVE

Box: City: KENILWORTH

State: NJ

ZIP: 07033

Country: US

Phone: 201-245-1111

CAGE: 33832

===== Composition/Information on Ingredients =====

Ingred Name: STODDARD SOLVENT

CAS: 8052-41-3

RTECS #: WJ8925000

Fraction by Wt: 41%

OSHA PEL: 500 PPM

ACGIH TLV: 100 PPM; 9293

Ingred Name: VOC=3.07 LBS/GAL OR 368 GRAMS/LITER

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RTECS #:9999999VO

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
Health Hazards Acute and Chronic:OVEREXPOSURE-NAUSEA, HEADACHE,
DIZZINESS CAUSED BY OVER INHALATION. HIGH VAPOR
CONCENTRATIONS
(>1000 PPM) ARE IRRITATING TO THE EYES AND RESPIRATORY TRACT,
ARE
ANESTHETIC, AND MAY HAVE OTHER CENTRAL N ERVOUS SYSTEM
EFFECTS.
Effects of Overexposure:OVEREXPOSURE-NAUSEA, HEADACHE, DIZZINESS
CAUSED
BY OVER INHALATION. HIGH VAPOR CONCENTRATIONS (>1000 PPM)
ARE
IRRITATING TO THE EYES AND RESPIRATORY TRACT, ARE
ANESTHETIC, AND
MAY HAVE OTHER CENTRAL N ERVOUS SYSTEM EFFECTS.
Medical Cond Aggravated by Exposure:NONE GENERALLY KNOWN.

===== First Aid Measures =====

First Aid:EYE CONTACT: FLUSH WITH WATER 15 MINUTES OR UNTIL
IRRITATION
SUBSIDES. IF IRRITATION PERSISTS, CALL PHYSICIAN. SKIN CONTACT:
REMOVE CONTAMINATED CLOTHING AND WASH THOROUGHLY WITH
SOAP AND
WATER. INHAL ATION: IF OVERCOME BY VAPORS. REMOVE TO FRESH
AIR, CALL
PHYSICIAN. INGESTION: DO NOT INDUCE VOMITING, CALL PHYSICIAN.

===== Fire Fighting Measures =====

Flash Point Method:SCC
Flash Point:103 F/40 C
Autoignition Temp:Autoignition Temp Text:473 F
Lower Limits:0.9
Upper Limits:7
Extinguishing Media:CARBON DIOXIDE, FOAM, WATER FOG OR DRY
CHEMICAL.
Fire Fighting Procedures:USE AIR SUPPLIED BREATHING EQUIPMENT.
COOL
ENCLOSED CONTAINERS WITH WATER SPRAY. AVOID BREATHING

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VAPORS OR
FUMES.

Unusual Fire/Explosion Hazard: IF LEAK OR SPILL HAS IGNITED, USE WATER
SPRAY TO DISPERSE THE VAPORS FROM FIRE FIGHTERS.

===== Accidental Release Measures =====

Spill Release Procedures: REMOVE ALL IGNITION SOURCES. KEEP FROM
HEAT,

SPARKS AND OPEN FLAME. ADD ABSORBENT (SAND, EARTH,
SAWDUST) TO

SPILL. VENTILATE AREA (OPEN WINDOWS, DOORS). LARGE SPILL:
KEEP FROM

ENTERING SEWERS/WATERCOURSES BY DIKING. ADVISE
AUTHORITIES IF DOES
ENTER.

===== Handling and Storage
=====

Handling and Storage Precautions: STORE AWAY FROM IGNITION SOURCES,
KEEP

IN COOL, DRY, WELL VENTILATED AREAS. AVOID DIRECT SUNLIGHT
AND

EXTREME TEMPERATURES, HOT OR COLD.

Other Precautions: AVOID EYE, SKIN CONTACT, INHALATION &/OR
INGESTION OF

MISTS, SPRAY OR VAPORS. AVOID BREATHING SANDING OR BLASTING
DUST.

===== Exposure Controls/Personal Protection =====

Respiratory Protection: USE HYDROCARBON VAPOR CANISTER OR
SUPPLIED AIR

RESPIRATOR IN CONFINED AREAS.

Ventilation: LOCAL EXHAUST: FACE VELOCITY 60FPM. SPECIAL: USE ONLY
W/ADEQUATE VENTILATION. MECHANICAL: USE EXPLOSION PROOF
EQUIPMENT.

Protective Gloves: CHEMICAL RESISTANT.

Eye Protection: SPLASH GOGGLES OR FACE SHIELD.

Other Protective Equipment: USE CHEMICAL RESISTANT APRON OR
CLOTHING.

Supplemental Safety and Health

===== Physical/Chemical Properties =====

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Boiling Pt:B.P. Text:308F,153C
Melt/Freeze Pt:M.P/F.P Text:O F(-17.8C)
Decomp Temp:Decomp Text:600 F(316C)
Vapor Pres:<10 @ 68 F
Vapor Density:4.8 @ 77 F
Spec Gravity:.90 (H2O=1)
Viscosity:C-F@77F G.H.
Evaporation Rate & Reference:0.09 (BUTYL ACETATE=1)
Solubility in Water:NEGLIGIBLE
Appearance and Odor:CLEAR CARAMEL LIQUID WITH SOLVENT ODOR.
Percent Volatiles by Volume:47.7

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
CAN REACT WITH OXIDIZING MATERIAL WHEN HEATED TO
DECOMPOSITION.
Stability Condition to Avoid:HIGH TEMPERATURES.
Hazardous Decomposition Products:CARBON MONOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods:ASSURE CONFORMITY WITH APPLICABLE
DISPOSAL
REGULATIONS. DISPOSE OF ABSORBED MATERIAL AT AN APPROVED
DISPOSAL
SITE OR FACILITY. DISPOSE IN CONFORMITY WITH STATE AND
FEDERAL
REGULATIONS.

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AeroTech Division, RCS Rocket Motor Components, Inc.

Material Safety Data Sheet & Emergency Response Information

Prepared in accordance with 29 CFR § 1910.1200 (g)

Section 1. Product Identification

Copperhead™ igniter, FirstFire™ igniter, FirstFire Jr.™ igniter. These products contain varying percentages of Ammonium or Potassium Perchlorate, carbon black and carbon fibers dispersed in a flammable binder with lesser amounts of proprietary ingredients such as burn rate modifiers and a metal fuel.

Section 2. Physical Characteristics

Narrow copper foil strips or yellow wires coated with a small amount of black igniter composition on one end, little or no odor

Section 3. Physical Hazards

Igniters are flammable and may give off varying amounts of Hydrogen Chloride and Carbon Monoxide gas, soot and carbon fibers when burned.

Section 4. Health Hazards

Igniter coating may be hazardous in the case of ingestion, and may be toxic to kidneys, lungs and the nervous system. Symptoms may include respiratory irritation, skin irritation, muscle tightness, vomiting, diarrhea, abdominal pain, muscular tremors, weakness, labored breathing, irregular heartbeat, convulsions. Inhalation of large amounts of combustion products may produce similar but lesser symptoms as ingestion.

Section 5. Primary Routes of Entry

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Ingestion, inhalation.

Section 6. Permitted Exposure Limits

None established for manufactured product.

Section 7. Carcinogenic Potential

None known.

Section 8. Precautions for Safe Handling

Keep away from flames and other sources of heat. Do not smoke within 25 feet of product. Do not ingest. Do not breathe combustion products. Keep in original packaging until ready for use.

Section 9. Control Measures

See section 8.

Section 10. Emergency & First Aid Procedures

If ingested, induce vomiting and call a physician. If combustion products are inhaled, move to fresh air and call a physician if ill effects are noted. For mild burns use a first aid burn ointment. For severe burns immerse the burned area in cold water at once and see a physician immediately.

Section 11. Date of Preparation or Revision

October 12, 2008

Section 12. Contact Information

AeroTech Division, RCS Rocket Motor Components, Inc.

2113 W. 850 N. St.

Cedar City, UT 84721

(435) 865-7100 (Ph)

(435) 865-7120 (Fax)

Email: customerservice@aerotech-rocketry.com

Web: <http://www.aerotech-rocketry.com>

Emergency Response: (800) 535-5053 (US), (352) 323-3500 (Int'l)

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AeroTech Division, RCS Rocket Motor Components, Inc.

Material Safety Data Sheet & Emergency Response Information

Prepared in accordance with 29 CFR § 1910.1200 (g)

Section 1. Product Identification

Model rocket motor, high power rocket motor, hobby rocket motor, composite rocket motor, rocket motor kit, rocket motor reloading kit, containing varying amounts of solid propellant with the trade names White Lightning™, Blue Thunder™, Black Jack™, Black Max™, Redline™, Warp-9™ or Mojave Green™. These products contain varying percentages of Ammonium Perchlorate, Strontium and/or Barium Nitrate dispersed in synthetic rubber with lesser amounts of proprietary ingredients such as burn rate modifiers and metal fuels. Rocket motor ejection charges contain black powder.

Section 2. Physical Characteristics

Black plastic cylinders or bags with various colored parts, little or no odor

Section 3. Physical Hazards

Rocket motors and reload kits are flammable, rocket motors may become propulsive in a fire. All propellants give off varying amounts of Hydrogen Chloride and Carbon Monoxide gas when burned, Mojave Green propellant also produces Barium Chloride.

Section 4. Health Hazards

Propellant is an irritant in the case of skin and eye contact, may be extremely hazardous in the case of ingestion, and may be toxic to kidneys, lungs and the nervous system. Symptoms include

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respiratory irritation, skin irritation, muscle tightness, vomiting, diarrhea, abdominal pain, muscular tremors, weakness, labored breathing, irregular heartbeat, convulsions. Inhalation of large amounts of combustion products may produce similar but lesser symptoms as ingestion.

Section 5. Primary Routes of Entry

Skin contact, ingestion, inhalation.

Section 6. Permitted Exposure Limits

None established for manufactured product.

Section 7. Carcinogenic Potential

None known.

Section 8. Precautions for Safe Handling

Disposable rubber gloves are recommended for handling Mojave Green propellant. Keep away from flames and other sources of heat. Do not smoke within 25 feet of product. Do not ingest. Do not breathe exhaust fumes. Keep in original packaging until ready for use.

Section 9. Control Measures

See section 8.

Section 10. Emergency & First Aid Procedures

If ingested, induce vomiting and call a physician. If combustion products are inhaled, move to fresh air and call a physician if ill effects are noted. In the case of skin contact, wash area immediately and contact a physician if severe skin rash or irritation develops. For mild burns use a first aid burn ointment. For severe burns immerse the burned area in cold water at once and see a physician immediately.

Section 11. Date of Preparation or Revision

October 11, 2008

Section 12. Contact Information

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AeroTech Division, RCS Rocket Motor Components, Inc.
2113 W. 850 N. St.
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(435) 865-7100 (Ph)
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Email: customerservice@aerotech-rocketry.com
Web: <http://www.aerotech-rocketry.com>
Emergency Response: (800) 535-5053 (US), (352) 323-3500 (Int'l)

EMS CATALOG NO: 13000
EMS PRODUCT: DER 736 Epoxy Resin
DATE: 03/06/96
PAGE NUMBER: One of 5

MATERIAL SAFETY DATA SHEET

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FOR PRODUCT AND SALES INFORMATION

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CONTACT ELECTRON MICROSCOPY SCIENCES OFFICE ABOVE.

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PRODUCT IDENTIFICATION

—

PRODUCT NAME: D.E.R.(R) 736 Epoxy Resin

INGREDIENTS: Epichlorohydrin-polyglycol reaction product

(% w/, unless otherwise noted)

CAS NUMBER: 041638-13-5

PERCENT: 100

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

PHYSICAL DATA

BOILING POINT: Greater than 225oC at 760 mm Hg

VAPOR PRESSURE: 5.6 mm Hg at 20oC

VAPOR DENSITY: Not applicable

SOLUBILITY IN WATER: 11.0 wt.%

SPECIFIC GRAVITY: 1.14

VISCOSITY: 30-60 cps at 25oC

APPEARANCE: Near water white liquid

ODOR: Slight ethereal.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 320oF

METHOD USED: PMCC, ASTM D-93

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FLAMMABLE LIMITS: LFL: Not determined

UFL: Not determined

EXTINGUISHING MEDIA:

Foam, CO₂, dry chemical, alcohol-resistant foam

FIRE AND EXPLOSION HAZARDS: None known

FIRE-FIGHTING EQUIPMENT: Wear positive pressure self-contained breathing apparatus.

REACTIVITY DATA

STABILITY (CONDITIONS TO AVOID):

None; but for maximum product life do not exceed 55°C (131°F) during storage.

INCOMPATIBILITY (SPECIFIC MATERIALS TO AVOID):

Base or strong acid, amines and oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS:

The by-products expected in incomplete pyrolysis or combustion of epoxy resins are mainly phenolics, carbon monoxide, hydrogen chloride, and water. The thermal decomposition products of epoxy resins therefore should be treated as potentially hazardous substances, and appropriate precautions should be taken.

HAZARDOUS POLYMERIZATION:

Will not occur by itself, but masses of more than 1 pound of product plus an aliphatic amine will cause irreversible polymerization with considerable heat buildup.

ENVIRONMENTAL AND DISPOSAL INFORMATION

ACTION TO TAKE FOR SPILLS/LEAKS:

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Soak up in absorbent material such as sand and collect in suitable containers. Residual resin may be removed using steam or hot soapy water. Solvents are not recommended for cleanup unless the recommended exposure guidelines and safe handling practices for the specific solvent are followed. Consult appropriate solvent MSDS for handling information and exposure guidelines. Keep spark producing equipment away. For large spills, evacuate upwind of spills and contain with dike.

DISPOSAL METHOD:

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF

WATER. For unused or uncontaminated material, the preferred disposal options are to send to a licensed recycler, reclaimer, or incinerator.

For used or contaminated material, the preferred disposal options remain the same, although additional evaluation is required (see, for example, 40 CFR, Part 261, "Identification and Listing of Hazardous waste.") Any disposal practice must be in compliance with Federal, State, Provincial, and Local laws and regulations.

HEALTH HAZARD DATA

EYE: May cause moderate irritation with corneal injury.

SKIN CONTACT:

Short single exposure not likely to cause significant skin irritation. Prolonged exposure may cause skin irritation. Repeated exposure may cause skin burns. May cause more severe response if confined to skin or skin is abraded (scratched or cut). May cause allergic skin reaction in susceptible individuals.

SKIN ABSORPTION:

A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD50 for skin absorption in rabbits is >2000mg/kg.

INGESTION:

Single dose oral toxicity is low. The oral LD50 for

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rats is >2000 mg/kg. Amounts ingested incidental to normal handling operations are not likely to cause injury; swallowing larger amounts may cause injury.

INHALATION:

Elevated temperatures may generate vapor levels sufficient to cause irritation and other effects.

MUTAGENICITY (EFFECTS ON GENETIC MATERIAL):

Results of in vitro ("test tube") mutagenicity tests have been positive.

FIRST AID

EYES: Irrigate immediately with water for at least 15 minutes.

SKIN: Wash off in flowing water or shower.

INGESTION:

Induce vomiting if large amounts are ingested. Consult medical personnel.

INHALATION:

Remove to fresh air if effects occur. Consult a physician.

NOTE TO PHYSICIAN:

If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Supportive care. Treatment based on judgement of the physician in response to reactions of the patient.

HANDLING PRECAUTIONS

EXPOSURE GUIDELINE(S): None established.

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VENTILATION:

Good general ventilation should be sufficient for most conditions.

RESPIRATORY PROTECTION:

No respiratory protection should be needed. If respiratory irritation is experienced, use an approved air-purifying respirator.

SKIN PROTECTION:

For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron or full-body suit will depend on operation.

EYE PROTECTION:

Use safety glasses. Where contact with this material is likely, chemical goggles are recommended because eye contact may cause pain even though it is unlikely to cause injury.

ADDITIONAL INFORMATION

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

None except normal handling care. Practice good caution and personal cleanliness to avoid eye and skin contact. Avoid breathing vapors if generated.

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ITW DEVCON CORP -- 5-MINUTE EPOXY RESIN -- 8040-00-264-6816

===== Product Identification =====

Product ID:5-MINUTE EPOXY RESIN

MSDS Date:12/14/1989

FSC:8040

NIIN:00-264-6816

MSDS Number: BLJGZ

=== Responsible Party ===

Company Name:ITW DEVCON CORP

Address:30 ENDICOTT ST

City:DANVERS

State:MA

ZIP:01923

Country:US

Info Phone Num:508-777-1100

Emergency Phone Num:800-424-9300 CHEMTREC

CAGE:EO352

=== Contractor Identification ===

Company Name:DEVCON CORP

Address:30 ENDICOTT ST

Box:City:DANVERS

State:MA

ZIP:01923-3753

Country:US

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Phone:1-508-777-1100
CAGE:16059
Company Name:ITW DEVCON CORP
Address:30 ENDICOTT ST
City:DANVERS
State:MA
ZIP:01923
Country:US
Phone:508-777-1100
CAGE:EO352

===== Composition/Information on Ingredients =====

Ingred Name:BISPHENOL A DIGLYCIDYL ETHER RESIN (POTENTIAL SKIN SENSITIZER)
CAS:25068-38-6
RTECS #:KD4380000
Fraction by Wt: >60%
Other REC Limits:NONE SPECIFIED

Ingred Name:VOC: 0 LBS/GAL (EPA REFERENCE METHOD 24)
RTECS #:9999999VO
Other REC Limits:NONE SPECIFIED

===== Hazards Identification =====

LD50 LC50 Mixture:ORAL LD50 RAT: 11,400 MG/KG; DERM LD50 *
Routes of Entry: Inhalation:NO Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:PROLONGED OR REPEATED SKIN CONTACT MAY
CAUSE SENSITIZATION WITH ITCHING, SWELLING OR RASHES ON LATER EXPOSURE.
Explanation of Carcinogenicity:*RABB: >20,000 MG/KG; INHALATION LC50 RAT: NO DEATHS IN SATURATED AIR; EXPOSURE TIME: 8 HRS.
Effects of Overexposure:EYES: MILD IRRITATION. SKIN: MILD IRRITATION. INHALATION. THE LOW VAPOR PRESSURE OF THE RESIN MAKES INHALATION UNLIKELY IN NORMAL USE. INGESTION: ACUTE ORAL TOXICITY IS LOW. MAY CAUSE GASTRIC DISTRESS .
Medical Cond Aggravated by Exposure:ALLERGIES, ECZEMA OR OTHER SKIN DISORDERS.

