ACTIVATED-ALUMINAS, S-100 -- 6810-00N080933

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

Product ID:ACTIVATED-ALUMINAS, S-100
MSDS Date:06/28/1991
FSC:6810
NIIN:00N080933
MSDS Number: CFTSX
=== Responsible Party ===
Company Name:ALCOA
Box:300
City:BAUXITE
State:AR
ZIP:72011
Country:US
Info Phone Num:412-553-2881
Emergency Phone Num:412-553-4001;800-424-9300(CHEMTREC)
CAGE:EO093
=== Contractor Identification ===
Company Name:ALCOA
Box:300
CAGE:EO093
Company Name:ALUMINUM CO OF AMERICA INDUSTRIAL CHEM DIV
Address:HWY 88 (ALUM CO AM BAAUXITE AROLD)
Box:300
City:BAUXITE
State:AR
ZIP:72011
Country:US
Phone:501-776-4663
CAGE:4H413

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

Ingred Name:ALUMINUM OXIDE (2:3) (SARA 313)
CAS:1344-28-1
RTECS #:BD1200000
Fraction by Wt: 90-97%
OSHA PEL:15 MG/M3 TDUST
ACGIH TLV:10 MG/M3 TDUST

Ingred Name:SODIUM MONOXIDE; (SODIUM OXIDE)
CAS:12401-86-4
RTECS #:WC4800000
Fraction by Wt: 0.3-0.5%
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:SILICA, CRYSTALLINE-FUSED; (SILICON DIOXIDE). %:0.01-0.2.
LD50:(ORAL,RAT) 3160 MG/KG BODY WEIGHT.
CAS:60676-86-0
RTECS #:VV7328000
Fraction by Wt: <0.2%
OSHA PEL:10,5 MG/M3 RESP(MFR)
ACGIH TLV:10 MG/M3 TDUST (MFR)

Ingred Name:IRON OXIDE. %:0.03-0.1.
CAS:1332-37-2
RTECS #:NO7380000
Fraction by Wt: <0.1%
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:WATER; (LOSS ON IGNITION)
CAS:7732-18-5
RTECS #:ZC0110000
Fraction by Wt: 4-7%
OSHA PEL:N/K
ACGIH TLV:N/K

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

LD50 LC50 Mixture:SEE INGREDIENT 3.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:YES OSHA:NO
Health Hazards Acute and Chronic:THE DESICCANT PROPERTIES OF ALCOS ACTIVATED ALUMINA MAY CAUSE IRRITATION TO THE EYES AND UPPER RESPIRATORY TRACT.
Explanation of Carcinogenicity:SILICA, CRYSTALLINE-FUSED:IARC MONOGRAPHS, VOL 68, 1997:GROUP 1.
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

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

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:MEDIA SUITABLE FOR SURROUNDING FIRE .
Fire Fighting Procedures:USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:PRODUCT IS NON-FLAMMABLE. NOT AN EXPLOSION HAZARD.

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

Spill Release Procedures:CLEAN UP USING DRY PROCEDURES; AVOID DUSTING.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:NONE SPECIFIED BY MANUFACTURER.
Other Precautions:NONE SPECIFIED BY MANUFACTURER.

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

Respiratory Protection:WHERE EXPOSURE LIMIT IS OR MAY BE EXCEEDED, USE NIOSH APPROVED RESPIRATORY PROTECTION. SELECT APPROPRIATE RESPIRATOR (DUST RESPIRATOR) BASED ON ACTUAL OR POTENTIAL AIRBORNE

CONTAMINANTS & THEIR CONCEN TRATIONS PRESENT.
Ventilation:USE W/ADEQUATE VENTILATION TO MEET EXPOSURE LIMITS AS LISTED IN INGREDIENTS SECTION.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .
Other Protective Equipment:EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET ANSI DESIGN CRITERIA .
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
PH: -10 (20% SLURRY SOLUTION).

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

Melt/Freeze Pt:M.P/F.P Text:3700F,2038C
Spec Gravity:3.2
pH:SUPDAT
Solubility in Water:INSOLUBLE
Appearance and Odor:OFF-WHITE CRYSTALLINE OR GELATINOUS GRANULES, PELLETS OR POWDER; NO ODOR.

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

Stability Indicator/Materials to Avoid:YES
CONTACT W/WATER GENERATES HEAT.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:NONE SPECIFIED BY MANUFACTURER.

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

Waste Disposal Methods:DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS . WASTE MAY BE CONSIDERED AS INERT MATERIAL, SUITABLE FOR LANDFILL. RCRA HAZARDOUS WASTE NO:NOT FEDERALLY REGULATED.

ALKALINE POTASSIUM IODIDE AZIDE (CODE #7166) -- 6810-01-271-4046

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

Product ID:ALKALINE POTASSIUM IODIDE AZIDE (CODE #7166)
MSDS Date:04/23/1999
FSC:6810
NIIN:01-271-4046
Status Code:A
MSDS Number: CKGQG
=== Responsible Party ===
Company Name:LAMOTTE COMPANY
Box:329
City:CHESTERTOWN
State:MD
ZIP:21620
Country:US
Info Phone Num:410-778-3100
Emergency Phone Num:410-778-3100
Chemtrec Ind/Phone:(800)424-9300
CAGE:34807
=== Contractor Identification ===
Company Name:KAMPI COMPONENTS CO., INC.
Address:210 RT 13
Box:721
City:BRISTOL
State:PA
ZIP:19007-3517
Country:US
Phone:215-736-2000
Contract Num:SP0450-00-M-D703
CAGE:7Z016
Company Name:LAMOTTE COMPANY
Address:802 WASHINGTON AVE.
Box:329
City:CHESTERTOWN
State:MD
ZIP:21620
Country:US
Phone:410-778-3100
CAGE:34807

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

Ingred Name:**POTASSIUM HYDROXIDE** (SARA III)
CAS:1310-58-3
RTECS #:TT2100000
Minumum % Wt:60.
Maxumum % Wt:70.
Other REC Limits:NONE RECOMMENDED
OSHA PEL:C, 2 MG/M3
ACGIH TLV:C 2 MG/M3; 9293
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:SODIUM AZIDE (SARA III)
CAS:26628-22-8
RTECS #:VY8050000
< Wt:1.
Other REC Limits:NONE RECOMMENDED
OSHA PEL:S, C 0.1 PPM(HN3)
ACGIH TLV:C 0.11 PPM; 9293
EPA Rpt Qty:1000 LBS
DOT Rpt Qty:1000 LBS

Ingred Name:POTASSIUM IODIDE
CAS:7681-11-0
RTECS #:TT2975000
= Wt:14.
Other REC Limits:NONE RECOMMENDED

Ingred Name:WATER
CAS:7732-18-5
RTECS #:ZC0110000
Fraction by Wt: TO 100%

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

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:NO Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:TARGET ORGANS: CORROSIVE TO ALL BODY PARTS, EYES, SKIN.
Effects of Overexposure:SEVERE BURNS, MAY BE FATAL IF SWALLOWED.

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

First Aid:EYE CONTACT: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES. CONSULT PHYSICIAN. SKIN CONTACT: IMMEDIATELY FLUSH WITH WATER, REMOVE AFFECTED CLOTHING AND FLUSH SKIN FOR 15 MINUTES. INGESTION: DO NOT INDUC E VOMITING. RINSE MOUTH, DRINK GLASS OF WATER AND CONSULT PHYSICIAN. INHALATION: REMOVE TO FRESH AIR.

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

Extinguishing Media:NOT A FIRE HAZARD.
Fire Fighting Procedures:WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT INHALATION AND CONTACT WITH EYES.
Unusual Fire/Explosion Hazard:VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. MAY PRODUCE ENOUGH HEAT TO IGNITE COMBUSTIBLES. CAN REACT WITH METALS TO PRODUCE HYDROGEN, FORMING EXPLOSIVE MIX WITH AIR.

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

Spill Release Procedures:NEUTRALIZE BY CAREFULLY AND SLOWLY ADDING DILUTE HYDROCHLORIC ACID (CONC, 6M, OR LESS) TO PH 7. COLLECT WASTE LIQUID.
Neutralizing Agent:HYDROCHLORIC ACID

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

Handling and Storage Precautions:STORE AWAY FROM INCOMPATIBLE ITEMS (ACIDS, METALS).

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

Respiratory Protection:NONE SPECIFIED BY MANUFACTURER.
Ventilation:NORMAL VENTILATION
Protective Gloves:YES
Eye Protection:YES
Other Protective Equipment:LAB COAT
Work Hygienic Practices:AVOID CONTACT WITH SKIN AND CLOTHING.
Supplemental Safety and Health
NONE

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

HCC:B1
pH:14
Solubility in Water:SOLUBLE
Appearance and Odor:CLEAR, COLORLESS LIQUID - NO ODOR

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

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, METALS
Stability Condition to Avoid:HEAT
Hazardous Decomposition Products:HYDROGEN GAS

========== Toxicological Information ==========

Toxicological Information:ORAL RAT LD50: 365 MG/KG FOR POTASSIUM HYDROXIDE; 27 MG/KG FOR SODIUM AZIDE SOLID.

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

Waste Disposal Methods:SMALL AMT. <25 ML- FLUSH NEUTRALIZED WASTE TO DRAIN WITH WATER. LARGE AMT.- SODIUM AZIDE CAN REACT WITH METAL, SUCH AS COPPER PIPES, TO FORM SHOCK OR FRICTION SENSITIVE METAL AZIDES (EXPLOSIVE). DISP OSE OF LARGER AMTS AS HAZARDOUS WASTE, ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

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

Material Safety Data Sheet

Aluminum ammonium sulfate dodecahydrate, reagent (crystals), 99% (titr.)

ACC# 00104

Section 1 - Chemical Product and Company Identification

MSDS Name: Aluminum ammonium sulfate dodecahydrate, reagent (crystals), 99% (titr.)
Catalog Numbers: AC400540000, AC400545000
Synonyms: Ammonium aluminum dodecahydrate
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7784-26-1	Aluminum ammonium sulfate dodechydrate, reagent	>97	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Not available.
Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause eye and skin irritation. The toxicological properties of this material have not been fully investigated.
Target Organs: None.

Potential Health Effects

Eye: Dust may cause mechanical irritation.
Skin: May cause skin irritation.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated.
Chronic: Prolonged or repeated skin contact may cause irritation.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower:N/A
Upper: N/A
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container

tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum ammonium sulfate dodechydrate, reagent	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed

OSHA Vacated PELs: Aluminum ammonium sulfate dodechydrate, reagent: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: Not available.
Odor: Odorless.
pH: Not available.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: 200 deg C
Freezing/Melting Point:94.5 deg C
Decomposition Temperature:> 280 deg C
Solubility: Not available.
Specific Gravity/Density:1.6500g/cm3
Molecular Formula:H4AlNO8S2.12H2O
Molecular Weight:453.33

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, dust generation.
Incompatibilities with Other Materials: Strong bases, aluminum, copper, steel, zinc.
Hazardous Decomposition Products: Nitrogen oxides, oxides of sulfur, irritating and toxic fumes and gases, ammonia and/or derivatives.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7784-26-1: WS5640010
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7784-26-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7784-26-1 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7784-26-1: immediate.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7784-26-1 can be found on the following state right to know lists: California, (listed as Aluminum, soluble salts), Pennsylvania, (listed as Aluminum, soluble salts), Minnesota, (listed as Aluminum, soluble salts).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.
S 37 Wear suitable gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 28A After contact with skin, wash immediately with plenty of water
.

WGK (Water Danger/Protection)

CAS# 7784-26-1: 1

Canada - DSL/NDSL

CAS# 7784-26-1 is listed on Canada's DSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7784-26-1 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List

Material Safety Data Sheet

Aluminum Oxide, 99%

ACC# 95871

Section 1 - Chemical Product and Company Identification

MSDS Name: Aluminum Oxide, 99%
Catalog Numbers: AC215700000, AC215700010, AC215700250, AC215702500
Synonyms: Aluminum Oxide; Morin Dyed; Alumina.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
1344-28-1	Aluminum oxide	99	215-691-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white.
Caution! May cause mechanical eye and skin irritation. May cause respiratory tract irritation. May cause lung damage.
Target Organs: Lungs.

Potential Health Effects

Eye: Dust may cause mechanical irritation.
Skin: Dust may cause mechanical irritation. Low hazard for usual industrial handling.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Expected to be a low ingestion hazard.
Inhalation: May cause respiratory tract irritation. May cause lung damage.
Chronic: Chronic inhalation of fine dusts may cause lung damage.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid prolonged or repeated contact with skin. Avoid contact with eyes. Do not ingest or inhale.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum oxide	10 mg/m3 TWA (particulate matter containing no asbestos and <1% crystalline silica)	none listed	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

OSHA Vacated PELs: Aluminum oxide: 10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: Odorless.
pH: Not available.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 2980 deg C
Freezing/Melting Point:2000 deg C
Decomposition Temperature: Not available.
Solubility: Negligible in water.
Specific Gravity/Density:4.0 (water=1)
Molecular Formula: Al2O3
Molecular Weight:101.9612

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Incompatible materials.
Incompatibilities with Other Materials: Reacts with chlorine trifluoride or ethylene oxide. Exothermic reaction above 200C with halocarbon vapors produces toxic hydrogen chloride and phosgene.
Hazardous Decomposition Products: Hydrogen chloride, phosgene, none.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 1344-28-1: BD1200000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 1344-28-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 1344-28-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313

This material contains Aluminum oxide (CAS# 1344-28-1, 99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 1344-28-1 can be found on the following state right to know lists: New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 1344-28-1: 0

Canada - DSL/NDSL

CAS# 1344-28-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of Not controlled..

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 1344-28-1 is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Aluminum potassium sulfate dodecahydrate, reagent ACS, crystals

ACC# 01239

Section 1 - Chemical Product and Company Identification

MSDS Name: Aluminum potassium sulfate dodecahydrate, reagent ACS, crystals
Catalog Numbers: AC423260000, AC423260010, AC423260030, AC423260050, AC423265000
Synonyms: Alum; Aluminum potassium sulfate, dodecahydrate; Kalinite; Potassium alum; Sulfuric acid, aluminum potassium salt.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7784-24-9	Aluminum potasium sulfate dodecahydrate	>98	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white.
Caution! May cause severe eye irritation and possible injury. May cause respiratory and digestive tract irritation. Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.
Target Organs: None.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation.

Inhalation: Dust is irritating to the respiratory tract.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid if irritation or symptoms occur.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use agent most appropriate to extinguish fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Wash clothing before reuse. Discard contaminated shoes.
Storage: Store in a cool, dry place. Keep containers tightly closed. Keep away from strong bases.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum potasium sulfate dodecahydrate	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed
Potassium aluminum sulfate, anhydrous	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed

OSHA Vacated PELs: Aluminum potasium sulfate dodecahydrate: No OSHA Vacated PELs are listed for this chemical. Potassium aluminum sulfate, anhydrous: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: odorless

pH: 3.3 (0.2M solution)
Vapor Pressure: Not applicable.
Vapor Density: 16.4
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point:92.5 deg C
Decomposition Temperature:200 deg C
Solubility: Partially soluble.
Specific Gravity/Density:1.757
Molecular Formula: AlK(SO4)2.12H2O
Molecular Weight:474.3558

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, steel, aluminum, copper, zinc.
Hazardous Decomposition Products: Oxides of sulfur, aluminum oxide, oxides of potassium.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
CAS# 7784-24-9: WS5690000
CAS# 10043-67-1: WS5650000
LD50/LC50:
Not available.
Not available.