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===== First Aid Measures =====

First Aid:EYES: FLUSH W/CLEAN WATER-15 MIN. WHILE GENTLY HOLDING EYELIDS OPEN. GET IMMED MEDICAL ATTENTION. SKIN: WASH THOROUGHLY

W/SOAP & WARM WATER. CONSULT PHYSICIAN IF IRRIT DEVELOPS.

INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION IF SYMPTOMS PERSIST.

INGESTION: DO

NOT INDUCE VOMITING. GIVE 2 GLASSES WATER TO DILUTE (UNLESS UNCONSCIOUS). GET MEDICAL ATTEN.

===== Fire Fighting Measures =====

Flash Point Method:PMCC

Flash Point:>400F,>204C

Lower Limits:N/D

Upper Limits:N/D

Extinguishing Media:CO2, DRY CHEMICAL, FOAM.

Fire Fighting Procedures:FIREFIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING.

Unusual Fire/Explosion Hazard:NONE

===== Accidental Release Measures =====

Spill Release Procedures:PREVENT SKIN AND EYE CONTACT. LARGE SPILLS MAY

BE ABSORBED ON INERT MATERIAL SUCH AS SAND OR VERMICULITE. SCRAPE

SPILL UP INTO NONPOROUS CONTAINERS. CLEAN SPILL AREA WITH STRONG

DETERGENT AND WATER; U SE SOLVENTS ONLY WITH APPROPRIATE CAUTION.

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN A COOL, DRY PLACE. HANDLE MIXED RESIN & HARDENER IN ACCORDANCE W/POTENTIAL HAZARD OF THE

CURING AGENT USED. DISCARD CONTAM LEATHER ARTICLES.

Other Precautions:REMOVE CONTAMINATED CLOTHING AND PROTECTIVE GEAR;

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CLEAN THOROUGHLY BEFORE USING AGAIN. IF CURED MATERIAL IS
SANDED OR
MACHINED, USE ADEQUATE PRECAUTIONS AGAINST NUISANCE
PARTICULATES.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NONE REQUIRED AT NORMAL HANDLING
TEMPERATURES.

Ventilation:LOCAL EXHAUST IS RECOMMENDED FOR CONFINED AREAS.
GENERAL

MECHANICAL VENTILATION IS ADEQUATE FOR NORMAL USE.

Protective Gloves:IMPERVIOUS GLOVES.

Eye Protection:SAFETY GLASSES WITH SIDE SHIELDS.

Other Protective Equipment:OTHER GEAR AS REQUIRED.

Work Hygienic Practices:WASH THOROUGHLY AFTER USING,
PARTICULARLY

BEFORE EATING OR SMOKING.

Supplemental Safety and Health

===== Physical/Chemical Properties =====

HCC:N1

Boiling Pt:B.P. Text:N/D

Melt/Freeze Pt:M.P/F.P Text:N/D

Vapor Pres:NIL @ 70 F

Vapor Density:>1

Spec Gravity:1.2

pH:7 (5%)

Evaporation Rate & Reference:<<1 (BUAC = 1)

Solubility in Water:NIL

Appearance and Odor:THICK, AMBER LIQUID WITH LITTLE ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG ACIDS AND STRONG OXIDIZING AGENTS.

Stability Condition to Avoid:OPEN FLAME AND EXTREME HEAT.

Hazardous Decomposition Products:OXIDES OF CARBON, ALDEHYDES AND
ACIDS

FROM INCOMPLETE COMBUSTION.

Conditions to Avoid Polymerization:HEAT IS GENERATED WHEN THIS RESIN
IS

MIXED WITH AMINES OR EPOXY HARDENERS; BE CAREFUL WHEN
MIXING.

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===== Disposal Considerations =====

Waste Disposal Methods: REMOVE TO A WASTE FACILITY OPERATING IN COMPLIANCE WITH STATE AND LOCAL REGULATIONS.

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SPECIALTY COMPOUNDS INC -- SINMAST 4 EPOXY MORTAR MIX -
NORMAL CURE -- 5610-00N078857

===== Product Identification =====

Product ID: SINMAST 4 EPOXY MORTAR MIX - NORMAL CURE

MSDS Date: 08/01/1995

FSC: 5610

NIIN: 00N078857

MSDS Number: CGGQS

=== Responsible Party ===

Company Name: SPECIALTY COMPOUNDS INC

Address: 3300 EAST 84TH PLACE

City: MERRILVILLE

State: IN

ZIP: 46410

Country: US

Info Phone Num: 219-947-1070

Emergency Phone Num: 800-255-3924

CAGE: 7T163

=== Contractor Identification ===

Company Name: SPECIALTY COMPOUNDS INC

Address: 3300 E 84TH PL

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Box:City:MERRILLVILLE
State:IN
ZIP:46410-6551
Country:US
Phone:219-947-1070
CAGE:7T163

===== Composition/Information on Ingredients =====

Ingred Name:COMPONENT "A" (CONSISTING OF INGREDIENTS 2 & 3)
RTECS #:9999999ZZ
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:BISPHENOL A-EPICHLOROHYDRIN COPOLYMER;
(BISPHENOL A
EPICHLOROHYDRIN EPOXY RESIN)
CAS:25068-38-6
RTECS #:SL6475000
Fraction by Wt: 90%
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:PROPANE, 1-BUTOXY-2,3-EPOXY-; (BUTYL GLYCIDYL ETHER)
(BGE)
CAS:2426-08-6
RTECS #:TX4200000
Fraction by Wt: 10%
OSHA PEL:50 PPM
ACGIH TLV:25 PPM

Ingred Name:COMPONENT "B" (CONSISTING OF INGREDIENTS 5 - 8)
RTECS #:9999999ZZ
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:TOFA REACT WITH TEPA
CAS:68953-36-6
Fraction by Wt: 55%
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:DIETHYLENETRIAMINE
CAS:111-40-0
RTECS #:IE1225000

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Fraction by Wt: 15%
OSHA PEL:1 PPM
ACGIH TLV:1 PPM, S

Ingred Name:1,2-ETHANEDIAMINE, N-(2-AMINOETHYL)-N'-(2-
((2-AMINOETHYL)AMINO)ETHYL)-; (TETRAETHYLENEPENTAMINE)
CAS:112-57-2
RTECS #:KH8585000
Fraction by Wt: 15%
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:PHENOL, 4,4'-ISOPROPYLENEDI-; (BISPHENOL A) (SARA 313)
CAS:80-05-7
RTECS #:SL6300000
Fraction by Wt: 10%
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:SUPP DATA:WHEN PRODUCT COMES IN CONTACT
W/NITROUS ACID,
NITRITES OR ATMOSPHERES W/HIGH NITROUS OXIDE
CONCENTRATIONS.
RTECS #:9999999ZZ

Ingred Name:SPILL PROC:OR DISP. EVACUATE ALL PERS UPWIND FROM
SPILL.
PVNT SPILL PROD FROM ENTERING STREAMS/DRINKING WATER (ING
11)
RTECS #:9999999ZZ

Ingred Name:ING 10:SUPPLIES. NOTIFY LOCAL HEALTH AUTHORITIES &
OTHER
APPROPRIATE AGENCIES IF SUCH CONTAMINATION SHOULD OCCUR.
RTECS #:9999999ZZ

Ingred Name:PROT GLOVES:SITUATIONS, WEAR IMPERMEABLE GLOVES
W/CUFFS TO
PVNT SPREAD OF MATL ABOVE WRISTS. EXAMINE PROT GLOVES(ING
13)
RTECS #:9999999ZZ

Ingred Name:ING 12:BEFORE USING. DISCARD IF THERE IS EVIDENCE OF
HOLES
OR CRACKS.

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RTECS #:9999999ZZ

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.

Routes of Entry: Inhalation:NO Skin:YES Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:EYE CONTACT:MODERATELY IRRITATING.

SKIN CONTACT:MODERATELY IRRITATING - POSSIBLE SENSITIZATION.

INHALATION:DUE TO LOW VOLATILITY, NOT LIKELY TO BE INHALED.

INGESTION:CAN CAUSE BLEEDING IN GASTROINTESTINAL TRACT.

Explanation of Carcinogenicity:NOT RELEVANT

Effects of Overexposure:SEE HEALTH HAZARDS.

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

===== First Aid Measures =====

First Aid:EYES:FLUSH W/PLENTY OF WATER FOR AT LST 15 MINS
HOLDING LIDS

OPEN. GET MED ATTN. SKIN:REMOVE PROD FROM SKIN. FLUSH
AFFECTED AREA

W/WATER. REMOVE CONTAM CLTHG & GLOVES. FOLLOW BY WASHING
W/SOAP &

WATER . IF IRRIT PERSISTS GET MED ATTN. INHAL:REMOVE TO FRESH
AIR &

PROVIDE OXYG IF BRTHG IS DFCLT. GET MED ATTN. INGEST:DO NOT
INDUCE

VOMIT. ADMIN 3-4 GLASSES OF MILK/WATER. OBTAIN MED CARE
IMMEDIATELY.

===== Fire Fighting Measures =====

Flash Point Method:PMCC

Flash Point:156F,69C

Extinguishing Media:WATER FOG, CO*2, DRY CHEMICAL OR FOAM.
MATERIAL

WILL NOT BURN UNLESS PREHEATED.

Fire Fighting Procedures:USE NIOSH APPROVED SCBA & FULL PROTECTIVE
EQUIPMENT . COOL FIRE W/WATER FOG.

Unusual Fire/Explosion Hazard:NONE SPECIFIED BY MANUFACTURER.

===== Accidental Release Measures =====

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Spill Release Procedures: SHUT OFF/REMOVE ALL IGNIT SOURCES.
CONSTRUCT

DIKE TO PVNT SPREADING. PERS SHOULD BE EQUIPPED W/NIOSH
APPRVD SCBA

& BUTYL RUBBER PROT CLTHG. COVER MINOR SPILLS W/SODIUM
BISULFITE &

REDUCE VAPS. SPRAY W /WATER. PLACE IN METAL CNTNRS FOR
RECOVERY(ING

10)

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage
=====

Handling and Storage Precautions: CORR. KEEP AT ROOM TEMP, DRY,
VENTED

STOR IN CLSD CNTNRS. KEEP AWAY FROM OXIDIZERS, HEAT/FLAMES.
STORE

IN STEEL CNTNRS. AVOID CONT W/SKIN OR EYES.

Other Precautions: HANDLE IN WELL VENTED WORK SPACE. AVOID BRTHG
VAPS.

ADHERE TO WORK PRACTICE RULES ESTABLISHED BY GOVT REGS
(E.G. OSHA).

DO NOT USE SODIUM NITRITE/OTHER NITROSATING AGENTS IN
FORMULATIONS.

CANCER-CAUSI NG NITROSAMINES COULD BE FORMED.

===== Exposure Controls/Personal Protection =====

Respiratory Protection: IN POORLY VENTED AREAS, A NIOSH APPRVD
CARTRIDGE

MASK APPRVD FOR ORG VAPS IS REC UNDER FOLLOWING
CNDTNS: EMER

SITUATIONS, WHEN PROD VAP CONC IS >20 PPM FOR PERIOD >15
MINS,

DURING REPAIR & CLEANING OF EQUIP, DURING
TRANSFER/DISCHARGE(SUPDAT)

Ventilation: ADEQUATE GENERAL & LOCAL EXHAUST.

Protective Gloves: NITRILE RUBBER GLOVES. IN EMER (ING 12)

Eye Protection: ANSI APPRVD CHEM WORKERS GOGGS &(SUPDAT)

Other Protective Equipment: EYE WASH FOUNTAIN & DELUGE SHOWER
WHICH MEET

ANSI DESIGN CRITERIA . LONG SLEEVE CLTHG, SLICKER SUIT,
RUBBER

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BOOTS.

Work Hygienic Practices: CONTACT LENSES SHOULD NOT BE WORN. WASH AT END

OF EACH WORK SHIFT & BEFORE EATING, SMOKING/USING TOILET.

LAUNDER(SUPDAT)

Supplemental Safety and Health

PH:ALKALINE. WASTE DISP METH:LONG TERM ENVIRON HAZS, THUS LANDFILL

DISPS MUST BE CONSIDERED LESS ACCEPT THAN INCIN. RESP

PROT:& USE OF

PROD. EYE PROT:FULL LGTH FSHLD . HYGIENE PRACT:OR DISCARD C ONTAM

CLTHG. DISCARD CONTAM LEATHER ARTICLES INCL SHOES. MATLS TO

AVOID:ARE KNOWN TO BE CARCINS, MAY BE FORMED (ING 9)

===== Physical/Chemical Properties =====

pH:SUPDAT

Appearance and Odor:CLEAR, LIGHT AMBER, FLOWABLE LIQUID;

AMMONIACAL

ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

CAN REACT VIGOROUSLY W/STRONG OXIDIZING AGENTS, STRONG LEWIS/MINERAL

ACIDS. CAUT:N-NITROSAMINES, MANY OF WHICH (SUPDAT)

Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomposition Products:N-NITROSAMINES MAY BE FORMED.

===== Disposal Considerations =====

Waste Disposal Methods:COMPLY W/ALL FED, STATE & LOC REGS. INCIN IS

ACCEPT & PREF METH OF DISP. INCIN IN ADMIXT W/FUEL EQUIPPED

W/SCRUBBER TO REMOVE NITROGEN OXIDES & CARBON MONOXIDE.

DISP OF IN

APPRVD LANDFILL IF ALLOWED L OCALLY. WASTE FROM THIS PROD MAY

PRESENT (SUPDAT)

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GARLOCK INC -- COMPRESSED CARBON FIBER SHEET, STYLE MTC-9850 -
- 5330-00N064992

===== Product Identification =====

Product ID:COMPRESSED CARBON FIBER SHEET, STYLE MTC-9850

MSDS Date:08/11/1993

FSC:5330

NIIN:00N064992

MSDS Number: BZKXB

=== Responsible Party ===

Company Name:GARLOCK INC

Address:1666 DIVISION ST

City:PALMYRA

State:NY

ZIP:14522

Country:US

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Info Phone Num:315-597-4811

Emergency Phone Num:315-597-4811

Preparer's Name:HAROLD R HUGHES

CAGE:76380

=== Contractor Identification ===

Company Name:GARLOCK INC

Address:1666 DIVISION ST

Box:City:PALMYRA

State:NY

ZIP:14522

Country:US

Phone:315-597-4811

CAGE:76380

Company Name:GARLOCK INC MECHANICAL PACKING DIV

Address:1666 DIVISION ST

City:PALMYRA

State:NY

ZIP:14522-9343

Country:US

Phone:315-597-4811

CAGE:73680

===== Composition/Information on Ingredients =====

Ingred Name:MINERAL WOOL; (ROCK WOOL (MAN MADE MINERAL FIBER))

RTECS #:PY8070000

Fraction by Wt: 2-6%

OSHA PEL:N/K

ACGIH TLV:10 MG/M3 (TWA) (MFR)

Ingred Name:SILICA, CRYSTALLINE - QUARTZ (CRYSTALLINE SILICA - NOT A

HAZARD UNLESS AIRBORNE)

CAS:14808-60-7

RTECS #:VV7330000

Fraction by Wt: <2.5%

OSHA PEL:SEE TABLE Z-3

ACGIH TLV:0.1 MG/M3 RDUST;9495

Ingred Name:GRAPHITE; (NATURAL GRAPHITE - NOT A HAZARD UNLESS AIRBORNE)

CAS:7782-42-5

RTECS #:MD9659600

Fraction by Wt: 2-5%

OSHA PEL:15 MPPCF; Z-3

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ACGIH TLV:2 MG/M3 RDUST; 9495

Ingred Name:FIBERS, SYNTHETIC; (SYNTHETIC FIBERS)

OSHA PEL:N/K

ACGIH TLV:N/K

Ingred Name:BINDER SYSTEM; (ELASTOMERIC BINDERS)

OSHA PEL:N/K

ACGIH TLV:N/K

Ingred Name:STYRENE-BUTADIENE; (STYRENE-BUTADIENE ELASTOMER)

OSHA PEL:N/K

ACGIH TLV:N/K

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.

Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO

Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO

Health Hazards Acute and Chronic:PRODUCT DOES NOT POSE A HEALTH HAZARD

UNDER ORDINARY CONDITIONS OF USE. A HAZARD WOULD ARISE ONLY IF THE

PRODUCT WAS SUBJECT TO MECHANICAL ACTIONS WHICH COULD CAUSE FIBERS

AND/OR DUST TO RELEASED FROM THE ELASTOMER MATRIX. INHALATION OF

SUFFICIENT QUANTITIES OF FIBERS AND/OR DUST COULD CAUSE (EFTS OF OVEREXP)

Explanation of Carcinogenicity:CRYSTALLING SILICA:NTP 7TH ANNUAL RPT ON

CARCINS, 1994: ANTIC TO BE CARCIN. IARC MONOGRAPHS, SUPP. VOL 7, PG

341(SUPDAT)

Effects of Overexposure:HLTH HAZ:RESPIRATORY PROBLEMS AND HAS THE

POTENTIAL TO CAUSE LASTING LUNG DAMAGE.

Medical Cond Aggravated by Exposure:BREATHING AIRBORNE FIBERS OR PARTICULATES MAY AGGRAVATE ANY EXISTING LUNG DISORDERS OR BRONCHITIS.

===== First Aid Measures =====

=====

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First Aid:INGEST:CALL MD IMMEDIATELY . EYES:IMMEDIATELY FLUSH
W/POTABLE

WATER FOR A MINIMUM OF 15 MINUTES, SEEK ASSISTANCE FROM MD

SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD . INHAL:IF O
VERCOME

BY THERMAL DECOMPOSITION PRODUCTS FROM A FIRE, MOVE TO
FRESH AIR.

IF VICTIM IS UNCONSCIOUS, EXHIBITS BREATHING DIFFICULTY OR IF
RECOVERY IS NOT PROMPT, CONTACT A PHYSICIAN FOR TREATMENT.

===== Fire Fighting Measures =====

Extinguishing Media:WATER, FOAM, CARBON DIOXIDE, DRY CHEMICAL.

Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL
PROTECTIVE
EQUIPMENT .

Unusual Fire/Explosion Hazard:PRODUCES SMOKE AND SOME HAZARDOUS
DECOMPOSITION PRODUCTS WHEN BURNED.

===== Accidental Release Measures =====

Spill Release Procedures:NO SPECIAL ACTION FOR SOLID PIECES OF
PRODUCT.

VACUUM UP ANY DUST FROM OPERATIONS SUCH AS GASKET
CUTTING.

ALTERNATELY, DAMPEN AREA BEFORE WIPING OR SWEEPING. DO
NOT DRY WIPE
OR SWEEP.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN CLEAN DRY PLACE AWAY
FROM

STRONG OXIDIZING AGENTS. DO NOT GRIND OR MACHINE PRODUCT.
NORMAL

WASH UP AFTER HANDLING IS RECOMMENDED.

Other Precautions:WHEN REMOVING USED GASKETS, AVOID EXCESSIVE
MECHANICAL ACTIONS AND PLACE RESIDUE IN A PLASTIC BAG FOR
DISPOSAL.

===== Exposure Controls/Personal Protection =====

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Respiratory Protection:NO SPECIAL REQUIREMENTS UNDER NORM
CONDITIONS OF

USE. HALF-FACE RESP W/HIGH EFFICIENTY FILTERS SHOULD BE
WORN BY

INDIVIDUALS WHEN ENGAGING IN REMOVAL OF USED GASKETS THAT
ARE

FRIABLE/WHICH REQ AGGRESS IVE SCRAPING &/WIRE BRUSHING TO
REMOVE.

Ventilation:NO SPECIAL REQUIREMENTS UNDER NORMAL CONDITIONS OF
USE.

Protective Gloves:IMPERVIOUS GLOVES .

Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .

Other Protective Equipment:NONE SPECIFIED BY MANUFACTURER.

Work Hygienic Practices:NO SPECIAL RECOMMENDATIONS.

Supplemental Safety and Health

EXPLAN OF CARCIN: 1987: GROUP 2A. ANIMAL: LUNG. HAZ DECOMP
PROD:

HYDROGEN CYANIDE. THERE MAY BE OTHERS UNKNOWN TO US.

===== Physical/Chemical Properties =====

Solubility in Water:INSOLUBLE

Appearance and Odor:BLACK SHEET OR GASKETS - SLIGHT ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:NO

AVOID STORAGE WITH STRONG OXIDIZING AGENTS.

Stability Condition to Avoid:DIRECT FLAME WILL IGNITE PRODUCT.

Hazardous Decomposition Products:IN A FIRE:CARBON MONOXIDE UNDER
CERTAIN CIRCUMSTANCES, POSSIBLY ACRYLONITRILE MONOMER
FUMES AND

POSSIBLY SOME (SUPDAT)

===== Disposal Considerations =====

Waste Disposal Methods:NORMAL LANDFILL. COMPLY WITH ANY LOCAL
DISPOSAL

REGULATIONS. DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,
STATE AND

LOCAL REGULATIONS .

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CLARK-SCHWEBEL FIBER GLASS CORP -- FIBER GLASS CLOTH -- 8305-01-276-9043

===== Product Identification =====

Product ID:FIBER GLASS CLOTH

MSDS Date:06/28/1989

FSC:8305

NIIN:01-276-9043

MSDS Number: BWRFR

=== Responsible Party ===

Company Name:CLARK-SCHWEBEL FIBER GLASS CORP

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Box:2627
City:ANDERSON
State:SC
ZIP:29622
Country:US
Info Phone Num:803-224-3506
Emergency Phone Num:800-424-9300 (CHEMTREC)
CAGE:1H193
=== Contractor Identification ===
Company Name:CLARK-SCHWEBEL FIBER GLASS CORP
Box:City:ANDERSON
State:SC
ZIP:29622
Country:US
Phone:803-224-3506
CAGE:1H193

===== Composition/Information on Ingredients =====

Ingred Name:GLASS OXIDE
Fraction by Wt: >99%
OSHA PEL:15 MG/M3 (MFR)
ACGIH TLV:5 MG/M3 (MFR)

Ingred Name:METHACRYLATO CHROMIC CHLORIDE
Fraction by Wt: <1%
OSHA PEL:N/K
ACGIH TLV:N/K

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE: IF IN EYES OR ON SKIN, MAY
CAUSE MILD IRRITATION. IF INHALED, MAY CAUSE UPPER
RESPIRATORY
TRACT IRRITATION. CHRONIC HEALTH EFFECTS: NONE MENTIONED.
Explanation of Carcinogenicity:NOT RELEVANT
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE.

===== First Aid Measures =====

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First Aid:INGEST: CALL MD IMMEDIATELY . EYES: FLUSH WITH WATER FOR AT

LEAST 15 MINUTES WHILE LIFTING UPPER & LOWER EYELIDS. IF IRRITATION

PERSISTS, GET MEDICAL ATTENTION. SKIN: WASH THOROUGHLY WITH SOAP A

ND COOL WATER. INHAL: IF INHALED AND AFFECTED, REMOVE INDIVIDUAL TO

FRESH AIR. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION.

===== Fire Fighting Measures =====

Flash Point:NONE

Extinguishing Media:USE APPROPRIATE EXTINGUISHING MEDIA FOR PRIMARY

SOURCE OF FIRE. PRODUCT IS NOT COMBUSTIBLE.

Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .

Unusual Fire/Explosion Hazard:NONE.

===== Accidental Release Measures =====

Spill Release Procedures:NO SPECIAL PRECAUTIONS.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage

Handling and Storage Precautions:FIBER GLASS CLOTH IS DENSE AND EVEN

SMALL ROLLS ARE HEAVY. USE LIFT DEVICES TO PREVENT INJURIES. DO NOT

ALLOW CLOTH TO CRUSH LIMBS OR EXTREMITIES.

Other Precautions:NONE KNOWN.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:IF AIRBORNE FIBERGLASS CONCENTRATIONS EXCEED

PERMISSIBLE EXPOSURE LEVELS, NIOSH/MSHA APPROVED RESPIRATORY

PROTECTION FOR NUISANCE DUST IN ACCORDANCE WITH OSHA 1910.134

SHOULD BE USED. NONE NORMALLY RE QUIRED.

Ventilation:USE LOCAL EXHAUST VENTILATION IF NECESSARY TO

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MAINTAIN

AIRBORNE LEVELS TO BELOW ESTABLISHED LIMITS.

Protective Gloves:IMPERVIOUS GLOVES .

Eye Protection:ANSI APPRVD CHEM WORKERS GOGGLES .

Other Protective Equipment:IN SOME CIRCUMSTANCES, IT MAY BE ADVISABLE

TO WEAR LONG SLEEVED, LOOSE FITTING CLOTHING.

Work Hygienic Practices:USE RECOM SFTY EQUIP. WASH W/SOAP & WATER AFTER

HNDLG. WASH WORK CLOTHES SEPARATELY FROM OTHER CLTHG. WIPE OUT

(SUPDAT)

Supplemental Safety and Health

HYGIENE PRACT: WASHING MACHINE.

===== Physical/Chemical Properties =====

Spec Gravity:2.54 (H*2O=1)

Solubility in Water:INSOLUBLE

Appearance and Odor:WHITE TO LIGHT GREEN, ODORLESS CLOTH.

Percent Volatiles by Volume:NONE

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG BASES AND ACIDS (OXIDIZING MINERAL, ESPECIALLY OXALIC AND

HYDROFLUORIC ACID).

Stability Condition to Avoid:NONE.

Hazardous Decomposition Products:GLASS CLOTHG: NONE. SMALL AMOUNTS OF

OXIDES OF CARBON AND NITROGEN MAY BE EVOLVED IF EXPOSED TO FIRE.

===== Disposal Considerations =====

Waste Disposal Methods:AN INERT, SOLID WASTE. DISPOSE OF IN A LANDFILL

IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

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SCIENTIFIC POLYMER PRODUCTS, INC -- POLYSTYRENE, 400 -- 6810-00N047324

===== Product Identification =====

Product ID:POLYSTYRENE, 400
MSDS Date:03/01/1991

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FSC:6810

NIIN:00N047324

MSDS Number: BTQVW

=== Responsible Party ===

Company Name:SCIENTIFIC POLYMER PRODUCTS, INC

Address:6265 DEAN PARKWAY

City:ONTARIO

State:NY

ZIP:14519

Country:US

Info Phone Num:716-265-0413

Emergency Phone Num:716-265-0413

CAGE:0MW60

=== Contractor Identification ===

Company Name:SCIENTIFIC POLYMER PRODUCTS, INC

Address:6265 DEAN PARKWAY

Box:City:ONTARIO

State:NY

ZIP:14519

Country:US

Phone:716-265-0413

CAGE:0MW60

===== Composition/Information on Ingredients =====

Ingred Name:SYTRENE POLYMER; (POLYSTYRENE)

CAS:9003-53-6

RTECS #:WL6475000

Fraction by Wt: 99.9%

OSHA PEL:N/K

ACGIH TLV:N/K

Ingred Name:ADDITIVES

Fraction by Wt: <0.1%

OSHA PEL:N/K

ACGIH TLV:N/K

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.

Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:NONE SPECIFIED BY MANUFACTURER.

Explanation of Carcinogenicity:NOT RELEVANT.

Effects of Overexposure:NONE SPECIFIED BY MANUFACTURER.

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Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

===== First Aid Measures

First Aid:INGEST:CALL MD IMMEDIATELY . INHAL:REMOVE FROM EXPOSURE. IF BREATHING STOPS, BEGIN MOUTH TO MOUTH. EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES. SKIN:WASH AFFECTED AREA WITH SOAP AND WATER. REMOVE DIRTY CLOTHING. IN ALL CASES, IF IRRITATION DEVELOPS, SEEK MEDICAL ASSISTANCE.

===== Fire Fighting Measures =====

Flash Point Method:COC
Flash Point:977F,525C
Extinguishing Media:DRY CHEMICAL, CO₂, WATER.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:DECOMPOSITION MAY RESULT IN RELEASE OF CO₂ AND ORGANICS OF UNKNOWN CHEMICAL COMPOSITION. FLAMMABLE DUST WHEN FINELY DIVIDED & SUSPENDED IN AIR.

===== Accidental Release Measures =====

Spill Release Procedures:SWEEP UP SPILL AND PLACE IN CONTAINERS FOR SALVAGE OR DISPOSAL.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage

Handling and Storage Precautions:TREAT AS A COMBUSTIBLE SOLID. STORE AWAY FROM OXIDIZING MATLS IN A COOL, DRY PLACE WITH ADEQUATE VENTILATION.
Other Precautions:KEEP AWAY FROM HEAT AND OPEN FLAMES. KEEP

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CONTAINERS

TIGHTLY CLOSED. NOTE:THIS MATERIAL IS INTENDED FOR
LABORATORY USE
ONLY. IT IS NOT INTENDED FOR DRUG, HOUSEHOLD OR OTHER USES.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR
APPROPRIATE FOR

EXPOSURE OF CONCERN .

Ventilation:LOCAL EXHAUST ADEQUATE.

Protective Gloves:IMPERVIOUS GLOVES .

Eye Protection:ANSI APPRVD CHEM WORKER GOGGLES .

Other Protective Equipment:ANSI APPRVD EMERGENCY EYE WASH &
DELUGE

SHOWER .

Work Hygienic Practices:GOOD HYGIENE PRACTICES SHOULD BE
STRICTLY

FOLLOWED.

Supplemental Safety and Health

NONE SPECIFIED BY MANUFACTURER.

===== Physical/Chemical Properties =====

Melt/Freeze Pt:M.P/F.P Text:>212F,>100C

Spec Gravity:1.05

Solubility in Water:INSOLUBLE

Appearance and Odor:COLORLESS, ODORLESS PELLET

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZING AGENTS.

Hazardous Decomposition Products:CO AND ORGANICS OF UNKNOWN
CHEMICAL

COMPOSITION.

===== Disposal Considerations =====

Waste Disposal Methods:IN ACCORDANCE WITH FEDERAL, STATE AND
LOCAL

REGULATIONS.

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DOW CHEMICAL CO -- 05536 DOW GRAYBOARD EXTRUDED
POLYSTYRENE FOAM INSULATION -- 5640-00F024892

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===== Product Identification =====

Product ID:05536 DOW GRAYBOARD EXTRUDED POLYSTYRENE FOAM
INSULATION

MSDS Date:06/13/1990

FSC:5640

NIIN:00F024892

MSDS Number: BNYRD

=== Responsible Party ===

Company Name:DOW CHEMICAL CO

Address:2030 DOW CENTER

City:MIDLAND

State:MI

ZIP:48674

Country:US

Info Phone Num:(517) 636-4410

Emergency Phone Num:(517) 636-4410

CAGE:0BG07

=== Contractor Identification ===

Company Name:DOW CHEMICAL CO THE

Address:1801 DOW CTR

City:MIDLAND

State:MI

ZIP:48674-1801

Country:US

Phone:517-636-4400 / 800-258-2436

CAGE:0BG07

Company Name:DOW CHEMICAL U.S.A.

City:MIDLAND

State:MI

ZIP:48674

Country:US

Phone:517-636-4400

CAGE:71983

===== Composition/Information on Ingredients =====

Ingred Name:ETHENE-1-OCTENE COPOLYMER; POLYETHYLENE

CAS:26227-73-8

Fraction by Wt: 0-10%

Ingred Name:STYRENE POLYMER, POLYSTYRENE

CAS:9003-53-6

RTECS #:WL6475000

Fraction by Wt: BALANCE

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Ingred Name:DICHLORODIFLUOROMETHANE, FREON 12

CAS:75-71-8

RTECS #:PA8200000

Fraction by Wt: 0-7.5%

Other REC Limits:1000 PPM

OSHA PEL:4950 MG/CUM

ACGIH TLV:4950 MG/CUM

EPA Rpt Qty:5000 LBS

DOT Rpt Qty:5000 LBS

Ozone Depleting Chemical:1

Ingred Name:ETHANE, 1-CHLORO-1,1-DIFLUORO-,

CHLORODIFLUOROETHANE (DOT),

FREON 142, DIFLUOROROMONOCHELOROETHANE

CAS:75-68-3

RTECS #:KH7650000

Fraction by Wt: 0-10%

Ozone Depleting Chemical:2

Ingred Name:POLYETHYLENE, POLYETHYLENE RESIN (HOMOPOLYMER)

CAS:9002-88-4

RTECS #:TQ3325000

Fraction by Wt: 0-10%

Ingred Name:HEXABROMOCYCLODODECANE

92-2

CAS:3194-55-6

Fraction by Wt: 0-2%

Ingred Name:1,2,3,4,5-PENTABROMO-6-CHLOROCYCLOHEXANE

*92-

2*

CAS:87-84-3

Fraction by Wt: 0-2%

Ingred Name:ETHYL CHLORIDE, CHLOROETHANE

CAS:75-00-3

RTECS #:KH7525000

Fraction by Wt: 0-4.5%

Other REC Limits:2600 MG/CUM

OSHA PEL:1000 PPM

ACGIH TLV:1000 PPM

EPA Rpt Qty:100 LBS

DOT Rpt Qty:100 LBS

===== Hazards Identification =====

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Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:EYES: IRRITATION OR CORNEAL INJURY.
SKIN: MECHANICAL INJURY. INGESTION: LIVER & KIDNEY EFFECTS,
INCREASE IN TISSUE LEVELS OF BROMINE, PHYSICAL INJURY,
CHOKING.

INHALATION: SEVERE RESPIRATORY EFFECTS, UPPER RESPIRATORY
TRACT

IRRITATION, CNSDEPRESSION, ANESTHETIC EFFECTS, IRREGULAR
HEARTBEATS

& CARDIAC SENSITIZATION.

Explanation of Carcinogenicity:NONE

Effects of Overexposure:EYES: IRRITATION OR CORNEAL INJURY. SKIN:
MECHANICAL INJURY. INGESTION: LIVER & KIDNEY EFFECTS,
INCREASE IN

TISSUE LEVELS OF BROMINE, PHYSICAL INJURY, CHOKING.

INHALATION:

SEVERE RESPIRATORY EFFECTS, UPPER RESPIRATORY TRACT
IRRITATION,

CNSDEPRESSION, ANESTHETIC EFFECTS, IRREGULAR HEARTBEATS &
CARDIAC
SENSITIZATION.