Carcinogenicity:
CAS# 7784-24-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 10043-67-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7784-24-9 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 10043-67-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7784-24-9: delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7784-24-9 can be found on the following state right to know lists: California, (listed as Aluminum, soluble salts), Pennsylvania, (listed as Aluminum, soluble salts), Minnesota, (listed as Aluminum, soluble salts).

CAS# 10043-67-1 can be found on the following state right to know lists: California, (listed as Aluminum, soluble salts), Pennsylvania, (listed as Aluminum, soluble salts), Minnesota, (listed as Aluminum, soluble salts).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 7784-24-9: No information available.
CAS# 10043-67-1: 1

Canada - DSL/NDSL

CAS# 10043-67-1 is listed on Canada's DSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7784-24-9 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List.

CAS# 10043-67-1 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Aluminum sulfate

ACC# 00980

Section 1 - Chemical Product and Company Identification

MSDS Name: Aluminum sulfate
Catalog Numbers: AC192430000, AC192430050
Synonyms: Aluminum trisulfate; Dialuminum sulphate; Sulfuric acid aluminum salt
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10043-01-3	Aluminum sulfate	99	233-135-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.
Caution! May cause eye, skin, and respiratory tract irritation. Hygroscopic (absorbs moisture from the air). This is expected to be a low hazard for usual industrial handling.
Target Organs: None.

Potential Health Effects

Eye: Dust may cause mechanical irritation.
Skin: May cause skin irritation. Low hazard for usual industrial handling.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Expected to be a low ingestion hazard.
Inhalation: May cause respiratory tract irritation. Low hazard for usual industrial handling.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum sulfate	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed

OSHA Vacated PELs: Aluminum sulfate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: none reported
pH: >2.9 at 5% solution.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:770 deg C
Decomposition Temperature:770 deg C
Solubility: Soluble.
Specific Gravity/Density:2.7 (water=1)
Molecular Formula: Al2(SO4)3
Molecular Weight:342.1358

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Hygroscopic: absorbs moisture or water from the air.
Conditions to Avoid: Dust generation, exposure to moist air or water.
Incompatibilities with Other Materials: No significant incompatibilities identified with common materials and contaminants..
Hazardous Decomposition Products: Oxides of sulfur, aluminum oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 10043-01-3: BD1700000
LD50/LC50:
CAS# 10043-01-3:
Draize test, rabbit, eye: 10 mg/24H Severe;
Oral, mouse: LD50 = 6207 mg/kg;
.

Carcinogenicity:
CAS# 10043-01-3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 10043-01-3 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 10043-01-3: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 10043-01-3: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 10043-01-3 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10043-01-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Aluminum, soluble salts), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 10043-01-3: 1

Canada - DSL/NDSL

CAS# 10043-01-3 is listed on Canada's DSL List.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 10043-01-3 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List.

FISHER SCIENTIFIC -- AMMONIUM BIFLUORIDE -- 6810-00N001396

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

Product ID:AMMONIUM BIFLUORIDE
MSDS Date:09/29/1994
FSC:6810
NIIN:00N001396
MSDS Number: CDWCV
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410
Country:US
Info Phone Num:201-798-7100
Emergency Phone Num:201-796-7100
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:ING 10: PELVIS & SPINAL COLUMN MAY OCCUR. FOR MORE INFO
CONCERNING HLTH HAZARDS CONTACT NEHC .
RTECS #:9999999ZZ

Ingred Name:FIRST AID PROC: TREAT SYMPTOMATICALLY & SUPPORTIVELY. GET
MED ATTN. EYE: WASH IMMED W/LGE AMTS OF WATER, OCCAS (ING 13)
RTECS #:9999999ZZ

Ingred Name:ING 12: LIFTING UPPER & LOWER LIDS, UNTIL NO EVIDENCE OF
CHEM REMAINS (APPROX 15-20 MIN). CONTINUE IRRIGATING (ING 14)
RTECS #:9999999ZZ

Ingred Name:ING 13: W/NORM SALINE UNTIL PH HAS REDUCED TO NORM (30-60
MIN). COVER W/STERILE BANDAGES. GET MED ATTN IMMED. (ING 15)
RTECS #:9999999ZZ

Ingred Name:ING 14: INGEST: GIVE LGE AMTS OF MILK/WATER IMMED. DO NOT
GIVE ANYTHING BY MOUTH IF PERS IS UNCON/OTHERWISE (ING 16)
RTECS #:9999999ZZ

Ingred Name:ING 15: UNABLE TO SWALLOW. DO NOT PERFORM GASTRIC
LAVAGE/INDUCE EMESIS. IF VOMIT OCCURS, KEEP HEAD LOWER THAN (ING
17)
RTECS #:9999999ZZ

Ingred Name:ING 16: HIPS TO HELP PVNT ASPIR. TREAT SYMPTOMATICALLY &

SUPPORTIVELY. GET MED ATTN IMMED. ANTIDOTE: POISONING (ING 18)
RTECS #:9999999ZZ

Ingred Name:ING 17: FROM SOL FLUORIDE SALTS: GIVE CALCIUM GLUCONATE, 10 ML OF 10% SOLN INTRAVENOUSLY SLOWLY; REPEAT UNTIL (ING 19)
RTECS #:9999999ZZ

Ingred Name:ING 18: SYMPS DISAPPEAR. IF SERUM MAGNESIUM IS REDUCED, GIVE MILK OF MAGNESIA, 10 ML EVERY HR. ANTIDOTE SHOULD (ING 20)
RTECS #:9999999ZZ

Ingred Name:ING 19: BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.
RTECS #:9999999ZZ

Ingred Name:SPILL PROC: ISOLATE HAZARD AREA AND DENY ENTRY. REPORTABLE QUANTITY (RQ): 100 POUNDS.
RTECS #:9999999ZZ

Ingred Name:AMMONIUM BIFLUORIDE (CERCLA)
CAS:1341-49-7
RTECS #:BQ9200000
Fraction by Wt: 100%
OSHA PEL:2.5 MG (F)/M3
ACGIH TLV:2.5 MG (F)/M3
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

Ingred Name:EFTS OF OVEREXP: DISORDERS, INCL HYPOCALCEMIA, HYPOMAGNESENIA, ACIDOSIS, & HYPERKALEMIA. PATHOLOGIC FINDINGS MAY (ING 3)
RTECS #:9999999ZZ

Ingred Name:ING 2: INCL CONGESTION & HEMORRHAGIC INFILTRATION OF ALL ORGANS & DEGENERATION OF KIDNEYS & LIVER. IN NON-FATAL (ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3: CASES, MALAISE & EPIGASTRIC PAIN MAY PERSIST FOR SEVERAL DAYS. MAY CAUSE IMMED PAIN & SEV BURNS OF MUC (ING 5)
RTECS #:9999999ZZ

Ingred Name:ING 4: MEMB. THERE MAY BE DISCOLORATION OF TISS. EFTS ON ESOPHAGUS & GI TRACT MAY RANGE FROM IRRIT TO SEV CORR. (ING 6)
RTECS #:9999999ZZ

Ingred Name:ING 5: EDEMA OF EPIGLOTTIS & SHOCK MAY OCCUR. CHRONIC: INHAL: RPTD/PRLNG EXPOS MAY CAUSE NOSEBLEEDS, HOARSENESS, (ING 7)
RTECS #:9999999ZZ

Ingred Name:ING 6: SORE THROAT, SINUS TROUBLE, ASTHMA, INFLAMM & ULCERATIVE CHANGES IN MOUTH & POSS BRONCH & GI DISTURBANCES.(ING 8)
RTECS #:9999999ZZ

Ingred Name:ING 7: SKIN: RPTD/PRLNG EXPOS TO DUSTS, FUMES/CORR SUBSTANCES MAY CAUSE DERM. EYE: RPTD & PRLNG EXPOS MAY CAUSE (ING 9)
RTECS #:9999999ZZ

Ingred Name:ING 8: CONJ. INGEST: MAY CAUSE FLUOROSIS CHARACTERIZED BY NAUS, VOMIT, ANOREXIA, DIARR/CONSTIP, WT LOSS, ANEMIA,(ING 10)
RTECS #:9999999ZZ

Ingred Name:ING 9: WEAK & GEN ILL HLTH. EXCESS CALCIFICATION OF BONES W/BRITTLENESS & CALCIFICATION OF LIGAMENTS OF RIBS, (ING 11)
RTECS #:9999999ZZ

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

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE: IN PRESENCE OF MOISTURE A CORR SUBSTANCE MAY BE FORMED. INHAL: DUST MAY CAUSE IRRIT W/COUGHING & SHORTNESS OF BRTH, NAUS, & LARYNGEAL & PULM EDEMA. MAY CAUSE/AGGRAVATE ASTHMA. SYSTEMIC POISONIN G AS DETAILED IN ACUTE INGEST MAY OCCUR. MAY CAUSE SEV IRRIT OF RESP TRACT W/COUGHING, CHOKING, PAIN (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: & POSS BURNS OF MUC MEMB. SEV CASES MAY BE FATAL. SKIN: MAY CAUSE IRRIT W/REDNESS, PAIN & POSS BURNS. ABSORPTION MAY OCCUR THRU DAMAGED SKIN & RSLT IN SYSTEMIC POISONING. EYE: DUSTS/SOLNS MA Y CAUSE IRRIT & POSS BURNS. INGEST: SYMPS OF ACUTE FLUORIDE TOXICITY MAY BE CAUSED BY A VARIETY OF METABOLIC (ING 2)
Medical Cond Aggravated by Exposure:PERSONS WITH ASTHMA.

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

First Aid:INHAL: REMOVE TO FRESH AIR IMMED. PERFORM ARTF RESP IF NEC. MAINTAIN AIRWAY, BLOOD PRESS & RESP. KEEP WARM & AT REST. TREAT SYMPTOMATICALLY & SUPPORTIVELY. GET MED ATTN IMMED. SKIN: REMOVE CONTAM CLTH G & SHOES IMMED. WASH W/SOAP & WATER UNTIL NO EVIDENCE OF CHEM REMAINS (APPROX 15-20 MIN). IF BURNS OCCUR, COVER AFFECTED AREA SECURELY W/STERILE, DRY, LOOSE-FITTING DRESSING. (ING 12)

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

Extinguishing Media:DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM. FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM.
Fire Fighting Procedures:WEAR NIOSH APPRVD SCBA & FULL PROT EQUIP . MOVE CONTR FROM FIRE AREA IF W/OUT RISK. APPLY COOLING WATER TO SIDES OF CONTRS EXPOSED TO FLAMES (SUP DAT)
Unusual Fire/Explosion Hazard:NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

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

Spill Release Procedures:DO NOT TOUCH MATL. STOP LEAK IF W/OUT RISK. SML SPILL: TAKE UP W/ABSORB MATL & PLACE INTO CONTRS FOR LATER DISP. SML DRY SPILL: W/CLEAN SHOVEL PLACE MATL INTO CLEAN, DRY CONTR & COVER. LGE SPILL: DIKE FAR AHEAD OF SPILL FOR LATER DISP. (ING 21)
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:OBSERVE ALL FED, STATE & LOC REGS WHEN STORING SUBSTANCE. STORE IN PLASTIC, RUB, WOOL/PARAFFINED CONTRS. STORE AWAY FROM INCOMPATIBLE SUBSTANCES.
Other Precautions:DO NOT STORE IN GLASS/PORCELAIN CONTRS. STORE IN COOL, DRY PLACE; KEEP CONTR TIGHTLY CLSD WHEN NOT IN USE. MAY BURN BUT DOES NOT IGNITE READILY. FLAMM, POISONOUS GASES MAY ACCUM IN TANKS & HOPPER CARS . MAY IGNITE COMBUST (WOOD, PAPER, OIL).

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

Respiratory Protection:THE SPECIFIC RESP SELECTED MUST BE BASED ON CONTAM LEVELS FOUND IN WORK PLACE, MUST NOT EXCEED WORKING LIMS OF RESP & BE NIOSH APPRVD. FOR COMPLETE LIST OF RESPIRATORS CONTACT NEHC .
Ventilation:PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PUBLISHED EXPOSURE LIMITS.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:ANSI APPRVD CHEM WORKERS GOGGLES .
Other Protective Equipment:ANSI APPRVD EMER EYEWASH & DELUGE SHOWER . APPROP PROT CLTHG & EQUIP TO PVNT CONT W/SUBSTANCE.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
FIRE FIGHT PROC: UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. DO NOT USE WATER DIRECTLY ON MATL. IF LGE AMTS OF COMBUST MATLS INVOLVED, USE WATER SPRAY/FOG IN FLOODING AMTS TO ABSORB CO RR VAPS. COOL CONTRS FROM AS FAR AS DIST AS POSS. KEEP UPWIND.

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

Boiling Pt:B.P. Text:463F,239C
Melt/Freeze Pt:M.P/F.P Text:>257F,>125C
Vapor Pres:NEGLIGIBLE
Spec Gravity:1.211-1.51
Solubility in Water:38-58%
Appearance and Odor:ODORLESS, WHITE, RHOMBIC OR TETRAGONAL, DELIQUESCENT CRYSTALS OR FLAKES
Percent Volatiles by Volume:0

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

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, STRONG BASES, CEMENT, GLASS, METALS, SILICEOUS MATERIALS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:MAY INCLUDE TOXIC AND CORROSIVE AMMONIA, HYDROGEN FLUORIDE, AND TOXIC OXIDES OF NITROGEN.

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

Waste Disposal Methods:OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN DISPOSING OF THIS SUBSTANCE.

disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

Material Safety Data Sheet

Aluminum potassium sulfate dodecahydrate, reagent ACS, crystals

ACC# 01239

Section 1 - Chemical Product and Company Identification

MSDS Name: Aluminum potassium sulfate dodecahydrate, reagent ACS, crystals
Catalog Numbers: AC423260000, AC423260010, AC423260030, AC423260050, AC423265000
Synonyms: Alum; Aluminum potassium sulfate, dodecahydrate; Kalinite; Potassium alum; Sulfuric acid, aluminum potassium salt.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7784-24-9	Aluminum potasium sulfate dodecahydrate	>98	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white.
Caution! May cause severe eye irritation and possible injury. May cause respiratory and digestive tract irritation. Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.
Target Organs: None.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation.
Inhalation: Dust is irritating to the respiratory tract.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid if irritation or symptoms occur.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use agent most appropriate to extinguish fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Wash clothing before reuse. Discard contaminated shoes.
Storage: Store in a cool, dry place. Keep containers tightly closed. Keep away from strong bases.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum potasium sulfate dodecahydrate	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed
Potassium aluminum sulfate, anhydrous	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed

OSHA Vacated PELs: Aluminum potasium sulfate dodecahydrate: No OSHA Vacated PELs are listed for this chemical. Potassium aluminum sulfate, anhydrous: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: odorless
pH: 3.3 (0.2M solution)
Vapor Pressure: Not applicable.
Vapor Density: 16.4
Evaporation Rate: Not applicable.

Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point:92.5 deg C
Decomposition Temperature:200 deg C
Solubility: Partially soluble.
Specific Gravity/Density:1.757
Molecular Formula: AlK(SO4)2.12H2O
Molecular Weight:474.3558

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, steel, aluminum, copper, zinc.
Hazardous Decomposition Products: Oxides of sulfur, aluminum oxide, oxides of potassium.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
CAS# 7784-24-9: WS5690000
CAS# 10043-67-1: WS5650000
LD50/LC50:
Not available.
Not available.

Carcinogenicity:
CAS# 7784-24-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 10043-67-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7784-24-9 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).
CAS# 10043-67-1 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7784-24-9: delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7784-24-9 can be found on the following state right to know lists: California, (listed as Aluminum, soluble salts), Pennsylvania, (listed as Aluminum, soluble salts), Minnesota, (listed as Aluminum, soluble salts).

CAS# 10043-67-1 can be found on the following state right to know lists: California, (listed as Aluminum, soluble salts), Pennsylvania, (listed as Aluminum, soluble salts), Minnesota, (listed as Aluminum, soluble salts).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 7784-24-9: No information available.

CAS# 10043-67-1: 1

Canada - DSL/NDSL

CAS# 10043-67-1 is listed on Canada's DSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7784-24-9 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List.

CAS# 10043-67-1 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Aluminum sulfate

ACC# 00980

Section 1 - Chemical Product and Company Identification

MSDS Name: Aluminum sulfate
Catalog Numbers: AC192430000, AC192430050
Synonyms: Aluminum trisulfate; Dialuminum sulphate; Sulfuric acid aluminum salt
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10043-01-3	Aluminum sulfate	99	233-135-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.
Caution! May cause eye, skin, and respiratory tract irritation. Hygroscopic (absorbs moisture from the air). This is expected to be a low hazard for usual industrial handling.
Target Organs: None.

Potential Health Effects

Eye: Dust may cause mechanical irritation.
Skin: May cause skin irritation. Low hazard for usual industrial handling.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Expected to be a low ingestion hazard.
Inhalation: May cause respiratory tract irritation. Low hazard for usual industrial handling.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Aluminum sulfate	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	2 mg/m3 TWA (as Al) (listed under Aluminum, soluble salts).	none listed

OSHA Vacated PELs: Aluminum sulfate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: none reported
pH: >2.9 at 5% solution.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:770 deg C
Decomposition Temperature:770 deg C
Solubility: Soluble.
Specific Gravity/Density:2.7 (water=1)
Molecular Formula: Al2(SO4)3
Molecular Weight:342.1358

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Hygroscopic: absorbs moisture or water from the air.
Conditions to Avoid: Dust generation, exposure to moist air or water.
Incompatibilities with Other Materials: No significant incompatibilities identified with common materials and contaminants..
Hazardous Decomposition Products: Oxides of sulfur, aluminum oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 10043-01-3: BD1700000
LD50/LC50:
CAS# 10043-01-3:
Draize test, rabbit, eye: 10 mg/24H Severe;
Oral, mouse: LD50 = 6207 mg/kg;
.

Carcinogenicity:
CAS# 10043-01-3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 10043-01-3 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 10043-01-3: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 10043-01-3: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 10043-01-3 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10043-01-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Aluminum, soluble salts), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 10043-01-3: 1

Canada - DSL/NDSL

CAS# 10043-01-3 is listed on Canada's DSL List.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 10043-01-3 (listed as Aluminum, soluble salts) is listed on the Canadian Ingredient Disclosure List.

FISHER SCIENTIFIC -- AMMONIUM BIFLUORIDE -- 6810-00N001396

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

Product ID:AMMONIUM BIFLUORIDE
MSDS Date:09/29/1994
FSC:6810
NIIN:00N001396
MSDS Number: CDWCV
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410
Country:US
Info Phone Num:201-798-7100
Emergency Phone Num:201-796-7100
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US

Phone:201-796-7100
CAGE:1B464

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

Ingred Name:ING 10: PELVIS & SPINAL COLUMN MAY OCCUR. FOR MORE INFO
CONCERNING HLTH HAZARDS CONTACT NEHC .
RTECS #:9999999ZZ

Ingred Name:FIRST AID PROC: TREAT SYMPTOMATICALLY & SUPPORTIVELY. GET
MED ATTN. EYE: WASH IMMED W/LGE AMTS OF WATER, OCCAS (ING 13)
RTECS #:9999999ZZ

Ingred Name:ING 12: LIFTING UPPER & LOWER LIDS, UNTIL NO EVIDENCE OF
CHEM REMAINS (APPROX 15-20 MIN). CONTINUE IRRIGATING (ING 14)
RTECS #:9999999ZZ

Ingred Name:ING 13: W/NORM SALINE UNTIL PH HAS REDUCED TO NORM (30-60
MIN). COVER W/STERILE BANDAGES. GET MED ATTN IMMED. (ING 15)
RTECS #:9999999ZZ

Ingred Name:ING 14: INGEST: GIVE LGE AMTS OF MILK/WATER IMMED. DO NOT
GIVE ANYTHING BY MOUTH IF PERS IS UNCON/OTHERWISE (ING 16)
RTECS #:9999999ZZ

Ingred Name:ING 15: UNABLE TO SWALLOW. DO NOT PERFORM GASTRIC
LAVAGE/INDUCE EMESIS. IF VOMIT OCCURS, KEEP HEAD LOWER THAN (ING
17)
RTECS #:9999999ZZ

Ingred Name:ING 16: HIPS TO HELP PVNT ASPIR. TREAT SYMPTOMATICALLY &
SUPPORTIVELY. GET MED ATTN IMMED. ANTIDOTE: POISONING (ING 18)
RTECS #:9999999ZZ

Ingred Name:ING 17: FROM SOL FLUORIDE SALTS: GIVE CALCIUM GLUCONATE, 10
ML OF 10% SOLN INTRAVENOUSLY SLOWLY; REPEAT UNTIL (ING 19)
RTECS #:9999999ZZ

Ingred Name:ING 18: SYMPS DISAPPEAR. IF SERUM MAGNESIUM IS REDUCED,
GIVE MILK OF MAGNESIA, 10 ML EVERY HR. ANTIDOTE SHOULD (ING 20)
RTECS #:9999999ZZ

Ingred Name:ING 19: BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.
RTECS #:9999999ZZ

Ingred Name:SPILL PROC: ISOLATE HAZARD AREA AND DENY ENTRY. REPORTABLE
QUANTITY (RQ): 100 POUNDS.
RTECS #:9999999ZZ

Ingred Name:AMMONIUM BIFLUORIDE (CERCLA)
CAS:1341-49-7
RTECS #:BQ9200000
Fraction by Wt: 100%
OSHA PEL:2.5 MG (F)/M3
ACGIH TLV:2.5 MG (F)/M3
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

Ingred Name:EFTS OF OVEREXP: DISORDERS, INCL HYPOCALCEMIA, HYPOMAGNESENIA, ACIDOSIS, & HYPERKALEMIA. PATHOLOGIC FINDINGS MAY (ING 3)
RTECS #:9999999ZZ

Ingred Name:ING 2: INCL CONGESTION & HEMORRHAGIC INFILTRATION OF ALL ORGANS & DEGENERATION OF KIDNEYS & LIVER. IN NON-FATAL (ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3: CASES, MALAISE & EPIGASTRIC PAIN MAY PERSIST FOR SEVERAL DAYS. MAY CAUSE IMMED PAIN & SEV BURNS OF MUC (ING 5)
RTECS #:9999999ZZ

Ingred Name:ING 4: MEMB. THERE MAY BE DISCOLORATION OF TISS. EFTS ON ESOPHAGUS & GI TRACT MAY RANGE FROM IRRIT TO SEV CORR. (ING 6)
RTECS #:9999999ZZ

Ingred Name:ING 5: EDEMA OF EPIGLOTTIS & SHOCK MAY OCCUR. CHRONIC: INHAL: RPTD/PRLNG EXPOS MAY CAUSE NOSEBLEEDS, HOARSENESS, (ING 7)
RTECS #:9999999ZZ

Ingred Name:ING 6: SORE THROAT, SINUS TROUBLE, ASTHMA, INFLAMM & ULCERATIVE CHANGES IN MOUTH & POSS BRONCH & GI DISTURBANCES.(ING 8)
RTECS #:9999999ZZ

Ingred Name:ING 7: SKIN: RPTD/PRLNG EXPOS TO DUSTS, FUMES/CORR SUBSTANCES MAY CAUSE DERM. EYE: RPTD & PRLNG EXPOS MAY CAUSE (ING 9)
RTECS #:9999999ZZ

Ingred Name:ING 8: CONJ. INGEST: MAY CAUSE FLUOROSIS CHARACTERIZED BY NAUS, VOMIT, ANOREXIA, DIARR/CONSTIP, WT LOSS, ANEMIA,(ING 10)
RTECS #:9999999ZZ

Ingred Name:ING 9: WEAK & GEN ILL HLTH. EXCESS CALCIFICATION OF BONES W/BRITTLENESS & CALCIFICATION OF LIGAMENTS OF RIBS, (ING 11)
RTECS #:9999999ZZ

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

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE: IN PRESENCE OF MOISTURE A CORR SUBSTANCE MAY BE FORMED. INHAL: DUST MAY CAUSE IRRIT W/COUGHING & SHORTNESS OF BRTH, NAUS, & LARYNGEAL & PULM EDEMA. MAY CAUSE/AGGRAVATE ASTHMA. SYSTEMIC POISONIN G AS DETAILED IN ACUTE INGEST MAY OCCUR. MAY CAUSE SEV IRRIT OF RESP TRACT W/COUGHING, CHOKING, PAIN (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: & POSS BURNS OF MUC MEMB. SEV CASES MAY BE FATAL. SKIN: MAY CAUSE IRRIT W/REDNESS, PAIN & POSS BURNS. ABSORPTION MAY OCCUR THRU DAMAGED SKIN & RSLT IN SYSTEMIC POISONING. EYE: DUSTS/SOLNS MA Y CAUSE IRRIT & POSS BURNS. INGEST: SYMPS OF ACUTE FLUORIDE TOXICITY MAY BE CAUSED BY A VARIETY OF METABOLIC (ING 2)

Medical Cond Aggravated by Exposure:PERSONS WITH ASTHMA.

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

First Aid:INHAL: REMOVE TO FRESH AIR IMMED. PERFORM ARTF RESP IF NEC. MAINTAIN AIRWAY, BLOOD PRESS & RESP. KEEP WARM & AT REST. TREAT SYMPTOMATICALLY & SUPPORTIVELY. GET MED ATTN IMMED. SKIN: REMOVE CONTAM CLTH G & SHOES IMMED. WASH W/SOAP & WATER UNTIL NO EVIDENCE OF CHEM REMAINS (APPROX 15-20 MIN). IF BURNS OCCUR, COVER AFFECTED AREA SECURELY W/STERILE, DRY, LOOSE-FITTING DRESSING. (ING 12)

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

Extinguishing Media:DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM. FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM.
Fire Fighting Procedures:WEAR NIOSH APPRVD SCBA & FULL PROT EQUIP . MOVE CONTR FROM FIRE AREA IF W/OUT RISK. APPLY COOLING WATER TO SIDES OF CONTRS EXPOSED TO FLAMES (SUP DAT)
Unusual Fire/Explosion Hazard:NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

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

Spill Release Procedures:DO NOT TOUCH MATL. STOP LEAK IF W/OUT RISK. SML SPILL: TAKE UP W/ABSORB MATL & PLACE INTO CONTRS FOR LATER DISP. SML DRY SPILL: W/CLEAN SHOVEL PLACE MATL INTO CLEAN, DRY CONTR & COVER. LGE SPILL: DIKE FAR AHEAD OF SPILL FOR LATER DISP. (ING 21)
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:OBSERVE ALL FED, STATE & LOC REGS WHEN STORING SUBSTANCE. STORE IN PLASTIC, RUB, WOOL/PARAFFINED CONTRS. STORE AWAY FROM INCOMPATIBLE SUBSTANCES.
Other Precautions:DO NOT STORE IN GLASS/PORCELAIN CONTRS. STORE IN COOL, DRY PLACE; KEEP CONTR TIGHTLY CLSD WHEN NOT IN USE. MAY BURN BUT DOES NOT IGNITE READILY. FLAMM, POISONOUS GASES MAY ACCUM IN TANKS & HOPPER CARS . MAY IGNITE COMBUST (WOOD, PAPER, OIL).

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

Respiratory Protection:THE SPECIFIC RESP SELECTED MUST BE BASED ON CONTAM LEVELS FOUND IN WORK PLACE, MUST NOT EXCEED WORKING LIMS OF RESP & BE NIOSH APPRVD. FOR COMPLETE LIST OF RESPIRATORS CONTACT NEHC .
Ventilation:PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PUBLISHED EXPOSURE LIMITS.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:ANSI APPRVD CHEM WORKERS GOGGLES .
Other Protective Equipment:ANSI APPRVD EMER EYEWASH & DELUGE SHOWER . APPROP PROT CLTHG & EQUIP TO PVNT CONT W/SUBSTANCE.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
FIRE FIGHT PROC: UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. DO NOT USE WATER DIRECTLY ON MATL. IF LGE AMTS OF COMBUST

MATLS INVOLVED, USE WATER SPRAY/FOG IN FLOODING AMTS TO ABSORB CO RR VAPS. COOL CONTRS FROM AS FAR AS DIST AS POSS. KEEP UPWIND.

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

Boiling Pt:B.P. Text:463F,239C
Melt/Freeze Pt:M.P/F.P Text:>257F,>125C
Vapor Pres:NEGLIGIBLE
Spec Gravity:1.211-1.51
Solubility in Water:38-58%
Appearance and Odor:ODORLESS, WHITE, RHOMBIC OR TETRAGONAL, DELIQUESCENT CRYSTALS OR FLAKES
Percent Volatiles by Volume:0

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

Stability Indicator/Materials to Avoid:YES
STRONG ACIDS, STRONG BASES, CEMENT, GLASS, METALS, SILICEOUS MATERIALS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:MAY INCLUDE TOXIC AND CORROSIVE AMMONIA, HYDROGEN FLUORIDE, AND TOXIC OXIDES OF NITROGEN.

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

Waste Disposal Methods:OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN DISPOSING OF THIS SUBSTANCE.

Material Safety Data Sheet

Ammonium Bromide

ACC# 01140

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium Bromide
Catalog Numbers: A650-500, S79895
Synonyms: Hydrobromic Acid Monoammoniate.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
12124-97-9	Ammonium Bromide	100	235-183-8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.
Warning! Causes eye irritation. May cause respiratory and digestive tract irritation. May cause skin irritation. Air sensitive. Hygroscopic (absorbs moisture from the air).
Target Organs: No data found.

Potential Health Effects

Eye: Causes eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: May cause respiratory tract irritation. Inhalation of bromides may cause irritation of the upper respiratory tract and lung tissue.