===== First Aid Measures
=====

First Aid:EYES: IRRIGATE W/WATER FOR 5 MIN. INHALATION: REMOVE TO
FRESH

AIR. SKIN/INGESTION: OBTAIN MEDICAL ATTENTION IN ALL CASES.

===== Fire Fighting Measures =====

Flash Point Method:PMCC

Flash Point:670F

Extinguishing Media:WATER FOG

Fire Fighting Procedures:WEAR POSITIVE-PRESSURE SCBA. APPLY LARGE
VOLUME OF WATER DIRECTLY ON FLAME OR BURNING SURFACE.

Unusual Fire/Explosion Hazard:EMITS DENSE, BLACK SMOKE WHEN
BURNED.

GRINDING OR CUTTING MAY LEAD TO A BUILDUP OF DUST
SUSPENDED IN AIR

WHICH CAN CAUSE A DUST EXPLOSION IF IGNITED.

===== Accidental Release Measures =====

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Spill Release Procedures: PICK UP, OR IF DUST/SMALL PIECES, SWEEP UP
&
PLACE IN SUITABLE CONTAINER FOR DISPOSAL.

=====
===== Handling and Storage
=====

Handling and Storage Precautions: DON'T STORE OR USE IN CONFINED,
VIRTUALLY AIRTIGHT SPACES TO PREVENT BUILDUP OF
COMBUSTIBLE VAPORS.

Other Precautions: USE ONLY AS DIRECTED BY THE SPECIFIC
INSTRUCTIONS FOR
THIS PRODUCT. PROVIDE ADEQUATE VENTILATION, & APPROPRIATE
DUST
HANDLING SYSTEMS.

===== Exposure Controls/Personal Protection =====

Respiratory Protection: USE AN APPROVED AIR-PURIFYING/APPROVED
DUST
RESPIRATOR.

Ventilation: GENERAL/LOCAL EXHAUST

Eye Protection: GLASSES/CHEMICAL GOGGLES

Supplemental Safety and Health

GAS FIRED RECIRCULATING AIR FURNACES/HEATERS, GAS WATER
HEATERS CAN BE

SUBJECTED TO RUST/CORROSION PROBLEMS. THIS INSULATION
CONTAINS A
FLAME RETARDANT ADDITIVE TO INHIBIT ACCIDENTAL IGNITION FROM
FIRE

SOURCES. PRODUCT MAY CONTAIN EITHER 9002-88-4 OR 26221-73-8.

===== Physical/Chemical Properties =====

Spec Gravity: 0.027 TO 0.064

Solubility in Water: INSOLUBLE

Appearance and Odor: RIGID CELLULAR FOAM BOARD, NO ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid: YES

AROMATIC HYDROCARBONS, HIGHER (>C5) ALIPHATIC HYDROCARBONS,
ESTERS,

AMINES, HIGHER ALDEHYDES.

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Stability Condition to Avoid: FIRE, HIGH TEMPS. TEMPERATURES OVER 572F
WILL RELEASE COMBUSTIBLE GASES.

Hazardous Decomposition Products: CO, CO₂, HYDROGEN
BROMIDE/CHLORIDE/FLUORIDE & SMALL AMOUNTS OF AROMATIC
HYDROCARBONS
SUCH AS STYRENE & ETHYLBENZENE.

Conditions to Avoid Polymerization: FLAME OR OTHER IGNITION SOURCES

===== Disposal Considerations =====

Waste Disposal Methods: BURY IN AN APPROVED LANDFILL, OR BURN IN AN
ADEQUATE INCINERATOR W/EXCESS OXYGEN, IN ACCORDANCE
W/LOCAL, STATE
& FEDERAL REGULATIONS.

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KING ADHESIVES CORP -- 11-282 DUCT TAPE ADHESIVE -- 8040-00F038125

===== Product Identification =====

Product ID:11-282 DUCT TAPE ADHESIVE

MSDS Date:02/07/1992

FSC:8040

NIIN:00F038125

MSDS Number: BWKRB

=== Responsible Party ===

Company Name:KING ADHESIVES CORP

Address:5231 NORTHRUP AVE

City:ST LOUIS

State:MO

ZIP:63110-5000

Country:US

Info Phone Num:314-772-9953/800-233-8171

Emergency Phone Num:314-772-9953/800-233-8171

CAGE:KINGG

=== Contractor Identification ===

Company Name:KING ADHESIVES CORP

Address:5231 NORTHRUP AVE

Box:City:ST LOUIS

State:MO

ZIP:63110-5000

Country:US

Phone:314-772-9953/800-233-8171

CAGE:KINGG

===== Composition/Information on Ingredients =====

Ingred Name:NON HAZARDOUS INGREDIENTS

===== Hazards Identification =====

Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:EYES: IRRITATION, DAMAGE TO MUCOUS
LININGS. SKIN: IRRITATION. INHALATION: NASAL & RESPIRATORY
IRRITATION. INGESTION: GI IRRITATION.

Explanation of Carcinogenicity:NONE

Effects of Overexposure:REDNESS, TEARING, BLURRED VISION,
IRRITATION.

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===== First Aid Measures =====

First Aid:EYES: FLUSH W/WATER FOR 15 MINS. INHALATION: REMOVE TO FRESH AIR. INGESTION: DON'T INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IN ALL CASES.

===== Fire Fighting Measures =====

Flash Point Method:TCC
Flash Point:>203F
Extinguishing Media:FOAM, CO2, DRY CHEMICAL, WATER FOG
Fire Fighting Procedures:WEAR SELF CONTAINED BREATHING APPARATUS W/FULL FACE PIECE OPERATED IN A PRESSURE DEMAND/OTHER POSITIVE PRESSURE MODE. DRY FILM WILL BURN.

===== Accidental Release Measures =====

Spill Release Procedures:DIKE AREA TO PREVENT FROM SPREADING. COLLECT MATERIAL IN SALVAGE CONTAINER. MATERIAL WILL FLOW.

===== Handling and Storage =====

Handling and Storage Precautions:DON'T STORE IN TEMP >125F/BELOW FREEZING. WHEN HANDLING MATERIAL, ALWAYS FOLLOW PERSONAL PROTECTION INSTRUCTION & NEVER TRANSFER.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NONE REQUIRED
Ventilation:GENERAL MECHANICAL
Protective Gloves:IMPERVIOUS ARE RECOMMENDED
Eye Protection:SAFETY GLASSES
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health

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===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:212F
Vapor Density:>1
Spec Gravity:1.03
Evaporation Rate & Reference:SLOWER THAN ETHER
Solubility in Water:COMPLETE
Appearance and Odor:WHITE COLORED THIN VISCOSITY LIQUID W/BLAND
ODOR
Percent Volatiles by Volume:45-53

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
SULFURIC ACID/ALKALI MATERIALS/SODIUM/METAL HYDRIDES.
Stability Condition to Avoid:FREEZING, TEMP <125F.
Hazardous Decomposition Products:CO₂, CO, CARBON, ACETIC
ACID/ACETALDEHYDE

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IAW/FEDERAL, STATE & LOCAL
REGULATIONS.

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SCOTCH BRAND #232 HIGH PERFORMANCE MASKING TAPE

MANUFACTURER: 3M

DIVISION: Industrial Tape And Specialties Division

ADDRESS: 3M Center

St. Paul, MN 55144-1000

EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)

Issue Date: 01/11/2005

Supercedes Date: 07/24/2003

Document Group: 07-0454-4

Product Use:

Intended Use: Used in medium temperature paint bake operations.

Limitations on Use: 250°F for up to one hour.

SECTION 2: INGREDIENTS

Ingredient C.A.S. No. % by Wt

SATURATED PAPER BACKING MIXTURE 35 - 50

RUBBER / RESIN ADHESIVE MIXTURE 5 - 20

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Specific Physical Form: Roll of Tape

Odor, Color, Grade: Tan color paper with unpigmented adhesive

General Physical Form: Solid

Immediate health, physical, and environmental hazards: The environmental properties of this product present a low environmental hazard. This product, when used under reasonable conditions and in accordance with the 3M directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:

No health effects are expected.

Skin Contact:

No health effects are expected.

Inhalation:

No health effects are expected.

Ingestion:

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No health effects are expected.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

This substance does not leach metals or other RCRA (Resource Conservation and Recovery Act) listed TCLP (Toxic Characteristic Leaching Procedure) hazardous substances at concentrations that would make the product a hazardous waste.

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: No need for first aid is anticipated.

Skin Contact: No need for first aid is anticipated.

Inhalation: No need for first aid is anticipated.

If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature 451 °F

Flash Point *No Data Available*

Flammable Limits - LEL *Not Applicable*

Flammable Limits - UEL *Not Applicable*

5.2 EXTINGUISHING MEDIA Ordinary combustible material. Use fire extinguishers with class A extinguishing agents (e.g., water, foam). Use fire extinguishers

with class B extinguishing agents (e.g., dry chemical, carbon dioxide).

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: See Hazardous Decomposition section for products of combustion. Nonflammable. Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: Not applicable. No unusual fire or explosion hazards are anticipated. Non-flammable: ordinary combustible material.

Note: See **STABILITY AND REACTIVITY (SECTION 10)** for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Collect as much of the spilled material as possible. Reclaim undamaged product.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING

Do not ingest. Do not breathe thermal decomposition products. Avoid skin contact with hot material. Avoid eye contact with vapors, mists, or spray. This product is considered to be an article which does not

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release or otherwise result in exposure to a hazardous chemical under normal use conditions. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits. If ventilation is not adequate, use respiratory protection equipment.

7.2 STORAGE

Store out of direct sunlight. Not applicable. Store under normal warehouse conditions.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS

Not applicable. Provide appropriate local exhaust for molten or extruded material. Provide appropriate local exhaust when product is heated. General ventilation adequate below 400 C. Local exhaust recommended above 400 C.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection

Avoid eye contact. Not applicable. Avoid eye contact with vapors, mists, or spray.

8.2.2 Skin Protection

Wear appropriate gloves, such as Nomex, when handling this material to prevent thermal burns. Not applicable. Avoid skin contact.

Avoid prolonged or repeated skin contact. Avoid skin contact with hot material.

Gloves are not required. Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

8.2.3 Respiratory Protection

Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection. **8.2.4 Prevention of Swallowing**

Not applicable. Do not ingest.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form: Roll of Tape

Odor, Color, Grade: Tan color paper with unpigmented adhesive

General Physical Form: Solid

Autoignition temperature 451 °F

Flash Point *No Data Available*

Flammable Limits - LEL *Not Applicable*

Flammable Limits - UEL *Not Applicable*

Boiling point *Not Applicable*

Density 0.84 - 0.88 g/ml

Vapor Density *Not Applicable*

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Vapor Density Negligible
Vapor Pressure *Not Applicable*
Vapor Pressure Negligible
Specific Gravity Approximately 0.85 g/ml
pH *Not Applicable*
Melting point *Not Applicable*
Solubility In Water *Not Applicable*
Solubility in Water Negligible
Evaporation rate *Not Applicable*
Hazardous Air Pollutants *No Data Available*
Volatile Organic Compounds $\leq 0.2\%$
Percent volatile *Not Applicable*
VOC Less H₂O & Exempt Solvents $\leq 0.2\%$
Viscosity *Not Applicable*

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: None known Additional Information:
Excessive heat

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance Condition

Hydrocarbons Not Specified

Carbon monoxide Not Specified

Carbon dioxide Not Specified
Hazardous Decomposition: Under recommended usage conditions, hazardous decomposition products are not expected. Hazardous decomposition products may occur as a result of oxidation, heating, or reaction with another material.

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not determined. Not applicable.

CHEMICAL FATE INFORMATION

Not determined. Not applicable.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Reclaim if feasible. If product can't be reclaimed, dispose of waste product in a sanitary landfill.

Alternatively, incinerate the waste product in an industrial, commercial, or municipal incinerator. Dispose of waste product in a sanitary landfill. As a disposal alternative, incinerate in an industrial or commercial facility.

EPA Hazardous Waste Number (RCRA): Not regulated

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Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14: TRANSPORT INFORMATION

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard – No

STATE REGULATIONS

Contact 3M for more information.

CHEMICAL INVENTORIES

The components of this product are in compliance with the chemical notification requirements of TSCA.

All applicable chemical ingredients in this material are listed on the European Inventory of Existing Chemical Substances (EINECS), or are exempt polymers whose monomers are listed on EINECS.

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information.

INTERNATIONAL REGULATIONS

Contact 3M for more information.

WHMIS: Hazardous

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification

Health: 0 Flammability: 1 Reactivity: 0 Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

DISCLAIMER: The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. 3M

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SUPER GLUE CORP -- SUPER GLUE -- 8040-00N056030

===== Product Identification =====

Product ID: SUPER GLUE

MSDS Date: 08/18/1993

FSC: 8040

NIIN: 00N056030

MSDS Number: BWBXW

=== Responsible Party ===

Company Name: SUPER GLUE CORP

Address: 184-08 JAMACA AVE

City: HOLLIS

State: NY

ZIP: 11423

Country: US

Info Phone Num: 718-454-4747

Emergency Phone Num: 800-424-9300 (CHEMTREC)

CAGE: 0ACS9

=== Contractor Identification ===

Company Name: SUPER GLUE CORP

Address: 184-08 JAMAICA AVE

Box: City: HOLLIS

State: NY

ZIP: 11423

Country: US

Phone: 800-221-4478

CAGE: 0ACS9

===== Composition/Information on Ingredients =====

Ingred Name: 2-PROPENOIC ACID, 2-CYANO-, ETHYL ESTER; (ETHYL
CYANOACRYLATE)

CAS: 7085-85-0

RTECS #: UD3330000

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Fraction by Wt: 60-100%

OSHA PEL:N/K

ACGIH TLV:N/K

Ingred Name:HYDROQUINONE (SARA III)

CAS:123-31-9

RTECS #:MX3500000

Fraction by Wt: 0-1%

OSHA PEL:2 MG/M3

ACGIH TLV:2 MG/M3

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

Ingred Name:POLYMETHYLMETHACRYLATE

CAS:9011-14-7

RTECS #:TR0400000

Fraction by Wt: 10-30%

OSHA PEL:N/K

ACGIH TLV:N/K

Ingred Name:SUPDAT:(DO NOT PULL) LIPS APART. IT IS ALMOST IMPOSSIBLE TO

SWALLOW CYANOACRYLATE AS ADHESIVE SOLIDIFIES UPON (ING 5)

RTECS #:9999999ZZ

Ingred Name:ING 4:CONT W/SALIVA & MAY ADHERE TO INSIDE OF MOUTH. SALIVA

WILL LIFT ADHESIVE IN 1-2 DAYS, AVOID SWALLOWING (ING 6)

RTECS #:9999999ZZ

Ingred Name:ING 5:ADHESIVE AFTER DETACHMENT.

RTECS #:9999999ZZ

===== Hazards Identification =====

LD50 LC50 Mixture:LD50:(ORAL) 12.2 CC/KG

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:ACUTE:IRRITATES EYES, MUCOUS MEMBRANES. CHRONIC:NO RESIDUAL AFFECTS OF ACUTE PROPERTIES.

Explanation of Carcinogenicity:NOT RELEVANT.

Effects of Overexposure:SEE HEALTH HAZARDS.

Medical Cond Aggravated by Exposure:PRE-EXISTING SKIN, EYE AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE.

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===== First Aid Measures =====

First Aid:EYE:TEARING FROM EYE IRRIT. REMOVE TO FRESH AIR. FLUSH AREAS

OF CONT W/WATER FOR @ LEAST 15 MINS. ADHESIVE WILL DISASSOCIATE

FROM EYE/EYELIDS OVER TIME, USUALLY W/IN SEVERAL HRS.

TEMPORARY

WEeping OF EYES/DOUBLE VISION MAY BE EXPERIENCED UNTIL CLEARANCE

IS ACHIEVED. SKIN:IMMERSE BONDED AREAS IN WARM, SOAPY WATER.

PEEL/ROLL SKIN APART. REMOVE SECURED ADHESIVE W/SEVERAL APPLIC OF

WARM, SOAPY(SUPDAT)

===== Fire Fighting Measures =====

Flash Point Method:TCC

Flash Point:176F,80C

Extinguishing Media:FLUSH WITH LARGE AMOUNTS OF WATER OR DRY CHEMICAL

EXTINGUISHER.

Fire Fighting Procedures:NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP .

FUMES MAY BE IRRITATING IF NOT BURNING & REQ AIR SUPPLY W/GOGG

WHILE APPLYING LG AMTS OF WATER/DRY (SUPDAT)

Unusual Fire/Explosion Hazard:NONE. COMBUSTIBLE REQUIRING THE ABOVE

PROCEDURES.

===== Accidental Release Measures =====

Spill Release Procedures:POLYMERIZE WITH WATER. SOLID MATERIAL MAY BE

SCRAPED FROM SURFACE.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:AVOID MOISTURE, DIRECT UV=SUNLIGHT AND

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DO NOT STORE ABOVE 25C. KEEP CNTNRS CLSD TIGHTLY WHEN NOT IN USE.

AVOID BRTHG VAP, CONT WITH EYES/SKIN.

Other Precautions:DO NOT SOTRE AT -5C WHICH FREEZES PRODUCT TO USELESS

STATE. PRODUCT NOT DAMAGED BY FREEZING.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NORMALLY NOT NECESSARY. A NIOSH/MSHA APPROVED

ORGANIC VAPOR CANISTER MAY BE USED.