Chronic: Chronic ingestion may cause bromism characterized by disturbances of the central nervous system, skin and digestive tract.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: For small fires, use water spray, dry chemical, carbon dioxide or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Place under an inert atmosphere.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation. Handle under an inert atmosphere. Store protected from air.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store protected from moisture. Store under an inert atmosphere.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium Bromide	none listed	none listed	none listed

OSHA Vacated PELs: Ammonium Bromide: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: odorless
pH: Slightly acidic.
Vapor Pressure: 1 mm Hg @ 198C
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:846 deg F

Decomposition Temperature: Not available.
Solubility: 97% in water.
Specific Gravity/Density:2.4
Molecular Formula:NH4Br
Molecular Weight:97.9387

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Incompatible materials, dust generation, moisture, exposure to air, excess heat, exposure to moist air or water.
Incompatibilities with Other Materials: Air, moisture, strong oxidizing agents.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, hydrogen bromide, ammonia and/or derivatives.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 12124-97-9: BO9155000
LD50/LC50:
CAS# 12124-97-9:
Oral, mouse: LD50 = 2860 mg/kg;
Oral, rat: LD50 = 2700 mg/kg;
.
Oral, rat: LD50 =
Carcinogenicity:
CAS# 12124-97-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 12124-97-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 12124-97-9: immediate, delayed.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 12124-97-9 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36 Irritating to eyes.

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 12124-97-9: No information available.

Canada - DSL/NDSL

CAS# 12124-97-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Material Safety Data Sheet

Ammonium chloride

ACC# 01170

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium chloride
Catalog Numbers: AC123340000, AC123340010, AC123340250, AC199970000, AC199970010, AC199975000, AC393180000, AC393180010, AC393180050, AC393182500, AC423280000, AC423280010, AC423285000, A649-3, A649-500, A661-10, A661-3, A661-500, A687-10, A687-100, A687-212, A687-500
Synonyms: Ammonium Chloratum; Ammonium Chloridum; Ammonium Muriate; Sal Ammonia; Salmiac.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
12125-02-9	Ammonium chloride	>99	235-186-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless or white crystalline powder.
Warning! Harmful if swallowed. Causes eye irritation. Hygroscopic (absorbs moisture from the air).
Target Organs: Gastrointestinal system, eyes.

Potential Health Effects

Eye: Causes eye irritation.
Skin: May cause skin irritation. May be harmful if absorbed through the skin.

Ingestion: Harmful if swallowed. May cause irritation of the digestive tract. May cause systemic toxicity with acidosis.
Inhalation: If heated, dust or fume may cause respiratory tract irritation. May be harmful if inhaled. Ammonium chloride fume may cause an asthma-like allergy. Future exposure may cause asthma attacks with shortness of breath, wheezing, coughing, and/or chest tightness.
Chronic: Prolonged or repeated skin contact may cause dermatitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. Get medical aid immediately. Call a poison control center.
Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium chloride	10 mg/m3 TWA (fume); 20 mg/m3 STEL (fume)	10 mg/m3 TWA (fume)	none listed

OSHA Vacated PELs: Ammonium chloride: 10 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: colorless or white
Odor: odorless
pH: 5.0 (10% sol at 25C)
Vapor Pressure: 1 mm Hg @ 160.4C
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: 520 deg C

Freezing/Melting Point:328 deg C
Decomposition Temperature: Not available.
Solubility: 39.6% at 176F.
Specific Gravity/Density:1.53 (Water=1)
Molecular Formula:NH4Cl
Molecular Weight:53.49

Section 10 - Stability and Reactivity

Chemical Stability: Hygroscopic: absorbs moisture or water from the air.
Conditions to Avoid: Incompatible materials, excess heat, exposure to moist air or water.
Incompatibilities with Other Materials: Acids, bases, silver salts, bromine trifluoride, nitrates, potassium chlorates, carbonates, bromine pentafluoride, lead salts.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, ammonia and hydrochloric acid fumes.
Hazardous Polymerization: May occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 12125-02-9: BP4550000; BP4570000
LD50/LC50:
CAS# 12125-02-9:
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, eye: 100 mg Severe;
Oral, mouse: LD50 = 1300 mg/kg;
Oral, rat: LD50 = 1650 mg/kg;
.

Carcinogenicity:
CAS# 12125-02-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: Mutagenic effects have occurred in experimental animals.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not Regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 12125-02-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 12125-02-9: 5000 lb final RQ; 2270 kg final RQ
SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 12125-02-9: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 12125-02-9 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 12125-02-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 22 Harmful if swallowed.
R 36 Irritating to eyes.

Safety Phrases:

S 22 Do not breathe dust.
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 12125-02-9: 1

Canada - DSL/NDSL

CAS# 12125-02-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 12125-02-9 is listed on the Canadian Ingredient Disclosure List.

FISHER SCIENTIFIC, CHEMICAL DIV. -- AMMONIUM DICHROMATE, A644500 -- 6810-00N008683

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

Product ID:AMMONIUM DICHROMATE, A644500
MSDS Date:05/25/1986
FSC:6810
NIIN:00N008683
MSDS Number: BCQTW
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC, CHEMICAL DIV.
Address:1 REAGENT LANE
City:FAIRLAWN
State:NJ
ZIP:07410-2802
Info Phone Num:201-796-7100
Emergency Phone Num:201-796-7100 (GASTON L. PILLORI)
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:AMMONIUM DICHROMATE (BICHROMATE) (SARA III)
CAS:7789-09-5
RTECS #:HX7650000
Fraction by Wt: 99.8%
Other REC Limits:N/K
OSHA PEL:0.1PPM CRO3;CEILING
ACGIH TLV:0.05 MG CR/M3
EPA Rpt Qty:10 LBS
DOT Rpt Qty:10 LBS

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

LD50 LC50 Mixture:N/K
Reports of Carcinogenicity:NTP:NO IARC:YES OSHA:NO
Health Hazards Acute and Chronic:INHAL:CHRONICALLY 0.11-0.15 MG/CUM PRODUCES BLEEDING & PAINLESS ULCERATION OF THE NASAL SEPTUM W/ NASAL DISCHARGE & BRONCHITIS.POSS LIVER DAMAGE W/ JAUNDICE.SKIN:RASH,SENSIT DERMAT W/ ECZEMA,SLOW-HEAL ING PAINLESS ULCERATION OF SKIN WHICH LEAVES DEPRESSED SCARS.EYES:PRLNG CONT OF FINE SPRAY MAY CAUSE (SEE SUPP DATA)
Explanation of Carcinogenicity:CR & CERTAIN CR CMPS:SUFF EVIDENCE FOR CARCIN IN HUMANS;SUFF EVIDENCE FOR CARCIN IN ANIMALS (IARC,1982).
Effects of Overexposure:THIS IS A CORROSIVE SUBSTANCE/SOLUTION.INHAL:SEVERE IRRITATION OF NOSE,THROAT,& RESPIRATORY TRACT.SKIN:REDNESS,PAIN & ULCERATION.EYES:IRRIT & PAIN.INGEST:DIZZINESS,INTENSE THRIST,ABDOMINAL PAIN,VOMITI NG &

SHOCK.
Medical Cond Aggravated by Exposure:N/K

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

First Aid:INHAL:REMOVE TO FRESH AIR.IF NO BRTHING,PERFORM ARTF RESP.KEEP PERSON WARM & CALM.GET MD ATTN.SKIN:REMOVE CONTAM CLOTHING & SHOES.WASH AREA W/ MILD SOAP & H*2O UNTIL NO CHEM REMAINS (15-20 MIN).GET MD ATTN.EYES:WASH W/ H*2O FOR AT LEAST 15MIN WHILE HOLDING LIDS OPEN.INGEST:IF CONSCIOUS,IMMED GIVE 2-4 GLASSES H*2O & INDUCE VOMITING.GET MD ATTN IMMED.

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

Flash Point:NONCOMBUSTIBLE
Extinguishing Media:DRY CHEMICAL OR CARBON DIOXIDE.FOR LARGE FIRES,FLOOD AREA W/ WATER FROM A DISTANCE.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .DO NOT GET SOLID STREAM OF H*2O ON SPILLED MATL.MOVE CNTNRS FROM FIRE AREA IF POSS.(SEE SUP DAT)
Unusual Fire/Explosion Hazard:STRONG OXIDIZER.MAY REACT VIOLENTLY OR EXPLODE IN CONTACT W/ COMBUSTIBLE OR REDUCING MATLS OR WHEN HEATED ABOVE 225C.CR TRIOXIDE SMOKE & NITROGEN RELEASED.

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

Spill Release Procedures:LG:DIKE AHEAD FOR LATER DISPOSAL.DENY UNNEC ENTRY.SMALL:TAKE UP W/ SAND OR OTHER ABSORB MATL OR IF DRY,SHOVEL W/ CLEAN DRY SHOVEL INTO CLEAN DRY CNTNRS & COVER.DO NOT TOUCH SPILLED MATL.KEEP COMBUSTIB LES (WOOD,PAPER,OIL,ETC) AWAY FROM SPILLED MATL.
Neutralizing Agent:NA BISULFATE,AGRICULTURAL LIME,SLAKED LIME,CRUSHED LIMESTONE,SODIUM BICARBONATE.

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

Handling and Storage Precautions:PROTECT CNTNRS FROM PHYSICAL DAMAGE.KEEP DRY & SEPARATE FROM COMBUSTIBLE,ORGANIC OR OXIDIZABLE MTLS.AVOID STORAGE ON WOOD FLOORS (NFPA 1982.FP N/ORNL)
Other Precautions:N/K

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

Respiratory Protection:5 MG/CUM:HIGH-EFFICIENT PARTICULATE RESP,SUPPLY-AIR RESP/SCBA;ALL W/FULL FACEPIECE.30 MG/CUM:POWER AIR-PURIFY RESP W/ORGANIC VAP CARTRIDGE,HIGH EFFICIENT PARTICULATE FILTER W/FULL FACEPIECE.TYPE C SUP PLY-AIR RESP W/FULL FACEPIECE(SUPP DATA)
Ventilation:PROCESS ENCLOSURE OR LOCAL EXHAUST VENTILATION TO KEEP CONCENTRATION BELOW TLV.
Protective Gloves:APPROPRIATE PROTECTIVE GLOVES.
Eye Protection:CHEM WORKER GOGGLES & FACESHIELD .
Other Protective Equipment:EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA & DELUGE SHOWER PROTECTIVE CLOTHING TO AVOID ANY SKIN CONTACT.
Work Hygienic Practices:N/K
Supplemental Safety and Health
SPEC FIRE PROC:COOL CNTNRS W/H+2O FROM SIDE UNTIL FIRE OUT.FLOOD AREA

W/H*2O.AVOID BRTHG TOX VAP/DUST.HLTH HAZ:CONJUNCT,LACRIMATION,POSS BROWN DISCOLOR.SPLASH CAUSES SEV,PERM CORNEAL INJURY.INGEST:OLI GURIA,ANURIA,SEV CIRCULAT COLLAPSE,DEATH FROM UREMIA.RESP:IN PRESS DEMAND MODE OR IN CONTINUOUS-FLOW MODE.

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

Boiling Pt:B.P. Text:N/K
Melt/Freeze Pt:M.P/F.P Text:365F,180C
Decomp Temp:Decomp Text:256F,124.4C
Vapor Pres:N/K
Vapor Density:N/K
Spec Gravity:2.2 @ 25C,77F
pH:3.5
Evaporation Rate & Reference:N/K
Solubility in Water:30.8%
Appearance and Odor:ODORLESS,YELLOW TO ORANGE-RED CRYSTALS

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

COMBUSTIBLE & OXIDIZABLE MATLS (WOOD SHAVINGS,CARBIDE,HG CYANIDE,HYDRAZINE & HYDRATES,HYDROXYL-AMINE & THE SALTS).
Stability Condition to Avoid:HEATING PAST 256F,124.4C.CONTACT W/ FUELS (REACTION MAY BE VIOLENT).PROXIMITY TO OTHER COMBUST MTL.RUNOFF TO SEWER.
Hazardous Decomposition Products:CHROMIC TRIOXIDE SMOKE & NITROGEN.

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

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS .

Material Safety Data Sheet

Ammonium nitrate

ACC# 01290

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium nitrate
Catalog Numbers: AC205860000, AC205860010, AC205861000, AC205865000, AC423350000, AC423350010, AC423350250, A676-212, A676-500, S75244
Synonyms: Nitric acid, ammonium salt; Norway saltpeter.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
6484-52-2	Ammonium nitrate	> 98	229-347-8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white to gray to brown solid.
Danger! Strong oxidizer. Contact with other material may cause a fire. Causes eye, skin, and respiratory tract irritation. May cause methemoglobinemia. Hygroscopic (absorbs moisture from the air). Ammonium nitrate when contaminated with oil, charcoal, or other organic materials should be considered an explosive capable of detonation by combustion or by explosion of adjacent explosive materials.
Target Organs: Blood, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation.

Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood.
Inhalation: Causes respiratory tract irritation. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, tachycardia, dyspnea (labored breathing), and death. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown blood. Inhalation can cause systemic acidosis and methemoglobinemia.
Chronic: May cause methemoglobinemia, which is characterized by chocolate-brown colored blood, headache, weakness, dizziness, breath shortness, cyanosis (bluish skin due to deficient oxygenation of blood), rapid heart rate, unconsciousness and possible death. May cause digestive tract disturbances.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Absorption of this product into the body may cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood). Moderate degrees of cyanosis need to be treated only by supportive measures: bed rest and oxygen inhalation. For methemoglobinemia, administer oxygen alone or with Methylene Blue depending on the methemoglobin concentration in the blood. Cleansing of the entire contaminated area of the body is of utmost importance.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with other material may cause fire. May explode under confinement and high temperatures, especially if contaminated.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use flooding quantities of water as spray.
Flash Point: Not available.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 2; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Keep combustibles (wood, paper, oil, etc.,) away from spilled material.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep away from heat, sparks and flame. Keep from contact with clothing and other combustible materials. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Avoid breathing dust. Inform laundry personnel of contaminant's hazards. Avoid localized heating of ammonium nitrate, potentially leading to development of high temperature areas. Ensure that ammonium nitrate is not exposed to strong shock waves from explosives. Avoid low pH (acidic) conditions.
Storage: Do not store near combustible materials. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids. Keep away from reducing agents. Avoid storage on wood floors.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium nitrate	none listed	none listed	none listed

OSHA Vacated PELs: Ammonium nitrate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: solid
Appearance: white to gray to brown
Odor: odorless
pH: 5.4 (0.1 M solution)
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:169 deg C
Decomposition Temperature:210 deg C
Solubility: Soluble.
Specific Gravity/Density:1.725 @ 25°C
Molecular Formula:NH4NO3
Molecular Weight:80.04

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Risk of explosion if heated under confinement. Deliquescent (tending to absorb atmospheric water vapor and become liquid).
Conditions to Avoid: Dust generation, contamination, heating in a confined space.
Incompatibilities with Other Materials: Strong reducing agents, strong acids, finely powdered metals, organic matter, chlorides, combustible materials.
Hazardous Decomposition Products: Oxides of nitrogen.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 6484-52-2: BR9050000
LD50/LC50:
CAS# 6484-52-2:

Oral, rat: LD50 = 2217 mg/kg;
.

Carcinogenicity:
CAS# 6484-52-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	AMMONIUM NITRATE	AMMONIUM NITRATE
Hazard Class:	5.1	5.1
UN Number:	UN1942	UN1942
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 6484-52-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 6484-52-2: immediate, fire, reactive.