Ventilation:LOCAL EXHAUST:TO PREVENT EYE IRRITATION. MECHANICAL (GENERAL):LARGE AMOUNT:USED TO 2PPM.

Protective Gloves:VINYL (POLYETHYLENE)NON-STICKING GLOVES.

Eye Protection:SAFETY GLASSES & SIDE SHIELD.

Other Protective Equipment:RUBBER APRON TO PROTECT CLOTHING.

Work Hygienic Practices:SOAP AND WATER HELPS REMOVE ADHESIVE FROM SKIN.

Supplemental Safety and Health

SOL IN H*20:INSOLUBLE, MATL REACTS TO HARDENED MASS FOR NON-HAZ WASTE.

FIRE FIGHT PROC:CHEM EXTING. FIRST AID PROC:WATER. INHAL:IRRIT OF

MUC MEMB/COUGHING. REMOVE TO FRESH AIR. INGEST:LIPS MAY BECOME

STUCK TOGETHER:APPLY COPIOUS AMTS OF WARM WATER & ENCOURAGE

SWETTING/PRESS FROM SALIVA INSIDE MOUTH. PEEL/ROLL (ING 4)

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:149F,65C

Vapor Pres:1 @ 20C

Spec Gravity:1.05 (H*20=1)

Evaporation Rate & Reference:NOT KNOWN

Solubility in Water:SUPP DATA

Appearance and Odor:TRANSPARENT WATER-WHITE TO STRAW COLORED LIQUID

WITH STIMULATIVE ODOR

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

POLYMERIZED BY WATER, ALCOHOL, AMINES, ALKALINE MATERIALS

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AND DIRECT

UV.

Stability Condition to Avoid: EXCESSIVE HEAT ABOVE 176F, MOISTURE AND ALKALINES. STABLE UP TO 122F. STORE IN COOL DRY PLACE.

Hazardous Decomposition Products: COMBUSTIBLE BY-PRODUCTS OF CARBON MONOXIDE/DIOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods: INCINERATE SOLID COMBUSTIBLE WASTE OR DUMP AS

CHEMICAL WASTE ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS.

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EMS CATALOG NO: 10000

EMS PRODUCT: Acetone

DATE: 4/22/96

PAGE NUMBER: One of 7

MATERIAL SAFETY DATA SHEET

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FORT WASHINGTON, PA 19034 24 HOUR EMERGENCY PHONE NUMBER
(215) 646-1566 CHEMTREC: (800) 424-9300

FOR PRODUCT AND SALES INFORMATION

CONTACT ELECTRON MICROSCOPY SCIENCES OFFICE ABOVE.

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PRODUCT IDENTIFICATION

PRODUCT NAME: Acetone

CAS NO.: 67-64-1

COMMON NAMES/SYNONYMS: 2-Propanone Dimethyl Ketal, Dimethyl Ketone

FORMULA: C₃H₆O

MOLECULAR WEIGHT: 58.08

NFPA RATING (MANUFACTURER):

HAZARD RATING SCALE:

HEALTH: 1

0 = NONE

FIRE: 3

1 = MINIMAL

REACTIVITY: 0

2 = MODERATE

SPECIAL: None

3 = SERIOUS

4 = SEVERE

HAZARDOUS INGREDIENTS

EXPOSURE LIMITS,PPM

OSHA ACGIH OTHER

COMPONENT	CAS NO.	%	PEL	TLV	LIMIT	HAZARD
Acetone	67-64-1	>99	750	750	1,000	Flammable/Irritant (ACGIH STEL)

PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 133F

MELTING POINT: 142F

SPECIFIC GRAVITY (WATER=1): 0.79

VAPOR PRESSURE, mm Hg: 184

pH: No data found

VAPOR DENSITY (AIR=1): 2.0

WATER SOLUBILITY : 100%

EVAPORATION RATE (BUTYL ACETATE=1): 5.6

% VOLATILE (BY VOLUME): 100

APPEARANCE AND ODOR: Clear, colorless liquid; sweet odor.

FIRST AID MEASURES

INHALATION: Remove to fresh air. Give artificial respiration if not breathing. Get immediate medical attention.

EYE CONTACT: Immediately flush eyes with lots of running water for 15 minutes, lifting the upper and lower eyelids occasionally. Get

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immediate attention.

SKIN CONTACT: Immediately wash skin with lots of soap and water. Remove contaminated clothing and shoes; wash before reuse. Get medical attention if irritation persists after washing.

INGESTION: Do not induce vomiting. If conscious, give lots of water. Get immediate medical attention. Do not give anything by mouth to an unconscious or convulsing person.

NOTES TO PHYSICIAN: The danger of aspiration must be weighed against toxicity when considering emptying the stomach. Stomach contents should be emptied quickly in a manner which avoids the vomitus from entering the lungs.

HEALTH HAZARD INFORMATION

PRIMARY ROUTES OF EXPOSURE: Inhalation, skin or eye contact.

SIGNS AND SYMPTOMS OF EXPOSURE:

INHALATION: Prolonged or repeated exposure or breathing very high concentration may cause headaches, nausea, vomiting, dizziness, other central nervous system effects, convulsions, and in extreme cases, unconsciousness and death.

EYE CONTACT: Vapors will irritate the eyes. Liquid and mists will irritate and may burn the eyes.

SKIN CONTACT: Brief contact may dry the skin. Prolonged or repeated contact may irritate the skin causing dermatitis.

INGESTION: Swallowing large quantities causes headaches, nausea, vomiting, and perhaps unconsciousness. Can also cause liver and kidney injury.

CHRONIC EFFECTS OF EXPOSURE: No specific information available.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Preexisting eye or skin disorders may be aggravated by acetone exposure. Also, use of alcoholic beverages enhances toxic effects.

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TOXICITY DATA

ORAL: Rat LD50 = 9750 MG/KG

DERMAL: Rabbit LD50 = 20 G/KG

INHALATION: Rat LC50 = 16,000 PPM/4 HR

CARCINOGENICITY: This material is not considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or The Occupational Safety and Health Administration.

OTHER DATA: Development of cataracts has been reported in laboratory animals after prolonged repeated skin exposure.

ECOLOGICAL INFORMATION SECTION

No data found

PERSONAL PROTECTION

VENTILATION: Local mechanical exhaust ventilation capable of maintaining emissions at the point of use below the PEL.

RESPIRATORY PROTECTION: If use conditions generate vapors or mists, wear a NIOSH- approved respirator appropriate for those emission levels.

Appropriate respirators may be a full facepiece or half mask air-purifying cartridge respirator equipped for organic vapors/mists, a self-contained breathing apparatus in the pressure demand mode, or a supplied-air respirator.

EYE PROTECTION: Chemical goggles unless a full facepiece respirator is also worn. It is generally recognized that contact lenses should not be worn when working with chemicals because contact lenses may contribute to the severity of an eye injury.

PROTECTIVE CLOTHING: Long-sleeved shirt, trousers, safety shoes, rubber gloves, and rubber apron.

OTHER PROTECTIVE MEASURES: An eyewash and safety shower should be nearby and ready for use.

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FIRE AND EXPLOSION INFORMATION

FLASH POINT: -15oF METHOD USED: TCC

FLAMMABLE LIMITS IN AIR: LOWER: 2% UPPER: 13%

AUTOIGNITION TEMPERATURE: No data found

EXTINGUISHING MEDIA: Use water spray, dry chemical, CO2 or alcohol foam.

SPECIAL FIREFIGHTING PROCEDURES: Fire fighters should wear self-contained

breathing apparatus and full protective clothing. Use water spray to cool nearby containers and structures exposed to fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Acetone is extremely flammable. Extinguish all nearby sources of ignition. Avoid accumulation of water or acetone vapors because aqueous solutions containing more than 2.5% acetone vapors are flammable. Vapors formed from this product are heavier than air and may travel along the surface to a distant sources of ignition and flashback. Explosive vapor-air mixtures may be formed above the flash point or between the lower and upper flammable limits.

HAZARDOUS REACTIVITY

STABILITY: Stable

POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Heat, Sparks, and Open Flames.

MATERIALS TO AVOID: Oxidizers, acids, alkalis, chlorinated compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: May liberate carbon monoxide, carbon

dioxide, and unidentified organic compounds in black smoke.

SPILL, LEAK AND DISPOSAL PROCEDURES

Action to take for spills or leaks: wear protective equipment including rubber boots, rubber gloves, rubber apron, and a self-contained breathing apparatus in the pressure demand mode or a supplied-air respirator. If the spill or leak is small, a full facepiece air-purifying cartridge respirator equipped for organic vapors may be satisfactory. In any event, always wear eye protection. Extinguish all ignition sources and ensure that all handling equipment is electrically grounded. For small spills or drips, mop or wipe up and dispose of in DOT-approved waste containers. For large spills, contain by diking with soil or

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other non-combustible absorbent materials and then pump into DOT-approved waste containers; or absorb with non-combustible sorbent material, place residue in DOT-approved waste containers. Keep out of sewers, storm drains, surface waters, and soil.

Comply with all applicable governmental regulations on spill reporting, and handling and disposal of waste.

DISPOSAL METHODS: Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult with appropriate Federal, State and local regulatory agencies.

NOTE: Empty containers can have residues, gases and mists and are subject to proper waste disposal, as above.

SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS: Keep away from heat, sparks, and flames.

Store in a cool, dry, well-ventilated place away from incompatible materials. Vent container frequently, and more often in warm weather, to relieve pressure. Electrically ground all equipment when handling this product and use only non-sparking tools. Keep container tightly closed when not in use.

Do not use pressure to empty container. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.

REPAIR AND MAINTENANCE PRECAUTIONS: Do not cut, grind, weld, or drill on or near this container.

OTHER PRECAUTIONS: Containers, even those that have been emptied, will retain product residue and vapors. Always obey hazard warnings and handle empty containers as if they were full.

OTHER REGULATORY INFORMATION

SECTION 313 - This product is a toxic chemical subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

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PROPOSITION 65 (WITH CHEMICALS LISTED) - This product contains the following chemical(s) considered by the state of California's safe drinking water and Toxic Enforcement Act of 1986 (Proposition 65) as causing cancer or reproductive toxicity and for which warnings are required:

CHEMICALS	CAS NO.	% WT
Benzene	71-43-2	30 PPM

MASSACHUSETTS - Under the Massachusetts right-to know law, hazardous substance and extraordinarily hazardous substances components present in this product which requires reporting are:

HAZARDOUS SUBSTANCE	CAS NO.	CONC. (>1%)
Acetone	67-64-1	100

PENNSYLVANIA - Under the Pennsylvania right-to-know law, hazardous substances and special hazardous substances components present in this product which require reporting are:

HAZARDOUS SUBSTANCE	CAS NO.	CONC. (>1%)
Acetone	67-64-1	100

CALIFORNIA SCAQMD: Rule 443.1 VOC'S
VOC: 790 G/L Vapor Pressure: 184 MMHG AT 68oF.

TSCA: THE INGREDIENTS OF THIS PRODUCT ARE ON THE TSCA INVENTORY.

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EMS CATALOG NO: 14810
EMS PRODUCT: EM GLASS
DATE: 09/24/96
PAGE NUMBER: One of 6

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—

PRODUCT IDENTIFICATION

—

PRODUCT NAME: EM Glass

CHEMICAL NAME: Merckoglas(R) Liquid Cover Glass

CHEMICAL FAMILY: Organic substances in toluene

FORMULA: Organic substances in toluene

MOLECULAR WEIGHT: N/A

COMPONENT CAS # APPR %

Toluene 108-88-3 N/A

Also contains organic substances not disclosed by the manufacturer.

HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

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Flammable liquid and vapor.

Harmful or fatal if swallowed.

Vapor harmful.

May be irritating to skin, eyes and mucous membranes.

May cause damage to central nervous system, liver, kidneys and lungs.

APPEARANCE: Colorless, viscous liquid.

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

Symptoms of Exposure:

Quantitative data on the toxicity of this product is not available.

Expected properties on the grounds of the components:

Harmful or fatal if swallowed. Vapor harmful if inhaled.

Symptoms: Headache, dizziness, hallucinations, distorted perceptions, changes in motor activity, nausea, diarrhea, respiratory irritation, central nervous system depression, unconsciousness, liver, kidney and lung damage. Contact can cause severe eye irritation. May cause skin irritation.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Data not available.

ROUTES OF ENTRY: Inhalation, ingestion.

CARCINOGENICITY: The material is not listed (IARC, NTP, OSHA) as cancer causing agent.

FIRST AID MEASURES

EMERGENCY FIRST AID:

GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.

SKIN: Wash thoroughly with soap and water.

EYES: Immediately flush thoroughly with water for at least 15 minutes.

INHALATION: Remove to fresh air; give artificial respiration if breathing has stopped.

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INGESTION: If conscious, drink water and induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

—

FIRE FIGHTING MEASURES

—

FLASH POINT (F): 47oF
FLAMMABLE LIMITS LEL (%): N/A
FLAMMABLE LIMITS UEL (%): N/A

EXTINGUISHING MEDIA: Dry chemical, CO2, or "alcohol" foam.

FIREFIGHTING PROCEDURES: Wear self-contained breathing apparatus and protective clothing.

FIRE & EXPLOSION HAZARDS: Dangerous fire and explosion hazard. Vapor can travel distances to ignition source and flash back.

—

ACCIDENTAL RELEASE MEASURES

—

SPILL RESPONSE:

Evacuate the area of all unnecessary personnel. Wear suitable protective equipment listed under Exposure/Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Take up and containerize for proper disposal as described under Disposal. Comply with Federal, State, and local regulations on reporting releases. Refer to Regulatory Information for reportable quantity and other regulatory data.

The following Electron Microscopy Sciences clean up kit is recommended for this product:

SX0863 Solvent Spill Treatment Kit

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HANDLING AND STORAGE

Keep container closed.

Store in a cool, dry area away from ignition sources and oxidizers.

Do not breath vapor or mist.

Do not get in eyes, on skin, or on clothing.

Electrically ground all equipment when handling this product.

Retained residue may make empty containers hazardous; use caution!

EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:

Ventilation, Respiratory Protection, Protective Clothing, Eye Protection

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Protective gloves should be worn to prevent skin contact (Viton or equivalent).

Safety glasses with side shields should be worn at all times.

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

WORK/HYGIENIC PRACTICES:

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Wash thoroughly after handling. Do not take internally.
Eye wash and safety equipment should be readily available.

EXPOSURE GUIDELINES:

TWA STEL CL
COMPONENT PPM MG/M3 PPM MG/M3 PPM MG/M3 SKIN
Toluene 100 375 150 560

ACGIH - TLV:
TWA STEL CL
COMPONENT PPM MG/M3 PPM MG/M3 PPM MG/M3 SKIN
Toluene 50 188 X

PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (C 760 mmHg): N/A
MELTING POINT (C): N/A
SPECIFIC GRAVITY (H2O = 1): .91
VAPOR PRESSURE (mm Hg) N/A
PERCENT VOLATILE BY VOL (%): N/A
VAPOR DENSITY (AIR =1): N/A
EVAPORATION RATE (BuAc = 1): N/a
SOLUBILITY IN WATER (%): Soluble
APPEARANCE: Colorless, viscous liquid.

STABILITY AND REACTIVITY

STABILITY: Stable.
HAZARDOUS POLYMERIZATION: Does not occur.
HAZARDOUS DECOMPOSITION: CO₂, hydrocarbons.
CONDITIONS TO AVOID: Heat; contact with ignition sources.
MATERIALS TO AVOID: Oxidizers.

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TOXICOLOGICAL INFORMATION

—

TOXICITY DATA: None established.

TOXICOLOGICAL FINDINGS: None-Cited in Registry of Toxic Effects of Substances (RTECS).

—

DISPOSAL CONSIDERATIONS

—

EPA WASTE NUMBERS: D001 U220

TREATMENT:

Incineration, fuels blending or recycle. Contact your local permitted waste disposal site (TSD) for permissible treatment sites. Always contact a permitted waste disposer (TSD) to assure compliance with all current local, State and Federal regulations.

—

TRANSPORT INFORMATION

—

DOT SHIPPING NAME: Flammable liquid, n.o.s. (contains Toluene)

DOT NUMBER: UN1993

—

REGULATORY/OTHER INFORMATION

—

TSCA STATEMENT: This product is a "Mixture". CAS number(s) of component(s) NOT listed on TSCA Inventory.

For Research and Development Use only; Not for Manufacturing or Commercial purposes.

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COMPONENT: SARA EHS (302) SARA EHS TPQ (lbs) CERCLA RQ (lbs)

Toluene 1000

OSHA Floor List SARA 313 DeMinimis for SARA 313

%

Toluene Y Y 1.0

NFPA Hazard Ratings: Health - 1

Flammability - 3

Reactivity - 0

UNION OIL CO OF CALIFORNIA, CORP. DIV-EASTERN -- MINERAL SPIRITS
75 -- 8010-01-127-6897

===== Product Identification =====

Product ID:MINERAL SPIRITS 75

MSDS Date:01/01/1985

FSC:8010

NIIN:01-127-6897

MSDS Number: BGNCM

=== Responsible Party ===

Company Name:UNION OIL CO OF CALIFORNIA, CORP. DIV-EASTERN

Address:1650 EAST GOLF ROAD

City:SCHAUMBURG

State:IL

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ZIP:60195

Country:US

Info Phone Num:708-619-2644

Emergency Phone Num:708-619-2644

CAGE:77416

=== Contractor Identification ===

Company Name:UNION OIL CO OF CALIFORNIA, CORP. DIV-EASTERN

Address:1650 EAST GOLF ROAD

Box:City:SCHAUMBURG

State:IL

ZIP:60195

Country:US

Phone:708-619-2644

CAGE:77416

===== Composition/Information on Ingredients =====

Ingred Name:NAPHTHA (PETROLEUM SPIRITS OR BENZIN)

CAS:8030-30-6

RTECS #:SE7555000

Fraction by Wt: 100%

OSHA PEL:100 PPM

===== Hazards Identification =====

Effects of Overexposure:EYES:SEVERE IRRIT. SKIN: DRYNESS.