Section 313

This material contains Ammonium nitrate (listed as Water Dissociable Nitrate Compounds), > 98%, (CAS# 6484-52-2) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 6484-52-2 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI O

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 8 Contact with combustible material may cause fire.

R 9 Explosive when mixed with combustible material.

Safety Phrases:

S 17 Keep away from combustible material.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 6484-52-2: 1

Canada - DSL/NDSL

CAS# 6484-52-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of C, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 6484-52-2 is not listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

Material Safety Data Sheet

Ammonium oxalate monohydrate

ACC# 06510

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium oxalate monohydrate
Catalog Numbers: AC206270000, AC206270010, AC206275000, AC423360000, AC423360050, AC423365000, S75031, S75032, S79900, S799001, A679-500
Synonyms: Diammonium oxalate, monohydrate; Ethanedioic acid, diammonium salt monohydrate; Oxalic acid, diammonium salt monohydrate.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
6009-70-7	Ammonium oxalate monohydrate	> 99	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder.
Warning! Harmful if swallowed. Causes eye, skin, and respiratory tract irritation. May cause kidney damage.
Target Organs: Kidneys, heart, eyes, skin, brain, nerves, mucous membranes.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Oxalate is an irritant and may cause dermatitis. Skin lesions begin with epithelial cracking and the formation of slow-healing ulcers. The fingers may appear cyanotic.
Ingestion: Ulcerations of the mouth, vomiting of blood, and rapid appearance of shock,

convulsions, twitching, tetany, and cardiovascular collapse may occur following ingestion of oxalic acid or its soluble salts. Systemic effects may be due to formation of calcium oxalate which is insoluble at physiological pH and can be deposited in the brain and kidney tubules. Resultant hypocalcemia might disturb the function of the heart and nerves. Mean lethal dose for oxalates in adults is estimated at 10 - 30 grams (143 - 428 mg/kg).
Inhalation: Inhalation of oxalic acid dust or vapor produces irritation of the respiratory tract, protein in the urine, nosebleed, ulceration of the mucous membranes, headache, nervousness, cough, vomiting, emaciation, back pain (due to kidney injury), and weakness.
Chronic: Inhalation of oxalic acid dust or mist over a long period of time might result in weight loss and respiratory tract inflammation. Rats administered oxalic acid at 2.5 and 5% in the diet for 70 days developed depressed thyroid function and weight loss. A study of railroad car cleaners in Norway who were heavily exposed to oxalic acid solutions and vapors revealed a 53% prevalence of urolithiasis (the formation of urinary stones), compared to a rate of 12% among unexposed workers from the same company.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.
Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.
Antidote: Intravenous administration of calcium gluconate or calcium chloride may be required if hypocalcemia or hypocalcemic tetany occur.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid breathing dust.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Oxalates slowly corrode steel.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium oxalate monohydrate	none listed	none listed	none listed
Ammonium oxalate anhydrous	none listed	none listed	none listed

OSHA Vacated PELs: Ammonium oxalate monohydrate: No OSHA Vacated PELs are listed for this chemical. Ammonium oxalate anhydrous: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or

European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: white
Odor: odorless
pH: 6.4 (0.1M soln)
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not available.
Boiling Point: Decomposes.
Freezing/Melting Point:70 deg C
Decomposition Temperature:70 deg C
Solubility: Soluble.
Specific Gravity/Density:1.5
Molecular Formula:C2H8N2O4.H2O
Molecular Weight:142.11

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation, excess heat, Oxalates slowly corrode steel..
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, carbon dioxide, formic acid, ammonia.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 6009-70-7 unlisted.
CAS# 1113-38-8: RO2750000
LD50/LC50:
Not available.
Not available.
CAS# 1113-38-8; Rat TDLo Oral: 9 mL/kg/3D continuous. Published data indicated liver changes and biochemical effects. Mean lethal dose for oxalates in adults is estimated at 10-30 grams (143-428 mg/kg).

Carcinogenicity:
CAS# 6009-70-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 1113-38-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: A study of railroad car cleaners in Norway who were heavily exposed to oxalic acid solutions and vapors revealed a 53% prevalence of urolithiasis (the formation of urinary stones), compared to a rate of 12% among unexposed workers from the same company.
Teratogenicity: No information available.
Reproductive Effects: Oxalic acid caused kidney damage in fetal sheep and rats and disturbed the estrus cycle in rats. Increased sperm abnormalities were seen in the second generation of mice administered 0.2% oxalic acid in the drinking water.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TOXIC SOLIDS, ORGANIC, N.O.S.	TOXIC SOLID ORGANIC NOS (AMMONIUM OXALATE MONOHYDRATE)
Hazard Class:	6.1	6.1
UN Number:	UN2811	UN2811
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 6009-70-7 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 1113-38-8 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 6009-70-7: 5000 lb final RQ (listed under Ammonium oxalate); 2270 kg final RQ (listed under

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 6009-70-7: immediate, delayed.

CAS # 1113-38-8: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 6009-70-7 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 6009-70-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 1113-38-8 can be found on the following state right to know lists: New Jersey.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 21/22 Harmful in contact with skin and if swallowed.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 6009-70-7: 1

CAS# 1113-38-8: No information available.

Canada - DSL/NDSL

CAS# 1113-38-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

FISHER SCIENTIFIC CO. CHEMICAL MFG DIV -- AMMONIUM PHOSPHATE DIBASIC - - -

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

Product ID:AMMONIUM PHOSPHATE DIBASIC
MSDS Date:02/23/1999
FSC:NIIN:Submitter:D DG
Status Code:A
MSDS Number: CKWLV
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410-2802
Country:US
Info Phone Num:201-796-7100
Emergency Phone Num:201-796-7100
Resp. Party Other MSDS Num.:01350
Chemtrec Ind/Phone:(800)424-9300
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:DIAMMONIUM PHOSPHATE
CAS:7783-28-0
> Wt:99.

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

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:EYES: DUSTS MAY CAUSE PERSISTENT EYE IRRITATION AND CONJUNCTIVITIS. SKIN: MAY CAUSE MILD SKIN IRRITATION. INGESTION: CAUSES GASTROINTESTINAL IRRITATION WITH NAUSEA, VOMITING AND DIARRHEA. INHALATION: MAY CAUSE RESPIRATORY TRACT IRRITATION. CHRONIC: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DERMITITIS.
Explanation of Carcinogenicity:NOT LISTED BY ACGIH, IARC, NIOSH, NTP, OR OSHA.
Effects of Overexposure:EYES: IRRITATION, CONJUNCTIVITIS. SKIN: IRRITATION. INGESTION: GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING AND DIARRHEA. INHALATION: RESPIRATORY TRACT IRRITATION. CHRONIC: SKIN: DERMITITIS.

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

First Aid:EYES: FLUSH WITH PLENTY OF WATER FOR 15 MINUTES, OCCASIONALLY

LIFTING EYELIDS. GET MEDICAL AID. SKIN: FLUSH WITH SOAP AND WATER FOR 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. GET MEDIC AL AID IF IRRIATTION DEVELOPS OR PERSISTS. WASH CLOTHING BEFORE REUSE. INGESTION: DO NOT INDUCE VOMITING. IF VICTIM IS CONSCIOUS AND ALERT, GIVE 2-4 CUPFULS OF MILK OR WATER. NEVER GIVE ANYTHING BY MO UTH TO AN UNCONSCIOUS PERSON. GET MEDICAL AID. INHALATION: MOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET MEDICAL AID. NOTES TO PHYSICIAN : TREAT SYMPTOMATICALLY.

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

Flash Point:NONCOMBUSTIBLE
Extinguishing Media:SUBSTANCE IS NONCOMBUSTIBLE; USE AGENT MOST APPROPRIATE TO EXTINGUISH SURROUNDING FIRE. IN CASE OF FIRE USE WATER SPRAY, DRY CHEMICAL, CARBON DIOXIDE, OR APPROPRIATE FOAM.
Fire Fighting Procedures:AS IN ANY FIRE, WEAR A SELF-CONTAINED BREATHING APPARATUS IN PRESSURE-DEMAND, MSHA/NIOSH (APPROVED OR EQUIVALENT), AND FULL PROTECTIVE GEAR.
Unusual Fire/Explosion Hazard:DURING A FIRE, IRRITATING AND HIGHLY TOXIC GASES MAY BE GENERATED BY THERMAL DECOMPOSITION OR COMBUSTION.

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

Spill Release Procedures:USE PROPER PROTECTIVE EQUIPMENT. VACUUM OR SWEEP UP MATERIAL AND PLACE INTO A SUITABLE DISPOSAL CONTAINER. AVOID GENERATING DUSTY CONDITIONS. PROVIDE VENTILATION.

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

Handling and Storage Precautions:HANDLING: USE WITH ADEQUATE VENTILATION. AVOID CONTACT WITH SKIN AND EYES. KEEP CONTAINER TIGHTLY CLOSED. AVOID INGESTION AND INHALATION. STORAGE: STORE IN A COOL, DRY, WELL-VENTILATED AREA AWAY FROM INCOMPATIBLE SUBSTANCES. KEEP CONTAINER TIGHTLY CLOSED.
Other Precautions:USE PROPER PERSONAL PROTECTIVE EQUIPMENT.

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

Respiratory Protection:FOLLOW THE OSHA RESPIRATOR REGUALTIONS FOUND IN 29 CFR 1910.134 OR EUROPEAN STANDARD EN 149. ALWAYS USE A NIOSH OR EUROPEAN STANDARD EN 149 APPROVED RESPIRATOR WHEN NECESSARY.
Ventilation:USE ADEQUATE VENTILATIOLN TO KEEP AIRBORNE CONCENTRATIONS LOW.
Protective Gloves:WEAR APPROPRIATE GLOVES TO PREVENT SKIN EXPOSURE.
Eye Protection:PROTECTIVE EYEGLASSES OR CHEMICAL SAFETY GOGGLES AND FACESHIELD AS NEEDED.
Other Protective Equipment:WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT SKIN EXPOSURE.
Work Hygienic Practices:USE WITH ADEQUATE VENTILATION. AVOID CONTACT WITH SKIN AND EYES. AVOID INGESTION AND INHALATION.
Supplemental Safety and Health
CATALOG NOS: A686 500, A686-3, A686-500, A6863, A686500, BP361 500, BP361-500, BP3611000, BP361500. SYNONYMS: DIAMMONIUM HYDROGEN PHOSPHATE, PHOSPHORIC ACID DIAMMONIUM SALT.

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

HCC:N1
Melt/Freeze Pt:=155.C, 311.F
Decomp Temp:=155.C, 311.F
Vapor Pres:NEGLIGIBLE
Vapor Density:NEGLIGIBLE
Spec Gravity:1.619
pH:8.0
Evaporation Rate & Reference:NEGLIGIBLE
Solubility in Water:58G/100ML (10C)
Appearance and Odor:SOLID, WHITE; AMMONIA-LIKE-WEAK ODOR.

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

Stability Indicator/Materials to Avoid:YES
SODIUM HYPOCHLORITE.
Stability Condition to Avoid:STABLE UNDER NORMAL TEMPERATURES AND PRESSURES. AVOID INCOMPATIBLE MATERIALS, EXPOSURE TO AIR, EXCESS HEAT.
Hazardous Decomposition Products:OXIDES OF PHOSPHOROUS, NITRIC OXIDE (NOX), AND AMMONIA (NH3) FUMES.
Conditions to Avoid Polymerization:HAS NOT BEEN REPORTED.

========== Toxicological Information ==========

Toxicological Information:RETECS#: CAS# 7783-28-0 UNLISTED. LD50/LC50: NOT AVAILABLE. CARCINOGENICITY: DIAMMONIUM PHOSPHATE NOT LISTED BY ACGIH, IARC, NIOSH, NTP, OR OSHA. NO INFORMATION AVAILABLE ON FOLLOWING:TERATOGENICITY, REPRODUCTIVE EFFECTS, NEUROTOXICITY, MUTAGENICITY. OTHER STUDIES: NO DATA AVAILABLE.

========== Ecological Information ==========

Ecological:ECOTOXICITY: FATHEAD MINNOW LC50=155 PPM/ 96 HR. ENVIRONMENTAL FATE: NOT AVAILABLE. PHYSICAL/CHEMICAL: NOT AVAILABLE. OTHER: NOT AVAILABLE. CLEAN AIR ACT: THIS MATERIAL DOES NOT CONTAIN ANY HAZARDOUS AIR POLLUTANTS, OR ANY CLASS 1 OZONE DEPLETORS, OR ANY CLASS 2 OZONE DEPLETORS. CLEAN WATER ACT: NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED AS HAZARDOUS SUBSTANCES UNDER THE CWA OR LISTED AS PR IORITY POLLUTANTS UNDER THE CWA, OR ARE LISTD AS TOXIC POLLUTANTS UNDER THE CWA..

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

Waste Disposal Methods:DISPOSE OF IN A MANNER CONSISTENT WITH FEDERAL, STATE AND LOCAL REGULATIONS. RCRA P-SERIES: NONE LISTED; RCRA U-SERIES: NONE LISTED.

========== MSDS Transport Information ==========

Transport Information:US DOT: NO INFORMATION AVAILABLE. IMO: NOT REGULATED AS A HAZARDOUS MATERIAL. IATA: NO REGULATED AS A HAZARDOUS MATERIAL. RID/ADR: NOT REGULATED AS A HAZARDOUS MATERIAL. CANADIAN TDG: NO INFORMATION A VAILABLE.

========== Regulatory Information ==========

SARA Title III Information:SECTION 302 (RQ): NONE OF THE CHEMICALS IN THIS MATERIAL HAVE AN RQ. SECTION 302 (TPQ): NONE OF THE CHEMICALS IN THIS PRODUCT HAVE A TPQ). SARA CODES: CAS# 7783-28-0: ACUTE. SECTION 313: NO CHEMICALS ARE REPORTABLE UNDER SECTION 313.
Federal Regulatory Information:TSCA: CAS# 7783-28-0 IS LISTED ON THE TSCA INVENTORY. HEALTH & SAFETY REPORTING LIST: NONE OF THE CHEMICALS ARE ON THE HEALTH & SAFETY REPORTING LIST. CHEMICAL TEST RULES: NONE OF THE CHEMICALS IN THI S PRODUCT ARE UNDER A CHEMICAL TEST RULE. SECTION 12B: NONE OF THE CHEMICALS ARE LISTED UNDER TSCA SECTION 12B. TSCA SIGNIFICIANT NEW USE RULE: NONE OF THE CHEMICALS IN THIS MATERIAL HAVE A SNUR UNDERTSCA. OSHA: NONE OF THE CHEMICALS IN THIS PRODUCT ARE CONSIDERED HIGHLY HAZARDOUS BY OSHA.
State Regulatory Information:DIAMMONIUM PHOSPHATE IS NOT PRESENT ONSTATE LISTS FROM CA, PA, MN, MA, FL, OR NJ. CALIFORNIA NO SIGNIFICANT RISK LEVEL: NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED.

========== Other Information ==========

Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

-- AMMONIUM PURPURATE -- 6810-00F004340

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

Product ID:AMMONIUM PURPURATE
MSDS Date:01/01/1987
FSC:6810
NIIN:00F004340
MSDS Number: BBQCW
=== Responsible Party ===
Company Name:EM SCIENCE/CHERRY HILL, NJ 08034
Emergency Phone Num:(609) 354-9200
CAGE:EO864
=== Contractor Identification ===
Company Name:E M SCIENCE DIV OF E M INDUSTRIES INC
Address:480 DEMOCRAT ROAD
Box:70
City:GIBBSTOWN
State:NJ
ZIP:08027
Country:US
Phone:800-222-0342/609-423-6300
CAGE:63612
Company Name:EM SCIENCE/CHERRY HILL, NJ 08034
CAGE:EO864

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

Ingred Name:AMMONIUM PURPURATE

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

Effects of Overexposure:GET MEDICAL ASSISTANCE FOR ALL CASES OF
OVEREXPOSURE.

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

First Aid:SKIN CONTACT: WASH WITH SOAP & WATER. EYE CONTACT: FLUSH
THOROUGHLY WITH WATER. INHALATION: REMOVE TO FRESH AIR.

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

Extinguishing Media:WATER SPRAY, FOAM, CO2
Fire Fighting Procedures:WEAR SELF-CONTAINED BREATHING APPARATUS.
Unusual Fire/Explosion Hazard:NONE

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

Spill Release Procedures:TAKE UP AND CONTAINERIZE FOR PROPER DISPOSAL.

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

Handling and Storage Precautions:DO NOT BREATHE DUST. AVOID CONTACT
WITH SKIN AND EYES. DO NOT TAKE INTERNALLY. WASH THOROUGHLYFTER
HANDLING.

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

Respiratory Protection:DUST RESPIRATOR REQUIRED IF CONDITIONS WARRANT.
Ventilation:PROVIDE LOCAL EXHAUST/MECH VENTILATION TO KEEP BELOW TLV
Protective Gloves:PROTECTIVE
Eye Protection:SAFETY GOGGLES
Other Protective Equipment:PROTECTIVE CLOTHING
Supplemental Safety and Health
MSDS DATE: JUL 84.

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

Boiling Pt:B.P. Text:760C
Solubility in Water:VERY SLIGHT
Appearance and Odor:RED POWDER

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

Stability Indicator/Materials to Avoid:YES
OXIDIZERS
Hazardous Decomposition Products:COX, NITROGEN COMPOUNDS

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

Waste Disposal Methods:TO BE PERFORMED IN COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

Material Safety Data Sheet

Ammonium sulfate

ACC# 01410

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium sulfate
Catalog Numbers: AC205870000, AC205870010, AC205872500, AC423400000, AC423400030, AC423400050, AC423400250, 42340-0010, 42340-5000, A701-3, A701-50, A702-10, A702-3, A702-500, A938-500, BP212-212, BP212R-1, NC9155259, NC9179991, NC9273346, NC9685224, S71915ACS
Synonyms: Diammonium sulfate; Sulfuric acid, diammonium salt.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7783-20-2	Ammonium sulfate	99+	231-984-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless crystals.
Warning! Causes eye, skin, and respiratory tract irritation.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation. Causes redness and pain.
Skin: Causes skin irritation. May be harmful if absorbed through the skin. May cause reddening of the skin.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be

harmful if swallowed.
Inhalation: Causes respiratory tract irritation. May be harmful if inhaled. May cause respiratory difficulty and coughing. May contribute to asthma attacks or clearance problems in persons with these pre-existing pulmonary diseases
Chronic: Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated exposure may cause permanent eye damage. Chronic exposure may cause lung damage. Systemic ammonia poisoning is possible if sufficient absorption occurs.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Substance is noncombustible. Decomposes at high temperatures, resulting in toxic and corrosive products.
Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium sulfate	none listed	none listed	none listed

OSHA Vacated PELs: Ammonium sulfate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Crystals
Appearance: colorless
Odor: odorless
pH: 5-6 (5% aq.sol. @ 20°C)
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Negligible
Viscosity: Not applicable.
Boiling Point: Not applicable.

Freezing/Melting Point:280 deg C
Decomposition Temperature: Not available.
Solubility: 77g/100mL @ 25°C
Specific Gravity/Density:1.760
Molecular Formula:(NH4)2SO4
Molecular Weight:132.13

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, dust generation, heating to decomposition.
Incompatibilities with Other Materials: Chlorates, nitrites, oxidizing agents, bases, alkali metals.
Hazardous Decomposition Products: Oxides of sulfur, nitrogen oxides (NOx) and ammonia (NH3).
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7783-20-2: BS4500000
LD50/LC50:
CAS# 7783-20-2:
Oral, mouse: LD50 = 640 mg/kg;
Oral, mouse: LD50 = 4280 mg/kg;
Oral, rat: LD50 = 2840 mg/kg;
Oral, rat: LD50 = 4540 mg/kg;
.

Carcinogenicity:
CAS# 7783-20-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea Daphnia: LC50 = 423 mg/L; 25 Hr; Unspecified No data available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7783-20-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7783-20-2: immediate.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7783-20-2 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 7783-20-2: 1

Canada - DSL/NDSL

CAS# 7783-20-2 is listed on Canada's DSL List.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7783-20-2 is listed on the Canadian Ingredient Disclosure List.

FISHER SCIENTIFIC -- A-708, AMMONIUM TARTRATE -- 6810-00N015852

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

Product ID:A-708, AMMONIUM TARTRATE
MSDS Date:02/15/1989
FSC:6810
NIIN:00N015852
MSDS Number: BPLCB
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410-2802
Country:US
Info Phone Num:201-796-7100
Emergency Phone Num:201-796-7100;800-424-9300(CHEMTREC)
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:ING 2:TO SKIN/EYES, & RESP TRACT. INGEST OF LG AMTS MAY
PRDCE GI IRRIT. HIGHLY TOX BY INTRAVENOUS RTE IN (ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3:EXPERIMENTAL ANIMALS.
RTECS #:9999999ZZ

Ingred Name:FIRST AID PROC: UNTIL NO EVIDENCE OF CHEM REMAINS FOR @ LST
15-20 MIN. GET MED ATTN IMMED. INGEST: DO NOT USE (ING 6)
RTECS #:9999999ZZ

Ingred Name:ING 5:GASTRIC LAVAGE/INDUCE VOMIT. DILUTE SUBSTANCE IMMED
W/LG QTY OF MILK/H*2O. GET MED ATTN IMMED. (DREISBACH, (ING 7)
RTECS #:9999999ZZ

Ingred Name:ING 6:HANDBOOK OF POISONING, 11TH ED). ANTIDOTE: NO
SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY & SUPPORTIVELY.
RTECS #:9999999ZZ

Ingred Name:RESP PROT:FOUND IN PHYS DATA, HLTH EFTS & TOX SECTIONS.
THEY ARE RANKED IN ORDER FROM MINIMUM TO MAX RESP PROT: (ING 9)
RTECS #:9999999ZZ

Ingred Name:ING 8:NIOSH/MSHA APPRVD: DUST & MIST RESP W/FULL FACEPIECE;
AIR-PURIFYING FULL FACEPIECE W/HIGH-EFFICIENCY (ING 10)
RTECS #:9999999ZZ

Ingred Name:ING 9:PARTICULATE FILTER; POWDERED AIR-PURIFYING RESP W/TIGHT-FITTING FACEPIECE & HIGH-EFFICIENCY PARTICULATE (ING 11)
RTECS #:9999999ZZ

Ingred Name:ING 10:FILTER. TYPE 'C' SUPPLIED-AIR RESP W/FULL FACEPIECE OPERATED IN PRESS-DEMAND/OTHER POS PRESS MODE W/FULL (ING 12)
RTECS #:9999999ZZ

Ingred Name:ING 11: FACEPIECE, HELMET/HOOD OPERATED IN CONTINUOUS-FLOW MODE; SCBA W/FULL FACEPIECE OPERATED IN PRESS-DEMAND (ING 13)
RTECS #:9999999ZZ

Ingred Name:ING 12: OTHER POS PRESS MODE. FOR FIREFIGHTING & OTHER IMMED DANGEROUS TO LIFE/HLT CNDTNS: NIOSH/MSHA APPRVD: (ING 14)
RTECS #:9999999ZZ

Ingred Name:ING 13:SCBA W/FULL FACEPIECE OPERATED IN PRESS DEMAND/OTHER POS PRESS MODE; SUPPLIED-AIR RESP W/FULL FACEPIECE (ING 15)
RTECS #:9999999ZZ

Ingred Name:ING 14:OPERATED IN PRESS-DEMAND/OTHER POS PRESS MODE IN COMBINATION W/AN AUXILIARY SCBA OPERATED IN PRESS-DEMAND(ING 16)
RTECS #:9999999ZZ

Ingred Name:ING 15:OR OTHER POSITIVE PRESSURE MODE.
RTECS #:9999999ZZ

Ingred Name:TARTARIC ACID, DIAMMONIUM SALT; (AMMONIUM TARTRATE)
CAS:3164-29-2
RTECS #:WW8050000
Fraction by Wt: 100%
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

Ingred Name:EFTS OF OVEREXP: SEV EXPOS MAY CAUSE GI PERFORATION. CHRONIC: NO DATA AVAIL. DIAMMONIUM TARTRATE IS IRRITATING (ING 3)
RTECS #:9999999ZZ

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

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE:INHAL: NO DATA AVAIL, HOWEVER, INHAL OF SOME AMMONIUM SALTS MAY CAUSE IRRIT OF MOUTH, NOSE/THROAT. SEV EXPOS MAY CAUSE WHEEZING, CHEST PAIN, & DELAYED PULM EDEMA. CHRONIC: RPTD/PRLNG EXPOS MAY C AUSE IRRIT. SKIN:ACUTE: NO DATA AVAIL, HOWEVER AMMONIUM SALTS MAY CAUSE RED, IRRIT & POSS CHEM BURNS. (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT
Effects of Overexposure:HLTH HAZ: CHRONIC: NO DATA AVAIL, HOWEVER, AMMONIUM SALTS AFTER RPTD/PRLNG CONT MAY CAUSE DERM. EYE: ACUTE: CONT MAY CAUSE RED/IRRIT, SEV EXPOS MAY PRDCE BURNS. CHRONIC: RPTD/PRLNG CONT MAY CAUSE CONJ . INGEST: ACUTE: NO DATA AVAIL, HOWEVER, INGEST OF AMMONIUM SALTS MAY PRDCE, NAUS, VOMIT & GASTRIC IRRIT. (ING 2)

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

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

First Aid:INHAL:REMOVE TO FRESH AIR IMMED. IF BRTHG HAS STOPPED, PERFORM ARTF RESP. KEEP WARM & @ REST. TREAT SYMPTOMATICALLY & SUPPORTIVELY. GET MED ATTN IMMED. SKIN: REMOVE CONTAMD CLTHG & SHOES IMMED. WASH A FFECTED AREA W/SOAP/MILD DETERGENT & LGAMTS OF H*2O UNTIL NO EVIDENCE OF CHEM REMAINS (APPROX 15-20 MIN). GET MED ATTN IMMED. EYE: WASH IMMED W/LG AMTS OF H*2O/NORM SALINE OCCAS LIFTING LIDS, (ING 5)

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

Flash Point:COMBUST SOLID
Extinguishing Media:DRY CHEM/CO*2/HALON, H&2O SPRAY/STD FOAM. (1987 EMER RESPONSE GUIDEBOOK, DOT P5800.4). FOR LGR FIRES, USE (SUPP DATA)
Fire Fighting Procedures:NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP. MOVE CONTR FROM FIRE AREA IF POSS. DO NOT SCATTER SPILLED MATL W/HIGH PRESS H*2O STREAMS. DIKE FIRE (SUPP DATA)
Unusual Fire/Explosion Hazard:NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

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

Spill Release Procedures:STOP LEAK OF YOU CAN DO SO W/OUT RISK. FOR SM SPILLS: TAKE UP W/SAND/OTHER ABSORB MATL & PLACE INTO CLEAN, DRY CONTR FOR LATER DISP. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:NONE SPECIFIED BY MANUFACTURER.
Other Precautions:NONE SPECIFIED BY MANUFACTURER.

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

Respiratory Protection:SPEC RESP SELECTED MUST BE BASED ON CONTAM LEVELS FOUND IN WORKPLACE, MUST NOT EXCEED WORKING LIM OF RESP & BE JOINTLY APPRVD BY NATL INSTITUTE FOR OCCUP SFTY & HLTH & MINE SFTY & HLTH ADMIN. FOLLOW R ESP ARE RECOM BASED ON DATA (ING 8)
Ventilation:PROVIDE GENERAL DILUTION VENTILATION.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:CHEMICAL WORKERS GOGGLES .
Other Protective Equipment:EMPLOYEE MUST WEAR APPROP PROT(IMPERVIOUS) CLTHG & EQUIP TO PVNT RPTD/PRLNG SKIN CONT W/THIS SUBSTANCE.
Work Hygienic Practices:CONTACT LENSES SHOULD NOT BE WORN.
Supplemental Safety and Health
EXTING MEDIA: H*2O SPRAY, FOG/STD FOAM (1987 EMER RESPONSE GUIDEBOOK, DOT P 5800.4) FIRE FIGHT PROC: CTL H*2O FOR LATER DISP (1987 EMER RESPONSE GUIDEBOOK, DOT P5800.4 GUIDE PG 31). USE AGENTS SUITABL E FOR TYPE OF SURROUNDING FIRE. AVOID BRTHG HAZ VAP, KEEP UPWIND.

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

HCC:N1
Boiling Pt:B.P. Text:DECOMPOSES
Melt/Freeze Pt:M.P/F.P Text:DECOMPOSES
Spec Gravity:1.6
Solubility in Water:58.01%@15C
Appearance and Odor:COLORLESS CRYSTALS OR WHITE GRANULES.

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

Stability Indicator/Materials to Avoid:YES
DIAMMONIUM TARTRATE (AMMONIUM TARTRATE): MAY EXPLODE VIOLENTLY ON CONT W/POTASSIUM CHLORATE.
Stability Condition to Avoid:MAY BURN BUT DOES NOT IGNITE READILY. AVOID CONT W/STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS, OR OPEN FLAME.
Hazardous Decomposition Products:THERMAL DECOMPOSITION MAY RELEASE CORROSIVE FUMES OF AMMONIA AND TOXIC OXIDES OF NITROGENS.

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

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS .

Material Safety Data Sheet

Ammonium Thiocyanate

ACC# 01450

Section 1 - Chemical Product and Company Identification

MSDS Name: Ammonium Thiocyanate
Catalog Numbers: AC206500000, AC206500010, AC206505000, AC423410000, AC423410030, AC423410050, 42341-5000, A709-3, A709-500
Synonyms: Thiocyanic acid; ammonium salt; Ammonium rhodanate; Ammonium sulfocyanate; Ammonium sulfocyanide; Ammonium thiocyanate; Ammonium rhodanide.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
1762-95-4	Ammonium thiocyanate	>97.5	217-175-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder.
Warning! Causes respiratory tract irritation. Causes eye and skin irritation. Contact with acids liberates toxic gas. May be harmful if swallowed, inhaled, or absorbed through the skin. Hygroscopic (absorbs moisture from the air).
Target Organs: Respiratory system, eyes, thyroid, skin.