INH:HDCH,DIZZ,NAUSEA.

===== First Aid Measures

=====

First Aid:EYES: FLUSH W/WATER 15 MINS,CALL MD. SKIN:WASH W/MILD SOAP &

WATER,APPLY SKIN CREAM. INH:MOVE TO FRESH AIR & CALL MD.

APPLY

ARTIFICIAL RESP IF NEC.

===== Fire Fighting Measures =====

Flash Point:108F.42C PCC

Lower Limits:1.0

Upper Limits:6.0

Extinguishing Media:WATER SPRAY, CO*2,FOAM,DRY CHEMICAL

Fire Fighting Procedures:WEAR SCBA. USE WATER SPRAY TO COOL

FIRE-EXPOSED CONTAINERS.

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Unusual Fire/Explosion Hazard:A DANGEROUS FIRE HAZARD IF HEATED OR
SPRAYED IN AIR.

===== Accidental Release Measures =====

Spill Release Procedures:FLUSH WITH WATER INTO RETAINING AREA OR
CONTAINER. AVOID EXPOSURE TO SPARKS,FIRE, OR HOT METAL
SURFACES.
VENTILATE AREA.

===== Handling and Storage =====

Handling and Storage Precautions:KEEP AWAY FROM HEAT, SPARKS &
OPEN
FLAME. USE WITH ADEQUATE VENTILATION. AVOID PROLONGED OR
REPEATED
CONTACT W/SKIN. KEEP CNTNRS CLSD WHEN NOT IN USE.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:SCBA FOR CONCENTRATIONS ABOVE TLV LIMITS.
Ventilation:LOCAL EXHAUST
Protective Gloves:YES
Eye Protection:YES
Other Protective Equipment:EYE BATH AND SAFETY SHOWER.
Supplemental Safety and Health
CONFORMS TO TT-T-291E,TYPE II, GRADE A. BP:156-198C. EVAP
RATE:<0.1,N-BUAC PER GE MSDS #1257.CONTAINER SIZE:1 QT. CAN.

===== Physical/Chemical Properties =====

HCC:F4
Boiling Pt:B.P. Text:313F-388F
Vapor Pres:2.0
Vapor Density:4.9
Spec Gravity:0.781
Evaporation Rate & Reference:SEE SUPP DATA
Solubility in Water:NEGLIGIBLE
Appearance and Odor:CLEAR LIQUID,CHARACTERISTIC ODOR.
Percent Volatiles by Volume:100

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

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STRONG OXIDIZING AGENTS

Stability Condition to Avoid:HEAT,SPARKS, OPEN FLAMES & FIRE.

Hazardous Decomposition Products:THERMAL DECOMP MAY YIELD CO.

===== Disposal Considerations =====

Waste Disposal Methods:INCINERATE UNDER SAFE CONDITIONS OR
DISPOSE OF

IN ACCORDANCE WITH LOCAL,STATE, OR FEDERAL REGULATIONS.

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assume responsibility for the suitability of this information to their
particular situation.

HENRY SCHEIN INC -- ALCOHOL-DENATURED -- 6810-00F012186

===== Product Identification =====

Product ID:ALCOHOL-DENATURED

MSDS Date:01/01/1987

FSC:6810

NIIN:00F012186

MSDS Number: BJBWG

=== Responsible Party ===

Company Name:HENRY SCHEIN INC

Address:5 HARBOR PARK DR

City:PORT WASHINGTON

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State:NY
ZIP:11050
Info Phone Num:(516) 621-4300
Emergency Phone Num:(516) 621-4300
CAGE:64682
=== Contractor Identification ===
Company Name:HENRY SCHEIN INC
Address:5 HARBOR PARK DR
Box:City:PORT WASHINGTON
State:NY
ZIP:11050
Phone:(516) 621-4300
CAGE:64682

===== Composition/Information on Ingredients =====

Ingred Name:METHYL ALCOHOL (METHANOL) (SARA III)
CAS:67-56-1
RTECS #:PC1400000
Other REC Limits:200 PPM
OSHA PEL:S,200PPM/250STEL
ACGIH TLV:S,200PPM/250STEL; 93
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:INHALATION: MAY CAUSE SYSTEMIC
POISONING.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:INHALATION: MAY CAUSE SYSTEMIC POISONING.

===== First Aid Measures =====

First Aid:EYES: FLUSH W/PLENTY OF WATER. CONTACT PHYSICIAN. SKIN:
WASH
CONTAMINATED AREA W/SOAP & WATER. INGESTION: INDUCE
VOMITING. GIVE
2 GLASSES WATER & STICK FINGER DOWN THROAT OR DILUTE POINT
W/WATER.
INHA LATION: REMOVE FROM CONTAMINATED AREA IMMEDIATELY.

Critical Design Review Report

Windward Community College – University of Hawaii 2009-2010

===== Fire Fighting Measures =====

Flash Point Method:TOC

Flash Point:60F

Lower Limits:5.5%

Upper Limits:36.5

Extinguishing Media:ALCOHOL OR POLYMER FOAM, CO2 OR DRY
CHEMICAL

Fire Fighting Procedures:ADDITION OF WATER TO BURNING FUEL WILL
REDUCE

THE INTENSITY OF FLAME.

Unusual Fire/Explosion Hazard:NONE

===== Accidental Release Measures =====

Spill Release Procedures:ELIMINATE IGNITION SOURCE. CONTAIN SPILL
FOR

SALVAGE OR DISPOSAL. USE OF ANY DILUTION WATER SHOULD BE
CLOSELY

CONTROLLED TO MINIMIZE SPILL VOLUME. AVOID RUN-OFF INTO
STORM

SEWERS & DITCHES WHICH LEAD TO NATURAL WATERWAYS. ADVISE
AUTHORITIES OF SPILL.

===== Handling and Storage =====

Handling and Storage Precautions:DON'T LEAVE CONTAINER OPEN. USE
W/ADEQUATE VENTILATION. AVOID PROLONGED/REPEATED CONTACT
W/SKIN.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:SELF-CONTAINED BREATHING APPARATUS.

Ventilation:MECHANICAL: ACCEPTABLE. LOCAL EXHAUST: PREFERABLE

Protective Gloves:NEOPRENE, RUBBER

Eye Protection:CHEMICAL SAFETY GOGGLES

Other Protective Equipment:IMPERVIOUS APRON, BOOTS, EYE BATH &
SAFETY

SHOWER.

Supplemental Safety and Health

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:64.6F

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Vapor Pres:96.0

Vapor Density:1.11

Spec Gravity:0.7925

Evaporation Rate & Reference:(BU AC = 1): 1

Solubility in Water:COMPLETE

Appearance and Odor:WATER-WHITE LIQUID; CHARACTERISTIC ODOR.

Percent Volatiles by Volume:100%

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

Stability Condition to Avoid:HEAT, SPARKS & FIRE

===== Disposal Considerations =====

Waste Disposal Methods:CHEMICAL INCINERATOR; BIOLOGICAL
TREATMENT;
LANDFILL.

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document should seek competent professional advice to verify and
assume responsibility for the suitability of this information to their
particular situation.

GOEX INC -- BLACK POWDER -- 1376-00N037788

===== Product Identification =====

Product ID:BLACK POWDER

MSDS Date:09/01/1988

FSC:1376

NIIN:00N037788

MSDS Number: BQWTX

=== Responsible Party ===

Critical Design Review Report

Windward Community College – University of Hawaii 2009-2010

Company Name:GOEX INC
Address:1002 SPRINGBROOK AVE
City:MOOSIC
State:PA
ZIP:18507
Country:US
Info Phone Num:717-457-6724
Emergency Phone Num:717-457-6724;800-424-9300(CHEMTREC)
CAGE:51580
=== Contractor Identification ===
Company Name:GOEX INC
Address:1002 SPRINGBROOK AVE
Box:City:MOOSIC
State:PA
ZIP:18507
Country:US
Phone:717-457-6724
CAGE:51580

===== Composition/Information on Ingredients =====

Ingred Name:POTASSIUM NITRATE
CAS:7757-79-1
RTECS #:TT3700000
Fraction by Wt: 70-76%

Ingred Name:CHARCOAL
CAS:16291-96-6
RTECS #:FL7243500
Fraction by Wt: 8-18%

Ingred Name:SULFUR; (SULPHUR)
CAS:7704-34-9
RTECS #:WS4250000
Fraction by Wt: 9-20%

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Explanation of Carcinogenicity:NOT RELEVANT

===== First Aid Measures =====

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First Aid:INGEST:CALL MD IMMEDIATELY . INHAL:REMOVE TO FRESH AIR.
SUPPORT BREATHING (GIVE O*2/ARTF RESP) . EYES:IMMEDIATELY
FLUSH
W/POTABLE WATER FOR A MINIMUM OF 15 MINUTES, SEEK
ASSISTANCE FROM
MD . SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD .

===== Fire Fighting Measures =====

Extinguishing Media:WATER.
Fire Fighting Procedures:DO NOT FIGHT FIRES. EVACUATE AREA.
Unusual Fire/Explosion Hazard:DO NOT FIGHT FIRES. BLACK POWDER MAY
DEFLAGRATE OR EXPLODE IN A FIRE WHILE CONFINED. EVACUATE
AREA.

===== Accidental Release Measures =====

Spill Release Procedures:CAREFULLY PICK UP SPILLS W/NONSPARKING &
NONSTATIC PRODUCING TOOLS. SUPERVISION ONLY BY A PERSON
KNOWLEDGEABLE IN EXPLOSIVES.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:NO SMOKING. STORE IN A COOL, DRY
PLACE.
Other Precautions:AFFECTED EQUIPMENT MUST BE THOROUGHLY WATER
CLEANED
BEFORE ATTEMPTING REPAIRS. USE ONLY NONSPARKING TOOLS.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE NIOSH/MSHA APPROVED RESPIRATOR
APPROPRIATE
FOR EXPOSURE OF CONCERN .
Ventilation:NOT REQUIRED IN OPEN, UNCONFINED AREAS.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:CHEMICAL WORKERS GOGGLES .
Other Protective Equipment:METAL FREE & NONSTATIC PRODUCING
CLOTHES.
Work Hygienic Practices:WASH HANDS/SHOWER.
Supplemental Safety and Health
SPEC GRAV:1.7-1.82 (H*2O=1).

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===== Physical/Chemical Properties =====

Spec Gravity:SUPP DATA

pH:6-8

Solubility in Water:HIGH

Appearance and Odor:BLACK; NO ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

Stability Condition to Avoid:KEEP AWAY FROM HEAT, SPARKS & OPEN FLAME.

AVOID IMPACT, FRICTION & STATIC ELECTRICITY.

Hazardous Decomposition Products:NONE SPECIFIED BY MANUFACTURER.

===== Disposal Considerations =====

Waste Disposal Methods:DE-SENSITIZE BY DILUTING IN WATER. OPEN TRAIN

BURNING OF SMALL UNCONFINED QUANTITIES. ALL PROCEDURES MUST BE IN

COMPLIANCE W/ALL LOCAL, STATE & FEDERAL REGULATIONS.

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BUCKEYE FIRE EQUIPMENT CO -- CARBON DIOXIDE (CO2) -- 4210-00-203-0217

===== Product Identification =====

Product ID:CARBON DIOXIDE (CO2)

MSDS Date:12/01/1990

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FSC:4210

NIIN:00-203-0217

MSDS Number: BXWLF

=== Responsible Party ===

Company Name:BUCKEYE FIRE EQUIPMENT CO

Address:102 INDUSTRIAL DR

City:KINGS MOUNTAIN

State:NC

ZIP:28086

Country:US

Info Phone Num:704-739-7415

Emergency Phone Num:704-739-7415

CAGE:57658

=== Contractor Identification ===

Company Name:BUCKEYE FIRE EQUIPMENT CO

Address:110 KINGS RD

Box:428

City:KINGS MOUNTAIN

State:NC

ZIP:28086

Country:US

Phone:704-739-7415

CAGE:57658

===== Composition/Information on Ingredients =====

Ingred Name:CARBON DIOXIDE

CAS:124-38-9

RTECS #:FF6400000

Other REC Limits:NONE RECOMMENDED

OSHA PEL:5000 PPM

ACGIH TLV:5000PPM/30000STEL;95

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:ACUTE: DIRECT CONTACT WITH LIQUID OR

SOLID WILL CAUSE BURNS, FROSTBITE OR BLINDNES. CARBON DIOXIDE IS AN

ASPHYXIAANT (DISPLACES OXYGEN). CHRONIC: NONE SPECIFIED BY MANUFACTURER.

Explanation of Carcinogenicity:NO INGREDIENT OF A CONCENTRATION OF 0.1%

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OR GREATER IS LISTED AS A CARCINOGEN OR SUSPECTED CARCINOGEN.

Effects of Overexposure:INHALED-SHORTNESS OF BREATH, INCREASED INHALATION RATE, UNCONSCIOUSNESS, POSSIBLE DEATH. CONTACT (SKIN,

EYES): BURNS, FROSTBITE, PAIN.

Medical Condition Aggravated by Exposure:NONE KNOWN.

===== First Aid Measures

First Aid:SKIN/EYES-TREAT AREA EXPOSED TO SOLID OR LIQUID AS FROSTBITE.

GET IMMEDIATE MEDICAL ATTENTION. INHALED-REMOVE TO FRESH AIR.

RESTORE BREATHING IF REQUIRED. GET MEDICAL ATTENTION.

===== Fire Fighting Measures =====

Extinguishing Media:NONE, THIS MATERIAL IS AN EXTINGUISHING AGENT. DLA-

HMIS: USE MEDIA APPROPRIATE FOR SURROUNDING FIRE.

Fire Fighting Procedures:NONE. DLA-HMIS: WEAR SELF-CONTAINED BREATHING

APPARATUS AND FULL PROTECTIVE GEAR. COOL FIRE EXPOSED CONTAINERS

WITH WATER.

Unusual Fire/Explosion Hazard:NONE.

===== Accidental Release Measures =====

Spill Release Procedures:RELEASED GAS WILL DISSIPATE RAPIDLY AND HARMLESSLY TO ATMOSPHERE, IN OPEN AREAS. IN CONFINED OR ENCLOSED

AREAS, MOVE PERSONNEL AND VENTILATE AREA. VENT TO ATMOSPHERE.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage

Handling and Storage Precautions:STORE AWAY FROM DIRECT HEAT OR FLAME.

Other Precautions:NONE.

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===== Exposure Controls/Personal Protection =====

Respiratory Protection: IF ENGINEERING CONTROLS FAIL OR NON-ROUTINE USE

OR AN EMERGENCY OCCURS; WEAR AN MSHA/NIOSH APPROVED AIR-SUPPLIED

RESPIRATOR OR SCBA, AS REQUIRED. USE IN ACCORDANCE WITH 29 CFR

1910.134 AND MANUFACTURER'S RECOMMENDATIONS.

Ventilation: USE ADEQUATE MECHANICAL VENTILATION OR LOCAL EXHAUST TO

MAINTAIN EXPOSURE BELOW TLV(S).

Protective Gloves: USE INSULATED GLOVES IF LIQUID OR SOLID.

Eye Protection: SAFETY GLASSES.

Other Protective Equipment: NONE REQUIRED.

Work Hygienic Practices: USE GOOD HYGIENE AND GOOD HOUSEKEEPING PRACTICES.

Supplemental Safety and Health
CONTAINS 15 POUNDS, NOMINAL.

===== Physical/Chemical Properties =====

HCC: G3

Boiling Pt: B.P. Text: -109F, -78C

Vapor Pres: GAS @ 70F

Vapor Density: 1.52

Evaporation Rate & Reference: HIGH (N-BUTYL ACETATE=1)

Solubility in Water: SLIGHT

Appearance and Odor: COLORLESS LIQUID OR GAS; NO ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid: YES

NONE SPECIFIED BY MANUFACTURER.

Stability Condition to Avoid: NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomposition Products: NONE SPECIFIED BY MANUFACTURER.

Conditions to Avoid Polymerization: WILL NOT OCCUR.

===== Disposal Considerations =====

Waste Disposal Methods: DLA-HMIS: DISPOSE OF IN ACCORDANCE WITH LOCAL,

STATE AND FEDERAL ENVIRONMENTAL REGULATIONS.