Potential Health Effects

Eye: May cause moderate eye irritation.
Skin: Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion: Harmful if swallowed. Causes gastrointestinal irritation with nausea, vomiting

and diarrhea. May cause agitation, delerium, convulsions, low blood pressure, anxiety and even unconsciousness and death.
Inhalation: Causes respiratory tract irritation. May be harmful if inhaled.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may cause thyroid damage: thyroid enlargement, decrease in metabolic rate, and hypothyroidism. Repeated exposure can cause headache, nausea, vomiting, loss of appetite and weight

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, "alcohol resistant" foam, or carbon dioxide.
Flash Point: 190 deg C (374.00 deg F)
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation. Use only with adequate ventilation.
Storage: Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Dark room.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium thiocyanate	none listed	none listed	5 mg/m3 TWA (listed under Cyanide anion).

OSHA Vacated PELs: Ammonium thiocyanate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: white
Odor: odorless
pH: 4.5-6.0 in 5% sol.
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Negligible.

Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:149 deg C
Decomposition Temperature:190 deg C
Solubility: Freely Soluble.
Specific Gravity/Density:1.305 g/cm3
Molecular Formula:NH4SCN
Molecular Weight:76.12

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. May decompose when exposed to light.
Conditions to Avoid: Dust generation, moisture, excess light.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, brass, copper, iron.
Hazardous Decomposition Products: Hydrogen cyanide, nitrogen oxides, carbon monoxide, oxides of sulfur, carbon dioxide, ammonia and/or derivatives.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 1762-95-4: XK7875000
LD50/LC50:
CAS# 1762-95-4:
Oral, mouse: LD50 = 500 mg/kg;
Oral, mouse: LD50 = 720 mg/kg;
Oral, rat: LD50 = 750 mg/kg;
.

Carcinogenicity:
CAS# 1762-95-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. Acute aquatic effect: 96-hour LC50; fathead minnow: 100 mg/L 96-hour LC50; water flea: 170 mg/L 48-hour LC50; mosquito fish: 420 mg/L
Environmental: This chemical has a low biological oxygen demand, and it is expected to cause little oxygen depletion in aquatic systems. It has a low potential to affect aquatic organisms. It is not likely to bioconcentrate.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SO (AMMONIUM THIOCYANATE)
Hazard Class:	XCP	9
UN Number:		UN3077
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 1762-95-4 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 1762-95-4: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 1762-95-4: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 1762-95-4 is listed as a Hazardous Substance under the CWA. CAS# 1762-95-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 1762-95-4 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 1762-95-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
R 32 Contact with acids liberates very toxic gas.

Safety Phrases:

S 36/37 Wear suitable protective clothing and gloves.
S 50A Do not mix with acids.

WGK (Water Danger/Protection)

CAS# 1762-95-4: 1

Canada - DSL/NDSL

CAS# 1762-95-4 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B, D1B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 1762-95-4 (listed as Cyanides, inorganic salts) is listed on the Canadian Ingredient Disclosure List.

CAROLINA BIOLOGICAL SUPPLY CO -- CHARCOAL, WOOD AND ANIMAL BONE, POWDER -- -

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

Product ID:CHARCOAL, WOOD AND ANIMAL BONE, POWDER
MSDS Date:02/02/1998
FSC:NIIN:Submitter:D RV
Status Code:A
MSDS Number: CKBKV
=== Responsible Party ===
Company Name:CAROLINA BIOLOGICAL SUPPLY CO
Address:2700 YORK RD
City:BURLINGTON
State:NC
ZIP:27215-3387
Country:US
Info Phone Num:800-227-1150
Emergency Phone Num:800-227-1150
Resp. Party Other MSDS Num.:PRODUCT CODE: 85-3780
CAGE:59896
=== Contractor Identification ===
Company Name:CAROLINA BIOLOGICAL SUPPLY CO
Address:2700 YORK RD
Box:City:BURLINGTON
State:NC
ZIP:27215-3387
Country:US
Phone:800-227-1150/910-584-0381
Contract Num:MDA414-99-P-6483
CAGE:59896

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

Ingred Name:CARBON
CAS:7440-44-0
RTECS #:FF5250000
= Wt:100.

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

LD50 LC50 Mixture:LD50 = 440 MG/KG (RAT)
Routes of Entry: Inhalation:YES Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:EMERGENCY OVERVIEW: COMBUSTIBLE SOLID.
POTENTAIL HEALTH EFFECT: ON CONTACT MAY CAUSE EYES OR SKIN IRRITATION. INGESTED, MAY CAUSE GASTROINTESTINAL DISCOMFORT. INHALED, MAY CAUSE IRRITATION TO RESPIRAT ORY TRACT.
Explanation of Carcinogenicity:NONE LISTED.
Effects of Overexposure:IRRITATION.

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

First Aid:EYE: FLUSH WITH WATER FOR AT LEAST 15 MINUTES, RAISING UPPER AND LOWER EYELIDS OCCASIONALLY. GET MEDICAL ATTENTION IF IRRITATION PERSISTS. SKIN: THOROUGHLY WASH EXPOSED AREA FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING. LAUNDER BEFORE

REUSE. INGEST: IF CONSCIOUS, GIVE PLENTY OF WATER AND INDUCE VOMITING IMMEDIATELY AS DIRECTED BY MEDICAL PERSONNEL. CALL A PHYSICIAN OR POISON CONTROL CENT ER. NEVER GIVE ANYTHING BY MOUTH TO AN UNSCIOUS PERSON. INHALE: REMOVE TO FRESH AIR. GIVE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICAIL RESPIRATION IF BREATHING HAS STOPPED. KEEP PERSON WARM AND Q UIET.

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

Extinguishing Media:USE DRY CHEMICAL, CARBON DIOXIDE OR APPROPRIATE FOAM.
Fire Fighting Procedures:FIREFIGHTERS SHOULD WEAR FULL PROTECTIVE EQUIPMENT AND NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS.
Unusual Fire/Explosion Hazard:DUST PARTICLES CAN FORM EXPLOSIVE MIXTURE WITH AIR. DANGER DUE TO SPONTANEOUS HEATING WHEN WET OR TIGHTLY PACKED.

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

Spill Release Procedures:VENTILATE AREA OF SPILL. CLEAN-UP PERSONNEL SHOULD WEAR PROPER PROTECTIVE EQUIPMENT. AVOID CREATING DUST. SWEEP OR SCOOP UP AND CONTAINERIZE FOR DISPOSAL.

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

Handling and Storage Precautions:KEEP CONTAINER CLOSED AND AWAY FROM HEAT, FLAMES, AND OXIDIZERS. AVOID WETTING AND SUBSEQUENT DRYING IN STORAGE.
Other Precautions:DO NOT BREATHE DUST. AVOID CONTACT WITH SKIN OR EYES.

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

Respiratory Protection:NONE NEEDED UNDER NORMAL CONDITIONS OF USE WITH ADEQUATE VENTILATION. NIOSH APPROVED EQUIPMENT SHOULD BE WORN IF PELS ARE EXCEEDED.
Ventilation:MECHANICAL TYPE IS ACCEPTABLE. LOCAL EXHAUST IS PREFERRED.
Protective Gloves:RUBBER, NEOPRENE, PVC, OR EQUIVALENT.
Eye Protection:SPLASH PROOF CHEMICAL SAFETY GOGGLES SHOULD BE WORN AT ALL TIMES.
Other Protective Equipment:LAB COAT, EYE WASH AND SAFETY SHOWERS.
Supplemental Safety and Health

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

HCC:R1
Melt/Freeze Pt:=3500.C, ######F
Solubility in Water:INSOLUBLE
Appearance and Odor:BLACK, ODORLESS, AMORPHOUS POWDER.

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

Stability Indicator/Materials to Avoid:YES
OXIDIZERS.
Stability Condition to Avoid:AVOID DUSTING.
Hazardous Decomposition Products:OXIDES OF CARBON.

========== Ecological Information ==========

Ecological:EPA WASTE NUMBER: D001

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

Waste Disposal Methods:DISPOSE IN ACCORDANCE WITH ALL APPLICABLE
FEDERAL, STATE AND LOCAL REGULATIONS.

========== MSDS Transport Information ==========

Transport Information:DOT: CHARCOAL, HAZARD CLASS 4.2, NA1361, PKG III.

========== Regulatory Information ==========

SARA Title III Information:NOT ON SARA SEC. 313 CHEMICALS LIST.
Federal Regulatory Information:ON TSCA INVENTORY LIST.

FISHER SCIENTIFIC -- ANTIMONY POTASSIUM TARTRATE, A867250 -- 6810-00N026769

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

Product ID:ANTIMONY POTASSIUM TARTRATE, A867250
MSDS Date:10/29/1991
FSC:6810
NIIN:00N026769
MSDS Number: BNLCR
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410
Country:US
Info Phone Num:201-796-7100
Emergency Phone Num:201-796-7100;800-424-9300(CHEMTREC)
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:ING 4: MANIFESTATIONS. CHRONIC INCORPORATION OF ANTIMONY POTASSIUM TARTRATE AT 5 PPM INTO DRINKING H*2O INCR (ING 6)
RTECS #:9999999ZZ

Ingred Name:ING 5: MORTALITY RATE & DECREASED SERUM GLUCOSE LEVELS IN RATS.
RTECS #:9999999ZZ

Ingred Name:FIRST AID PROC: SECURELY, BUT NOT TOO TIGHTLY. GET MED ATTN IMMED. EYE: WASH EYES IMMED W/LRG AMTS OF H*2O, (ING 8)
RTECS #:9999999ZZ

Ingred Name:ING 7:OCCASIONALLY LIFTING UPPER/LOWER LIDS FOR AT LEAST 15 MIN,UNTIL NO EVIDENCE OF CHEM REMAINS.CONT IRRIGATING(ING 9)
RTECS #:9999999ZZ

Ingred Name:ING 8:W/NORMAL SALINE UNTIL PH HAS RETURNED TO NORMAL (30-60 MIN). COVER W/STERILE BANDAGES.GET MED ATTN IMMED. (ING 10)
RTECS #:9999999ZZ

Ingred Name:ING 9: INGEST: REMOVE INGESTED ANTIMONY CMPDS BY GASTRIC LAVAGE/EMESIS. DO NOT PERFORM GASTRIC LAVAGE/EMESIS IF (ING 11)
RTECS #:9999999ZZ

Ingred Name:ING 10:VICTIM IS UNCON.GET MED ATTN IMMED. TREATMENT SHD BE

PERFORMED BY QUALIFIED MED PERSONNEL ONLY. ANTIDOTE:(ING 12)
RTECS #:9999999ZZ

Ingred Name:ING 11: FOLLOWING ANTIDOTE HAS BEEN RECOM. HOWEVER, DECISION AS TO WHETHER SEVERITY OF POISONING REQS ADMIN OF (ING 13)
RTECS #:9999999ZZ

Ingred Name:ING 12: ANY ANTIDOTE & ACTUAL DOSE REQD SHD BE MADE BY QUALIFIED MED PERSONNEL. ANTIMONY POISONING: ADMIN (ING 14)
RTECS #:9999999ZZ

Ingred Name:ING 13: DIMERCAPROL, 3 MG/KG (OR 0.3 ML/10 KG) EVERY 4 HOURS FOR FIRST 2 DAYS & THEN 2 MG/KG EVERY 12 HOURS FOR (ING 15)
RTECS #:9999999ZZ

Ingred Name:ING 14:TOTAL OF 10 DAYS. DIMERCAPROL IS AVAIL AS 10% SOLN IN OIL FOR INTRAMUSCULAR ADMIN. ANTIDOTE SHD BE ADMIN (ING 16)
RTECS #:9999999ZZ

Ingred Name:ING 15: BY QUALIFIED MEDICAL PERSONNEL.
RTECS #:9999999ZZ

Ingred Name:MATL:BICHLORIDE,OXIDIZERS,TANNIC ACID,ACIDS:MAY RELEASE HAZ & TOXIC STIBINE;TRIVALENT ANTIMONY & PERCHLORIC ACID-ING 18
RTECS #:9999999ZZ
Other REC Limits:NONE SPECIFIED

Ingred Name:ING-17: EXPLOSIVE MIXTURE WHEN HOT.
RTECS #:9999999ZZ
Other REC Limits:NONE SPECIFIED

Ingred Name:ANTIMONY POTASSIUM TARTRATE (SARA III)
CAS:28300-74-5
RTECS #:CC6825000
Fraction by Wt: 100%
OSHA PEL:0.5 MG (SB)/M3
ACGIH TLV:0.5 MG (SB)/M3
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

Ingred Name:SUPP DATA: MOIST AREAS OF BODY, RARELY INCL FACIAL REGION. EYE: RPTD/PRLNGD CONT W/IRRIT MAY CAUSE CONJUNCT. (ING 3)
RTECS #:9999999ZZ

Ingred Name:ING 2: INGEST: RPTD/PRLNGD INGEST OF ANTIMONY CMPDS MAY CAUSE NAUS, ANOREXIA, HDCH, SLEEPLESSNESS, DIZZ & LOWERED(ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3: BODY TEMP. LIVER & KIDNEY DEGENERATIVE CHANGES INCL HEMORRHAGIC NEPHRITIS & HEPATITIS W/JAUNDICE ARE LATE (ING 5)
RTECS #:9999999ZZ

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

LD50 LC50 Mixture:LD50: (ORAL,RAT) 115 MG/KG.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Health Hazards Acute and Chronic:(ACUTE) INHAL: INHAL MAY CAUSE MUC MEMB IRRIT W/SORE THROAT, COUGHING & DYSPNEA. SKIN: CONT W/ANTIMONY CMPDS MAY CAUSE IRRIT W/REDNESS, PAIN & POSS ULCERATION. EYE: CONT MAY CAUSE IRRIT W/REDNESS & PA IN. KERATITIS & ULCERATION HAVE BEEN REPORTED FROM EXPOS TO ANTIMONY CMPDS. INGEST: INGEST OF ANTIMONY (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: CMPDS MAY CAUSE VIOLENT IRRIT OF NOSE, MOUTH, STOMACH & INTESTINES, NAUS, VOMIT, SEV DIARR W/MUC & BLOOD & ABDOMINAL CRAMPS. SLOW & SHALLOW RESP, PULM CONGESTION, MUSCULAR PAIN, SHOCK, COLLA PSE & COMA MAY OCCUR. DEATH MAY OCCUR DUE TO CIRCULATORY & RESP FAILURE A FEW HOURS FOLLOWING INGEST. HUMAN (SUPP DATA)
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

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

First Aid:INHAL: REMOVE FROM EXPOS AREA TO FRESH AIR IMMED. IF BRTHG HAS STOPPED, PERFORM ARTF RESP. KEEP PERSON WARM & AT REST. TREAT SYMP & SUPPORTIVELY. GET MED ATTN IMMED. SKIN: REMOVE CONTAM CLTHG & SHOES IMMED. WASH AFFECTED AREA W/SOAP/MILD DETERGENT & LRG AMTS OF H*2O UNTIL NO EVIDENCE OF CHEM REMAINS (AT LEAST 15-20 MIN). IN CASE OF CHEM BURNS, COVER AREA W/STERILE, DRY DRESSING. BANDAGE (ING 7)

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

Extinguishing Media:DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM. FOR LRGR FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP . MOVE CNTNR FROM FIRE AREA IF YOU CAN DO IT W/OUT RISK. EXTING USING AGENT INDICATED; KEEP (SUPP DATA)
Unusual Fire/Explosion Hazard:NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

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

Spill Release Procedures:KEEP SPARKS, FLAME, AND OTHER SOURCES OF IGNITION AWAY. KEEP MATERIAL OUT OF WATER SOURCES AND SEWERS.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:STORE AWAY FROM INCOMPATIBLE SUBSTANCES. OBSERVE ALL FED, ST & LOC REGS WHEN STORING OF SUBSTANCE.
Other Precautions:FOR ASSISTANCE, CONTACT DISTRICT DIRECTOR OF ENVIRONMENTAL PROTECTION AGENCY.