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===== Product Identification =====

Product ID:936 SILICONE LUBE, 50A
MSDS Date:01/14/1993
FSC:6850
NIIN:00N078808
MSDS Number: CGGPN
=== Responsible Party ===
Company Name:AERVOE-PACIFIC CO INC
Address:1198 SAWMILL RD
City:GARDNERVILLE
State:NV
ZIP:89410
Country:US
Info Phone Num:702-782-0100
Emergency Phone Num:800-424-9300(CHEMTREC)
Preparer's Name:MIKE A. TRAQUINA
CAGE:0UPL1

=== Contractor Identification ===
Company Name:AERVOE-PACIFIC CO INC
Address:1198 SAWMILL RD
Box:City:GARDNERVILLE
State:NV
ZIP:89410
Country:US
Phone:702-782-0100
CAGE:0UPL1

===== Composition/Information on Ingredients =====

Ingred Name:HEXANE; (N-HEXANE) (CERCLA). LD50:(ORAL,RAT) 28710
MG/KG.
CAS:110-54-3
RTECS #:MN9275000
Fraction by Wt: 30%
OSHA PEL:500 PPM
ACGIH TLV:50 PPM
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:VM & P NAPHTHA; (PETROLEUM NAPHTHA). LD50:(ORAL,RAT)
>25
MG/KG.
CAS:64742-89-8
Fraction by Wt: 35%

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OSHA PEL:400 PPM (MFR)
ACGIH TLV:400 PPM (MFR)

Ingred Name:PROPANE
CAS:74-98-6
RTECS #:TX2275000
Fraction by Wt: 15%
OSHA PEL:1000 PPM
ACGIH TLV:ASPHYXIAN

Ingred Name:PROPANE, 2-METHYL-; (ISOBUTANE)
CAS:75-28-5
RTECS #:TZ4300000
Fraction by Wt: <5%
OSHA PEL:800 PPM (MFR)
ACGIH TLV:800 PPM (MFR)

Ingred Name:BUTANE; (NORMAL BUTANE)
CAS:106-97-8
RTECS #:EJ4200000
Fraction by Wt: 10%
OSHA PEL:800 PPM
ACGIH TLV:800 PPM

Ingred Name:VOLATILE ORGANIC COMPOUNDS (COATING): 5.09 LBS/GAL
(610
G/L).
RTECS #:9999999VO

===== Hazards Identification =====

LD50 LC50 Mixture:SEE INGREDIENTS.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:INHALATION:ANESTHETIC, IRRITATION
OF
THE RESPIRATORY TRACT OR NERVOUS SYSTEM DEPRESSION-
CHARACTERIZED BY
HEADACHE, DIZZINESS, NAUSEA OR POSSIBLE UNCONSCIOUSNESS.
EYE
CONTACT:PRIMARY IRRITATION. SKIN:CONTACT OR ABSORPTION
MAY CAUSE
IRRITATION OR BURNING SENSATION. PROLONGED OR REPEATED
CONTACT MAY
CAUSE(EFTS OF OVEREXP)

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Explanation of Carcinogenicity:NOT RELEVANT

Effects of Overexposure:HLTH HAZ:DERMATITIS - EXERCISE DUE CARE.

INGESTION:NOT APPLICABLE.

Medical Cond Aggravated by Exposure:NONE KNOWN.

===== First Aid Measures

=====

First Aid:INGEST:CALL MD IMMEDIATELY . INHAL:REMOVE FROM EXPOSURE &

RESTORE BREATHING, SEEK MEDICAL ATTENTION. SKIN:WASH AFFECTED AREA.

REMOVE CONTAMINATED CLOTHING. SEE MD IF ANY IRRITATION PERSISTS.

EYE S:FLUSH IMMEDIATELY W/WATER FOR AT LEAST 15 MINUTES & TAKE TO MD.

===== Fire Fighting Measures =====

Flash Point:-0F,-18C

Lower Limits:1%

Upper Limits:9.5%

Extinguishing Media:FOAM, ALCOHOL FOAM, CO*2, DRY CHEMICAL, WATER FOG.

Fire Fighting Procedures:USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT . WATER SPRAY MAY BE USED TO COOL CONTAINERS EXPOSED TO HEAT OR FIRE.

Unusual Fire/Explosion Hazard:CLSD CNTNRS MAY EXPLODE DUE TO BUILD UP

OF PRESS FROM EXTREME HEAT/FIRE. AEROSOL SPRAY IS EXTREMELY FLAMM.

SENSITIVITY TO IMPACT:DO NOT PUNCTURE. (SUPP DATA)

===== Accidental Release Measures =====

Spill Release Procedures:REMOVE ALL SOURCES OF IGNITION, FLAMES, SPARKS, STATIC ELECTRICITY & ELECTRICAL. VENTILATE AREA & SOAK UP

W/INERT ABSORBENT USING NON-SPARKING TYPE TOOLS.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage

=====

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Handling and Storage Precautions:DO NOT STORE ABOVE 120F. DO NOT STORE

OR USE NEAR HEAT, SPARKS OR FLAME. DO NOT GET IN EYES. DO NOT

BREATHE VAPORS. AVOID SKIN CONTACT.

Other Precautions:DO NOT TAKE INTERNALLY. SMOKING WHILE USING THIS

PRODUCT MUST BE STRICTLY PROHIBITED. AVOID PROLONGED OR REPEATED CONTACT.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:IN RESTRICTED AREAS W/POOR VENTILATION USE A

NIOSH APPROVED RESPIRATOR W/ORGANIC VAPOR CARTRIDGE.

Ventilation:ALL APPLICATION AREAS SHOULD BE ADEQUATELY VENTILATED IN

ORDER TO KEEP INGREDIENTS BELOW THEIR EXPOSURE LIMITS.

Protective Gloves:IMPERVIOUS GLOVES.

Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .

Other Protective Equipment:EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET

ANSI DESIGN CRITERIA . IMPERVIOUS APRON IS REC TO PREVENT SKIN

CONT.

Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.

Supplemental Safety and Health

EXPLO HAZ:SENSITIVITY TO STATIC DISCHARGE: PRIMARILY VAPORS.

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:10F,-12C

Vapor Density:HVR/AIR

Spec Gravity:0.7 (H*2O=1)

Evaporation Rate & Reference:FASTER/N-BUTYL ACETATE

Solubility in Water:NEGLIGIBLE

Appearance and Odor:CLEAR LIQUID; SOLVENT BASED ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

STRONG OXIDIZING AGENTS.

Stability Condition to Avoid:HIGH TEMPERATURES.

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Hazardous Decomposition Products: CARBON MONOXIDE & CARBON DIOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods: DISPOSE OF I/A/W LOCAL, STATE & FEDERAL REGULATIONS. DO NOT INCINERATE CLOSED CONTAINERS.

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BOWMAN DISTRIBUTION, BANRES GROUP INC -- 21911 WHITE LUBE
LITHIUM GREASE -- 9150-00F014116

===== Product Identification =====

Product ID:21911 WHITE LUBE LITHIUM GREASE

MSDS Date:10/18/1988

FSC:9150

NIIN:00F014116

MSDS Number: BJTPZ

=== Responsible Party ===

Company Name:BOWMAN DISTRIBUTION, BANRES GROUP INC

Address:850 EAST 72ND STREET

City:CLEVELAND

State:OH

ZIP:44103

Info Phone Num:(216) 391-7200

Emergency Phone Num:(216) 391-7200

CAGE:05575

=== Contractor Identification ===

Company Name:BOWMAN DISTRIBUTION, BARNES GROUP INC

Address:1301 EAST 9TH ST, SUITE 700

Box:City:CLEVELAND

State:OH

ZIP:44114-1824

Country:US

Phone:216-416-7200

CAGE:05573

Company Name:BOWMAN DISTRIBUTION, BARNES GROUP INC.

Address:850 EAST 72ND STREET

City:CLEVELAND

State:OH

ZIP:44103

Phone:(216) 391-7200

CAGE:05575

===== Composition/Information on Ingredients =====

Ingred Name:METHYL CHLOROFORM (1,1,1-TRICHLOROETHANE) (SARA III)

CAS:71-55-6

RTECS #:KJ2975000

Fraction by Wt: 15.0%

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Other REC Limits:350 PPM (CL)
OSHA PEL:350 PPM/450 STEL
ACGIH TLV:350 PPM/450STEL;9192
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS
Ozone Depleting Chemical:1

Ingred Name:HEXANE (N-HEXANE)
CAS:110-54-3
RTECS #:MN9275000
Fraction by Wt: 22.0%
Other REC Limits:50 PPM
OSHA PEL:500 PPM
ACGIH TLV:50 PPM; 9293
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:GREASE
Fraction by Wt: 38.0%

Ingred Name:ISOBUTANE, 2-METHYLPROPANE
CAS:75-28-5
RTECS #:TZ4300000
Fraction by Wt: <25.0%
Other REC Limits:1000 PPM
OSHA PEL:1800 MG/CUM
ACGIH TLV:1000 PPM

Ingred Name:PROPANE
CAS:74-98-6
RTECS #:TX2275000
Fraction by Wt: <25.0%
Other REC Limits:1800 MG/CUM
OSHA PEL:1000 PPM
ACGIH TLV:ASPHYXIAN; 9192

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:INHALATION: DIZZINESS OR NARCOSIS.
SKIN: DEFATTING, EFFECTS ARE REVERSIBLE. LONG TERM
EXPOSURE VAPOR
MAY CAUSE LUNG, LIVER OR KIDNEY DAMAGE. THE SOLVENTS LISTED
HAVE

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BEEN REPORTED TO AFFECT THE CENTRAL NERVOUS SYSTEM.
INGESTION:
HARMFUL.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:INHALATION: DIZZINESS, NARCOSIS. SKIN:
DEFATTING, EFFECTS ARE REVERSIBLE. LONG TERM EXPOSURE
VAPOR MAY
CAUSE LUNG, LIVER OR KIDNEY DAMAGE. THE SOLVENTS LISTED
HAVE BEEN
REPORTED TO AFFECT THE CENTRAL NERVOUS SYSTEM. INGESTION:
HARMFUL.
Medical Cond Aggravated by Exposure:HEART DISEASE, RESPIRATORY
DISORDER.

===== First Aid Measures =====

First Aid:INHALATION: IF UNCONSCIOUS, REMOVE PERSON TO FRESH
AIR. EYES:
FLUSH W/LARGE QUANTITIES OF WATER. OBTAIN MEDICAL
ATTENTION IN ALL
CASES.

===== Fire Fighting Measures =====

Flash Point Method:TCC
Flash Point:-40F
Lower Limits:1.8%
Upper Limits:12.0%
Extinguishing Media:WATERFOG, FOAM, CO2, OR DRY CHEMICAL
Fire Fighting Procedures:KEEP CONTAINERS COOL. USE EQUIPMENT OR
SHIELDING REQUIRED TO PROTECT PERSONNEL AGAINST BURSTING
OR VENTING
CONTAINERS.
Unusual Fire/Explosion Hazard:AT ELEVATED TEMPERATURES >130F
CONTAINERS
MAY VENT, RUPTURE OR BURST.

===== Accidental Release Measures =====

Spill Release Procedures:USE ABSORBENT SWEEPING COMPOUND TO
SOAK UP
MATERIAL. PUT INTO CONTAINER. DISPOSE AS HAZARDOUS WASTE.

===== Handling and Storage =====

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=====

Handling and Storage Precautions:DON'T STORE AT TEMPERATURES >120F.
Other Precautions:NONE

===== Exposure Controls/Personal Protection =====

Respiratory Protection:AVOID BREATHING CONCENTRATED VAPORS OR PARTICLES
FROM ALL PRODUCTS NOT SPECIFICALLY DESIGNED TO BE INHALED.
Ventilation:LOCAL EXHAUST: NORMAL USE-NORMAL VENTILATION
Eye Protection:SAFETY GLASSES REQUIRED
Other Protective Equipment:LONG SLEEVES/PANTS.
Supplemental Safety and Health

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:-40 - >600F
Vapor Pres:55 PSI
Vapor Density:4.0
Spec Gravity:0.8
pH:NONE
Appearance and Odor:LIQUID GAS, WHITE & SOLVENT ODOR.
Percent Volatiles by Volume:60.0%

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
Stability Condition to Avoid:PRESSURIZED CONTAINERS COULD RUPTURE
>130F.
Hazardous Decomposition Products:CO, CO2, WATER, PHOSGENE &
HALOGEN
ACIDS.

===== Disposal Considerations =====

Waste Disposal Methods:DON'T PUNCTURE OR INCINERATE CONTAINERS.
DISPOSE
AS HAZARDOUS WASTE IN ACCORDANCE W/EPA RCRA. CONSUMER
COMMODITY,
ORM-D, UN 1954. RCRA HAZARDOUS WASTE: D001.

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CHESTER LABORATORIES -- ISOPROPYL RUBBING ALCOHOL, USP --
6810-00-311-0192

===== Product Identification =====

Product ID:ISOPROPYL RUBBING ALCOHOL, USP

MSDS Date:08/20/1993

FSC:6810

NIIN:00-311-0192

MSDS Number: CHHNG

=== Responsible Party ===

Company Name:CHESTER LABORATORIES

Address:3208 DIXIE HWY

City:ERLANGER

State:KY

ZIP:41018

Country:US

Info Phone Num:800-354-9709

Emergency Phone Num:606-578-4550

Preparer's Name:KENNETH P. REED, PH.D,CIH

CAGE:JO149

=== Contractor Identification ===

Company Name:CHESTER LABORATORIES

Box:UNKNOWN

CAGE:87879

Company Name:CHESTER LABORATORY INC

Address:3208 DIXIE HIGHWAY

Box:City:ERLANGER

State:KY

ZIP:41018-1876

Country:US

Phone:606-341-7972

CAGE:JO149

Company Name:ROCHESTER MIDLAND CORP, INDUSTRIAL DIV

Address:321 COMMERCIAL AVE

Box:City:PALISADES PARK

State:NJ

ZIP:07650

Country:US

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Phone:201-947-9880

CAGE:0D8W2

===== Composition/Information on Ingredients =====

Ingred Name:ISOPROPYL ALCOHOL (SARA III)

CAS:67-63-0

RTECS #:NT8050000

Fraction by Wt: 70%

Other REC Limits:NONE SPECIFIED

OSHA PEL:400 PPM/500 STEL

ACGIH TLV:400 PPM/500STEL;9192

===== Hazards Identification =====

LD50 LC50 Mixture:TLV = 400 PPM

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:ACUTE: OVEREXPOSURE MAY LEAD TO
CENTRAL NERVOUS SYSTEM DEPRESSION, LEADING TO HEADACHES
AND

DIZZINESS. EYE: MAY LEAD TO IRRITATION AND WILL INJURE EYE
TISSUE

IF NOT REMOVED PROMPTLY. SKIN: MAY LEAD TO DERMATITIS.
INGESTION:

MAY LEAD TO VOMITING. CHRONIC: PROLONGED SKIN CONTACT MAY
CAUSE
DERMATITIS.

Explanation of Carcinogenicity:THIS CHEMICAL IS NOT LISTED AS HAVING
ANY EVIDENCE OF BEING CARCINOGENIC.

Effects of Overexposure:OVEREXPOSURE MAY LEAD TO DIZZINESS,
HEADACHES,

DERMATITIS AND EYE IRRITATION. HIGH VAPOR CONCENTRATIONS
ARE

ANESTHETIC AND MAY HAVE OTHER CENTRAL NERVOUS SYSTEM
EFFECTS, SUCH

AS LIGHTHEADEDNESS, HEADACHE AND DIZZINESS.

Medical Cond Aggravated by Exposure:PERSONS WITH SKIN, HEART,
RESPIRATORY, OR ANY OTHER MEDICAL CONDITION SHOULD USE
CAUTION WHEN

HANDLING OR USING THIS PRODUCT.

===== First Aid Measures =====

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First Aid:SKIN: IMMEDIATELY FLUSH WITH SOAP AND WATER. GET MEDICAL

ATTENTION IF NECESSARY. INHALATION: IMMEDIATELY REMOVE VICTIM TO

FRESH AIR. GIVE CPR IF BREATHING HAS STOPPED. GET MEDICAL ATTENTION. EYE: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES.GET

MEDICAL ATTENTION. INGESTION: GET PROMPT MEDICAL ATTENTION. DO NOT

INDUCE VOMITING. KEEP AT REST.

===== Fire Fighting Measures =====

Flash Point Method:SCC

Flash Point:53.0F,11.7C

Lower Limits:2

Upper Limits:13

Extinguishing Media:USE FOAM, OR DRY CHEMICAL. USE WATER SPRAY TO COOL

FIRE EXPOSED CONTAINERS AND TO PROTECT PERSONNEL.

Fire Fighting Procedures:WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A

FULL FACED SELF CONTAINED BREATHING APPARATUS.

Unusual Fire/Explosion Hazard:COMBUSTION OR HEAT OF FIRE MAY PRODUCE

HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS. VAPORS HEAVIER THAN

AIR, CAN TRAVEL ALONG GROUND AND FLASHBACK.

===== Accidental Release Measures =====

Spill Release Procedures:VENTILATE. ELIMINATE IGNITION SOURCES. ABSORB

MATERIAL WITH CLAY, VERMICULITE, OR SIMILAR ABSORBENT MATERIAL.

PLACE IN DISPOSAL CONTAINERS. FLUSH AREA WITH WATER.

===== Handling and Storage =====

Handling and Storage Precautions:USE ONLY IN WELL VENTILATED WORK AREA.

KEEP CONTAINERS CLOSED WHEN NOT IN USE. FLAMMABLE LIQUID. DO NOT

STORE ABOVE 120F.

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Other Precautions:DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL,
GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC
ELECTRICITY, OR OTHER SOURCES OF IGNITION. EXPLOSION HAZARD.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NONE NORMALLY REQUIRED. USE NIOSH/MSHA APPROVED

RESPIRATOR. AIR-SUPPLIED OR FILTERING TYPE WITH ORGANIC VAPOR

CARTRIDGES IF TLV IS EXCEEDED.

Ventilation:LOCAL AND MECHANICAL EXHAUST RECOMMENDED. AVOID OPEN

ELECTRICAL SOURCES NEAR PRODUCT VAPOR AREAS.

Protective Gloves:NEOPRENE, NITRILE, OR POLYVINYL ALCOHOL

Eye Protection:USE CHEMICAL SAFETY GOGGLES & FACESHIELD

Other Protective Equipment:SAFETY SHOES, EYE WASH STATION AND SAFETY

SHOWER.

Work Hygienic Practices:DO NOT TAKE INTERNALLY. AVOID SKIN CONTACT.

WASH SKIN AFTER USING PRODUCT. DO NOT EAT, DRINK OR SMOKE IN WORK

AREA.

Supplemental Safety and Health

NONE

===== Physical/Chemical Properties =====

HCC:F2

Boiling Pt:B.P. Text:194F,90C

Vapor Pres:38

Vapor Density:2.0

Spec Gravity:0.82

Evaporation Rate & Reference:2.8 (BUTYL ACETATE = 1)

Solubility in Water:100%

Appearance and Odor:CLEAR, COLORLESS LIQUID WITH AN ALCOHOL ODOR.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

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STRONG OXIDIZING AGENTS, REACTIVE ALKALI METALS.

Stability Condition to Avoid: HIGH HEAT, OPEN FLAMES AND OTHER SOURCES

OF IGNITION. ALSO AVOID VAPOR ACCUMULATION.

Hazardous Decomposition Products: CARBON MONOXIDE, CARBON DIOXIDE, INCOMPLETELY BURNED CARBON PRODUCTS.

===== Disposal Considerations =====

Waste Disposal Methods: DISPOSE OF ALL WASTE IN ACCORDANCE WITH LOCAL,

STATE AND FEDERAL REGULATIONS. INCINERATION IS RECOMMENDED.

Disclaimer (provided with this information by the compiling agencies):

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Appendix B: NAR / TRA Regulations

Source: http://www.tripoli.org/documents/safety_code.shtml

The Tripoli High Power Safety Code is based on NFPA 1127. You may view the current version of NFPA 1127 on the [NFPA Website](#).

Only a person who is a certified flyer shall operate or fly a high power rocket. Must comply with United States Code 1348, "Airspace Control and Facilities", Federal Aviation Act of 1958 and other applicable federal, state, and local laws, rules, regulations, statutes, and ordinances.

A person shall fly a high power rocket only if it has been inspected and approved for flight by a Safety Monitor for compliance with the applicable provisions of this code.

Motors

Use only certified commercially made rocket motors.

Do not dismantle, reload, or alter a disposable or expendable high power rocket motor, not alter the components of a reloadable high power rocket motor or use the contents of a reloadable rocket motor reloading kit for a purpose other than that specified by the manufacture in the rocket motor or reloading kit instructions.

A high power rocket shall be constructed to withstand the operating stresses and retain structural integrity under conditions expected or known to be encountered in flight.

A high power rocket vehicle intended to be propelled by one or more high power solid propellant rocket motor(s) shall be constructed using lightweight materials such as paper, wood, plastic, fiberglass, or, when necessary, ductile metal so that the rocket conforms to the other requirements of this code.

A person intending to operate a high power rocket shall determine its stability before flight, providing documentation of the location of the center of pressure and center of gravity of the high power rocket to the Safety Monitor, if requested.

Weight and Power Limits.

Ensure that the rocket weighs less than the rocket motor manufacturer's recommended maximum liftoff weight for the rocket motor(s) used for the flight. During pre-flight inspection, The Safety Monitor may request documentary proof of compliance.

Do not install a rocket motor or combination of rocket motors that will produce more than 40,960 newton-seconds of total impulse (4.448 newtons equals 1.0 pound).

Recovery.

Fly a high power rocket only if it contains a recovery system that will return all parts of it safely to the ground so that it may be flown again.

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Install only flame resistant recovery wadding if wadding is required by the design of the rocket.

Do not attempt to catch a high power rocket as it approaches the ground.

Do not attempt to retrieve a high power rocket from a place that is hazardous to people.

Payloads

Do not install or incorporate in a high power rocket a payload that is intended to be flammable, explosive, or cause harm.

Do not fly a vertebrate animal in a high power rocket.

Launching Devices

Launch from a stable device that provides rigid guidance until the rocket has reached a speed adequate to ensure a safe flight path.

Incorporate a jet deflector device if necessary to prevent the rocket motor exhaust from impinging directly on flammable materials.

A launching device shall not be capable of launching a rocket at an angle more than 20 degrees from vertical.

Place the end of the launch rod or rail above eye level or cap it to prevent accidental eye injury. Store the launch rod or rail so it is capped, cased, or left in a condition where it cannot cause injury.

Ignition Systems

Use an ignition system that is remotely controlled, electrically operated, and contains a launching switch that will return to "off" when released.

The ignition system shall contain a removable safety interlock device in series with the launch switch.

The launch system and igniter combination shall be designed, installed, and operated so the liftoff of the rocket shall occur within three (3) seconds of actuation of the launch system. If the rocket is propelled by a cluster of rocket motors designed to be ignited simultaneously, install an ignition scheme that has either been previously tested or has a demonstrated capability of igniting all rocket motors intended for launch ignition within one second following ignition system activation.

Install an ignition device in a high power rocket motor only at the launch site and at the last practical moment before the rocket is placed on the launcher.

Launch Site.

Launch a high power rocket only in an outdoor area where tall trees, power lines, and buildings will not present a hazard to the safe flight operation of a high power rocket in the opinion of the Safety Monitor.

Do not locate a launcher closer to the edge of the flying field (launch site) than one-half the radius of the minimum launch site dimension.

The flying field (launch site) shall be at least as large as the stated in

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Table 1. *or* Not less than one-half the maximum altitude expected, calculated, or simulated, or as granted by an FAA waiver or the authority having jurisdiction.

Launcher Location

Locate the launcher more than 1,500 feet from any occupied building. Ensure that the ground for a radius of 10 feet around the launcher is clear of brown grass, dry weeds, or other easy-to-burn materials that could be ignited during launch by the exhaust of the rocket motor.

Safe Distances

No person shall be closer to the launch of a high power rocket than the person actually launching the rocket and those authorized by the Safety Monitor.

All spectators shall remain within an area determined by the Safety Monitor and behind the Safety Monitor and the person launching the rocket.

A person shall not be closer to the launch of a high power rocket than the applicable minimum safe distance set forth in Table 2.

Launch Operations.

Do not ignite and launch a high power rocket horizontally, at a target, or so the rocket's flight path goes into clouds or beyond the boundaries of the flying field (launch site).

Do not launch a high power rocket if the surface wind at the launcher is more than twenty (20) miles per hour.

Do not operate a high power rocket in a manner that is hazardous to aircraft.

Launch Control.

Launch a high power rocket only with the immediate knowledge, permission, and attention of the Safety Monitor.

All persons in the launching, spectator, and parking areas during a countdown and launch shall be standing and facing the launcher if requested to do so by the Safety Monitor.

Precede the launch with a five (5) second countdown audible throughout the launching, spectator, and parking areas. This countdown shall be given by the person launching the rocket, the Safety Monitor, or other flying site operating personnel.

Do not approach a high power rocket that has misfired until the safety inter-lock has been removed or the battery has been disconnected from the ignition system, one minute has passed, and the Safety Monitor has given permission for only a single person to approach the misfired rocket to inspect it.

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Distance (feet)	Equivalent Distance (miles)
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160.01 - 320.00	H	1,500	.28
320.01 - 640.00	I	2,500	.50
640.01 - 1280.00	J	5,280	1.00
1280.01 - 2560.00	K	5,280	1.00
2560.01 - 5120.00	L	10,560	2.00
5120.01 - 10240.00	M	15,480	3.00
10240.01 - 20480.00	N	21,120	4.00
20480.01 - 40960.00	O	26,400	5.00

TABLE 1: LAUNCH SITE DIMENSIONS

TABLE 2: SAFE DISTANCE

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Safe Distance (feet)	Complex Minimum Safe Distance (feet)
160.01 - 320.00	H	50	100
320.01 - 640.00	I	100	200
640.01 - 1280.00	J	100	200
1280.01 - 2560.00	K	200	300
2560.01 - 5120.00	L	300	500
5120.01 - 10240.00	M	500	1,000
10240.01 - 20480.00	N	1,000	1,500
20480.01 - 40960.00	O	1,500	2,000

NAR Regulations

Source: <http://www.nar.org/NARhpsc.html>

High Power Rocket Safety Code

Certification. I will only fly high power rockets or possess high power rocket motors that are within the scope of my user certification and required licensing.

Materials. I will use only lightweight materials such as paper, wood, rubber, plastic, fiberglass, or when necessary ductile metal, for the construction of my rocket.

Motors. I will use only certified, commercially made rocket motors, and will not tamper with these motors or use them for any purposes except those

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recommended by the manufacturer. I will not allow smoking, open flames, nor heat sources within 25 feet of these motors.

Ignition System. I will launch my rockets with an electrical launch system, and with electrical motor igniters that are installed in the motor only after my rocket is at the launch pad or in a designated prepping area. My launch system will have a safety interlock that is in series with the launch switch that is not installed until my rocket is ready for launch, and will use a launch switch that returns to the "off" position when released. If my rocket has onboard ignition systems for motors or recovery devices, these will have safety interlocks that interrupt the current path until the rocket is at the launch pad.

Misfires. If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.

Launch Safety. I will use a 5-second countdown before launch. I will ensure that no person is closer to the launch pad than allowed by the accompanying Minimum Distance Table, and that a means is available to warn participants and spectators in the event of a problem. I will check the stability of my rocket before flight and will not fly it if it cannot be determined to be stable.

Launcher. I will launch my rocket from a stable device that provides rigid guidance until the rocket has attained a speed that ensures a stable flight, and that is pointed to within 20 degrees of vertical. If the wind speed exceeds 5 miles per hour I will use a launcher length that permits the rocket to attain a safe velocity before separation from the launcher. I will use a blast deflector to prevent the motor's exhaust from hitting the ground. I will ensure that dry grass is cleared around each launch pad in accordance with the accompanying Minimum Distance table, and will increase this distance by a factor of 1.5 if the rocket motor being launched uses titanium sponge in the propellant.

Size. My rocket will not contain any combination of motors that total more than

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40,960 N-sec (9208 pound-seconds) of total impulse. My rocket will not weigh more at liftoff than one-third of the certified average thrust of the high power rocket motor(s) intended to be ignited at launch.

Flight Safety. I will not launch my rocket at targets, into clouds, near airplanes, nor on trajectories that take it directly over the heads of spectators or beyond the boundaries of the launch site, and will not put any flammable or explosive payload in my rocket. I will not launch my rockets if wind speeds exceed 20 miles per hour. I will comply with Federal Aviation Administration airspace regulations when flying, and will ensure that my rocket will not exceed any applicable altitude limit in effect at that launch site.

Launch Site. I will launch my rocket outdoors, in an open area where trees, power lines, buildings, and persons not involved in the launch do not present a hazard, and that is at least as large on its smallest dimension as one-half of the maximum altitude to which rockets are allowed to be flown at that site or 1500 feet, whichever is greater.

Launcher Location. My launcher will be 1500 feet from any inhabited building or from any public highway on which traffic flow exceeds 10 vehicles per hour, not including traffic flow related to the launch. It will also be no closer than the appropriate Minimum Personnel Distance from the accompanying table from any boundary of the launch site.

Recovery System. I will use a recovery system such as a parachute in my rocket so that all parts of my rocket return safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.

Recovery Safety. I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places, fly it under conditions where it is likely to recover in spectator areas or outside the launch site, nor attempt to catch it as it approaches the ground.

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Appendix C: Hazard Mitigations

In addition to all the mitigation tactics listed below the team will always maintain good hygiene and a clean work environment		
Materials	Risk	Mitigation
Phenolic Powder-Black	Ingestion Hazards, Skin Irritation, Eye Irritation, Respiratory Irritation from Dust	Team members will work in well-ventilated areas and wear face masks at all times to prevent inhalation and ingestion of the dust from the Phenolic Black Powder. Gloves will be worn at all times to prevent skin irritation. Goggles will be worn at all times to prevent eye irritation.
Phenolic Resin	Toxic Fumes, Skin Irritation, Eye Irritation	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with clothing. Goggles will be worn at all times to prevent Eye Irritation
Copperhead igniter	Ingestion Hazards, Toxic Fumes, Skin Irritation, Eye Irritation, Inadvertent Ignition, Burns to skin	Team members will work in well-ventilated areas and wear face masks at all times to prevent inhalation and ingestion of hazardous chemicals. Gloves will be worn at all times to prevent skin irritation and burns to skin. Goggles will be worn at all times to prevent eye irritation. Igniters will be kept away from ignition sources such as flames, matches, and heat sources, and will be properly stored in Type 3 or Type 4 magazines to prevent inadvertent ignition.

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FirstFire Igniter	Ingestion Hazards, Toxic Fumes, Skin Irritation, Eye Irritation, Inadvertent Ignition, Burns to skin	Team members will work in well-ventilated areas and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of hazardous chemicals. Gloves will be worn at all times to prevent skin irritation and burns to skin. Goggles will be worn at all times to prevent eye irritation. Igniters will be kept away from ignition sources such as flames, matches, and heat sources, and will be properly stored in Type 3 or Type 4 magazines to prevent inadvertent ignition.
FirstFire Jr Igniter	Ingestion Hazards, Toxic Fumes, Skin Irritation, Eye Irritation, Inadvertent Ignition, Burns to skin	Team members will work in well-ventilated areas and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of hazardous chemicals. Gloves will be worn at all times to prevent skin irritation and burns to skin. Goggles will be worn at all times to prevent eye irritation. Igniters will be kept away from ignition sources such as flames, matches, and heat sources, and will be properly stored in Type 3 or Type 4 magazines to prevent inadvertent ignition.
Rocket Propellant	Skin Irritation, Inadvertent Ignition, Burns to skin	Gloves will be worn at all times to prevent skin irritation. Propellant will be kept away from ignition sources, such as flames, matches, igniters, heat sources, and will be properly stored in Type 3 or Type 4 magazines to prevent inadvertent ignition. After motor burn, the team will wait 15 minutes before disassembling the motor, while wearing insulated gloves to prevent burns to skin.

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Epoxy Resin	Toxic Fumes, Skin Irritation, Eye Irritation	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with clothing. Goggles will be worn at all times to prevent Eye Irritation
5-Minute Epoxy Resin	Toxic Fumes, Skin Irritation, Eye Irritation	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with clothing. Goggles will be worn at all times to prevent Eye Irritation
Sinmast 4 Epoxy Mortar Mix - Normal Cure	Ingestion Hazards, Skin Irritation, Eye Irritation	Team Members will wear face masks at all times to prevent ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with clothing. Goggles will be worn at all times to prevent Eye Irritation
Compressed Carbon Fiber Sheets	Inhalation Hazards, Eye Irritation, Skin Irritation	Team Members will wear face masks at all times to prevent inhalation of the material. Goggles will be worn at all times to prevent Eye Irritation. Gloves will be worn at all times to prevent skin irritation
Fiber Glass Cloth	Inhalation Hazards, Eye Irritation, Skin Irritation	Team Members will wear face masks at all times to prevent inhalation of the material. Goggles will be worn at all times to prevent Eye Irritation. Gloves will be worn at all times to prevent skin irritation

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Polystyrene	Ingestion Hazards	Team Members will wear face masks at all times to prevent Ingestion of Material
Polystyrene Foam	Ingestion Hazards, Skin Irritation, Eye Irritation	Team Members will wear face masks at all times to prevent Ingestion of Material. Goggles will be worn at all times to prevent eye irritation
Duct Tape	Skin Irritation, Eye Irritation	Team members will avoid prolonged exposure of duct tape to bare skin to prevent skin irritation. Team members will not place duct tape on their eyes to prevent eye irritation
Masking Tape	No Risks Stated	
Super Glue	Toxic Fumes, Ingestion Hazards, Eye Irritation, Skin Irritation	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with. Goggles will be worn at all times to prevent eye irritation.
Acetone	Toxic Fumes, Ingestion Hazards, Eye Irritation, Skin Irritation	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with. Goggles will be worn at all times to prevent eye irritation.

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Mineral Spirits	Severe Eye Irritation, Skin irritation, Ingestion hazards	Team Members will wear face masks at all times to prevent Ingestion of the material. Gloves will be worn at all times to prevent skin irritation. Goggle will be worn at all times to prevent eye irritation
Denatured Alcohol	Toxic Fumes, Ingestion Hazards, Eye Irritation	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Goggles will be worn at all times to prevent eye irritation
Black Powder	Inhalation Hazards, Eye Irritation, Inadvertent Ignition, Burns to skin	Team Members will wear face masks at all times to prevent Inhalation of the Black Powder. The Black Powder will be kept away from ignition sources such as flames, matches, and heat source to prevent inadvertent ignition. Gloves will be worn to prevent burns to skin. Goggles will be worn at all times to protect eyes. Equipment used with or near the Black Powder will be nonstatic producing materials to prevent inadvertent ignition.

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Carbon Dioxide	Inhalation Hazards	Team members will work in a well-ventilated area to prevent inhalation hazards
Silicone Lube	Ingestion Hazards, Skin Irritation, Eye Irritation, Toxic Fumes	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with clothing. Goggles will be worn at all times to prevent eye irritation
White Lithium Grease	Ingestion Hazards, Skin Irritation, Eye Irritation, Toxic Fumes	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Gloves and chemical resistant aprons will be worn at all times to prevent Skin Irritation and contact with clothing. Goggles will be worn at all times to prevent eye irritation
Isopropyl Rubbing Alcohol	Toxic Fumes, Ingestion Hazards, Eye Irritation, Inadvertent Ignition, Burns to Skin	Team Members will work in a well-ventilated area and wear face masks at all times to prevent inhalation of toxic fumes and ingestion of the material. Goggles will be worn at all times to prevent contact with eyes leading to eye irritation. Material will be kept away from ignition sources, such as flames, matches, igniters, heat sources.

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		Team members will wear gloves to protect from burns to skin in the event of an inadvertent ignition
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