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

Respiratory Protection:WEAR NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN . REFER TO ORIGINAL MSDS FOR FURTHER INFORMATION .
Ventilation:PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.
Protective Gloves:IMPERVIOUS GLOVES .

Eye Protection:CHEMICAL WORKERS GOGGLES .
Other Protective Equipment:APPROPRIATE IMPERVIOUS PROTECTIVE CLOTHING AND EQUIPMENT. EMERGENCY EYE WASH.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
FIRE FIGHT PROC: UPWIND. AVOID BRTHG VAPS/DUST. EFTS OF OVEREXP: PATHOLOGIC FINDINGS MAY INCL ULCERATIONS OF ESOPHAGUS & STOMACH. IN SUBACUTE CASES, FATTY DEGENERATION OF LIVER, KIDNEY, & HEART MAY BE PRESENT. (CHRONIC) SKIN: RPTD/PRLNGD CONT W/ANTIMONY CMPDS MAY CAUSE DERM & PAPULES, PUSTULES/LESIONS ON EXPOS (ING 2)

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

HCC:T4
Melt/Freeze Pt:M.P/F.P Text:212F,100C
Spec Gravity:2.6 @ 20C
pH:5-6
Solubility in Water:8.3%
Appearance and Odor:WHITE POWDER OR COLORLESS CRYSTALS WITH SWEET, METALLIC TASTE.

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

Stability Indicator/Materials to Avoid:YES
ACACIA,ALKALIES & THEIR CARBONATES,ANTIPYRINE,ASTRINGENT INFUSIONS, HALOGENATED ACIDS,LEAD SALTS,MERCURY (ING-17)
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC OXIDES OF ANTIMONY AND CARBON.

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

Waste Disposal Methods:OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN DISPOSING OF SUBSTANCE. FOR ASSISTANCE, CONTACT DISTRICT DIRECTOR OF ENVIRONMENTAL PROTECTION AGENCY.

EM SCIENCE -- BAKING SODA, SODIUM ACID CARBONATE, SX0318 -- 6810-00N049713

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

Product ID:BAKING SODA, SODIUM ACID CARBONATE, SX0318
MSDS Date:12/10/1992
FSC:6810
NIIN:00N049713
MSDS Number: BVHZC
=== Responsible Party ===
Company Name:EM SCIENCE
Address:480 DEMOCRAT RD
Box:70
City:GIBBSTOWN
State:NJ
ZIP:08027
Country:US
Info Phone Num:609-345-9200
Emergency Phone Num:800-424-9300(CHEMTREC)
CAGE:DO242
=== Contractor Identification ===
Company Name:E M SCIENCE
Address:480 DEMOCRATE RD
Box:70
City:GIBBSTOWN
State:NJ
ZIP:08027
Country:US
Phone:609-354-9200/800-424-9300(CHEMTREC)
CAGE:0SK29
Company Name:EM SCIENCE
Address:480 DEMOCRAT RD
City:GIBBSTOWN
State:NJ
ZIP:08927
Phone:800-424-9300 (CHEMTREC)
CAGE:DO242

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

Ingred Name:SODIUM BICARBONATE (1:1)
CAS:144-55-8
RTECS #:VZ0950000
Fraction by Wt: 100%
OSHA PEL:N/K
ACGIH TLV:N/K

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

LD50 LC50 Mixture:LD50:(ORAL,RAT) 4220 MG/KG.
Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:MAY CAUSE EYE IRRITATION. TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY PRODUCE ADVERSE MUTAGENIC & REPRODUCTIVE EFFECTS.

Explanation of Carcinogenicity:NOT RELEVANT
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE INDICATED.

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

First Aid:GET MEDICAL ASSISTANCE IF ANY ADVERSE EFFECTS SHOULD DEVELOP. SKIN:WASH THOROUGHLY W/SOAP & WATER. EYE:IMMEDIATELY FLUSH THOROUGHLY W/WATER FOR AT LEAST 15 MINUTES. INHAL:REMOVE TO FRESH AIR; GIVE ART IFICIAL RESPIRATION IF BREATHING HAS STOPPED. INGEST:GET IMMEDIATE MEDICAL ATTENTION; IF CONSCIOUS, GIVE WATER FREELY.

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

Flash Point:NONFLAMMABLE
Extinguishing Media:WATER.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:NONE INDICATED.

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

Spill Release Procedures:EVACUATE AREA OF ALL UNNEC PERS. WEAR SUITABLE PROT EQUIP LISTED UNDER EXPOS/PERSONAL PROT. ELIM ANY IGNIT SOURCES UNTIL AREA IS DETERMINED TO BE FREE FROM EXPLO/FIRE HAZS. CONTAIN RELS & ELIM ITS SOU RCE, IF THIS CAN BE DONE W/OUT RISK. TAKE (SUPDAT)
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:KEEP CONTAINER CLOSED. STORE AT CONTROLLED ROOM TEMPERATURE. DO NOT GET IN EYES. DO NOT TAKE INTERNALLY.
Other Precautions:HANDLING CARE GENERALLY IN KEEPING W/SAFE LABORATORY PRACTICES IS RECOMMENDED.

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

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:MATERIAL SHOULD BE HANDLED OR TRANSFERRED IN AN APPROVED FUME HOOD OR W/ADEQUATE VENTILATION.
Protective Gloves:NEOPRENE OR EQUIVALENT GLOVES.
Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .
Other Protective Equipment:EYE WASH & SAFETY EQUIPMENT SHOULD BE READILY AVAILABLE.
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
MP:252F,122C (DECOMPOSES). SPILL PROC:UP & CONTAINERIZE FOR PROPER DISP AS DESCRIBED UNDER DISP. COMPLY W/FED, STATE & LOC REGS ON REPORTING RELS. REFER TO REGULATORY INFO FOR REPORTABLE QTY & OTHER R EGULATORY DATA.

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

Melt/Freeze Pt:M.P/F.P Text:SUPP DATA
Spec Gravity:2.16 (H*2O=1)
Solubility in Water:SOLUBLE
Appearance and Odor:WHITE CRYSTALLINE POWDER; ODORLESS.

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

Stability Indicator/Materials to Avoid:YES
ACIDS. REACTS VIOLENTLY W/AMMONIUM PHOSPHATE, MONOBASIC.
Stability Condition to Avoid:NONE INDICATED.
Hazardous Decomposition Products:CO*X.

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

Waste Disposal Methods:MATL DOES NOT HAVE EPA WASTE NUMBER & IS NOT A LISTED WASTE, HOWEVER, CONSULTATION W/PERMITTED WASTE DISPOSAL SITE (TSD), SHOULD BE ACCOMPLISHED. ALWAYS CONTACT PERMITTED WASTE DISPOSER (TSD) TO ASSUR E COMPLIANCE W/ALL CURRENT LOC, STATE &FED REGS.

Material Safety Data Sheet

Canada balsam, neutral, filtered.

ACC# 04145

Section 1 - Chemical Product and Company Identification

MSDS Name: Canada balsam, neutral, filtered.
Catalog Numbers: 61232-1000, B10-100
Synonyms: Fir, balsam.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
8007-47-4	Canada balsam	100	232-362-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to green liquid.
Caution! May cause eye, skin, and respiratory tract irritation. The toxicological properties of this material have not been fully investigated.
Target Organs: No data found.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause irritation of the digestive tract.
Inhalation: May cause respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Good general ventilation should be sufficient to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Canada balsam	none listed	none listed	none listed

OSHA Vacated PELs: Canada balsam: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: yellow to green
Odor: fresh green odor
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate:>1
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:0.98
Molecular Formula: Varies
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Oxides of carbon.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 8007-47-4: CP2352500
LD50/LC50:
CAS# 8007-47-4:
Oral, rat: LD50 = >5 gm/kg;
Skin, rabbit: LD50 = >5 gm/kg;
.

Carcinogenicity:
CAS# 8007-47-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not Regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 8007-47-4 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 8007-47-4: immediate.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 8007-47-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
Not available.
Risk Phrases:

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)
CAS# 8007-47-4: No information available.
Canada - DSL/NDSL
CAS# 8007-47-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of Not controlled..
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List

Material Safety Data Sheet

Barium carbonate

ACC# 02340

Section 1 - Chemical Product and Company Identification

MSDS Name: Barium carbonate
Catalog Numbers: AC192520000, AC192520050, AC192520250, AC217490000, AC217495000, AC423440000, AC423445000, B30-100, B30-3, B30-500
Synonyms: None.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
513-77-9	Barium carbonate	>99	208-167-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white to gray white powder.
Warning! Causes eye, skin, and respiratory tract irritation. Harmful if inhaled or swallowed. May cause lung damage. May cause kidney damage. May cause cardiac disturbances. May cause adverse reproductive effects based upon animal studies.
Target Organs: Heart, liver, gastrointestinal system, muscles.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation.
Ingestion: May cause liver damage. Human fatalities have been reported from acute poisoning. The barium ion is a muscle poison causing stimulation and then paralysis. Initial

symptoms are gastrointestinal, including nausea, vomiting, colic, and diarrhea, followed by myocardial and general muscular stimulation with tingling in the extremities. The barium ion is a muscle poison causing stimulation and then paralysis. Initial symptoms are gastrointestinal, including nausea, vomiting, colic, and diarrhea, followed by myocardial and general muscular stimulation with tingling in the extremities. The barium ion is a muscle poison causing stimulation and then paralysis. Initial symptoms are gastrointestinal, including nausea, vomiting, colic, and diarrhea, followed by myocardial and general muscular stimulation with tingling in the extremities.
Inhalation: Harmful if inhaled. May cause respiratory tract irritation. May cause lung damage.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Adverse reproductive effects have been reported in animals. Adverse reproductive effects have been reported in animals.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Rinse area with large amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid breathing dust.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Barium carbonate	none listed	none listed	none listed

OSHA Vacated PELs: Barium carbonate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear impervious gloves.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: white to gray white
Odor: odorless
pH: Not available.
Vapor Pressure: Negligible
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point:811 deg C
Decomposition Temperature: Not available.
Solubility: Negligible in water.
Specific Gravity/Density:4.29 (Water=1)
Molecular Formula: BaCO3
Molecular Weight:197.35

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Dust generation, excess heat.
Incompatibilities with Other Materials: 2-Furanpercarboxylic acid and bromine trifluoride.
Hazardous Decomposition Products: Carbon dioxide, barium oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 513-77-9: CQ8600000; CQ8670000
LD50/LC50:
CAS# 513-77-9:
Oral, mouse: LD50 = 200 mg/kg;
Oral, mouse: LD50 = 200 mg/kg;
Oral, rat: LD50 = 418 mg/kg;
Oral, rat: LD50 = 418 mg/kg;
.

Carcinogenicity:
CAS# 513-77-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No information available.
Reproductive Effects: Maternal: oogenesis/ovaries/fallopian tubes, Ihl, rat TCLo=3130 ug/m3/24H (female 16W pre) Paternal: Spermatogenesis/testes/sprem duct, Ihl, rat

TCLo=1150 ug/m3/24H (male 16W)
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: Marine animals concentrate the element 7-100 times, and marine plants 1000 times from seawater. ... Soybeans and tomatoes also accumulate soil barium 2-20 times. Adsorption of barium was measured in a sandy soil and a sandy loam soil at concn levels closely corresponding to those to be expected for field conditions. In general, sludge solutions appeared to incr the mobility of elements in a soil. This is due to a combination of complexation by dissolved organic cmpd, high background concn and high ionic strengths of the soil solution.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	BARIUM COMPOUNDS, N.O.S.	BARIUM COMPOUNDS NOS (BARIUM CARBONATE)
Hazard Class:	6.1	6.1
UN Number:	UN1564	UN1564
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 513-77-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 513-77-9: immediate, delayed.

Section 313

This material contains Barium carbonate (listed as Barium compounds, n.o.s.), >99%, (CAS# 513-77-9) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 513-77-9 can be found on the following state right to know lists: New Jersey, (listed as Barium compounds, n.o.s.), Pennsylvania, (listed as Barium compounds, n.o.s.).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 20/22 Harmful by inhalation and if swallowed.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.
S 28 After contact with skin, wash immediately with...

WGK (Water Danger/Protection)

CAS# 513-77-9: 0

Canada - DSL/NDSL

CAS# 513-77-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 513-77-9 is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Barium chloride, anhydrous

ACC# 02370

Section 1 - Chemical Product and Company Identification

MSDS Name: Barium chloride, anhydrous
Catalog Numbers: AC612281000, B31-100C, B31-500, B35
Synonyms: Barium dichloride.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10361-37-2	Barium chloride	> 97	233-788-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.
Warning! Causes eye, skin, and respiratory tract irritation. Harmful if inhaled or swallowed. May cause lung damage. May cause cardiac disturbances. May cause kidney damage.
Target Organs: Kidneys, heart, respiratory system, muscles.

Potential Health Effects

Eye: Contact produces irritation, tearing, and burning pain. May cause conjunctivitis.
Skin: Causes skin irritation. Prolonged contact with the skin, especially if the skin is wet or moist, causes necrosis.
Ingestion: Harmful if swallowed. May cause kidney damage. The barium ion is a muscle poison causing stimulation and then paralysis. Initial symptoms are gastrointestinal,

including nausea, vomiting, colic, and diarrhea, followed by myocardial and general muscular stimulation with tingling in the extremities. Barium chloride affects the muscles (especially the smooth muscles of the cardiovascular and respiratory systems), causes salivation, tingling of the mouth or face, convulsions, numbness, muscle paralysis, respiratory failure, slow pulse rate, pulmonary edema, irregular heart beat, potassium deficiency in the
Inhalation: Harmful if inhaled. Causes respiratory tract irritation. May cause effects similar to those described for ingestion.
Chronic: Chronic exposure may cause effects similar to those of acute exposure.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Do NOT use mouth-to-mouth resuscitation.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not ingest or inhale.
Storage: Store in a cool, dry place.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Barium chloride	none listed	0.5 mg/m3 TWA (as Ba) 50 mg/m3 IDLH	none listed

OSHA Vacated PELs: Barium chloride: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: odorless
pH: Not available.
Vapor Pressure: Negligible.
Vapor Density: Not applicable.
Evaporation Rate: Negligible.
Viscosity: Not available.

Boiling Point: 1560 deg C
Freezing/Melting Point:960 deg C
Decomposition Temperature: Not available.
Solubility: 59% @ 100°C
Specific Gravity/Density:3.86
Molecular Formula: BaCl2
Molecular Weight:208.27

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Dust generation, excess heat.
Incompatibilities with Other Materials: Bromine trifluoride, Furan-2-peroxycarboxylic acid.
Hazardous Decomposition Products: Hydrogen chloride, chlorine.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 10361-37-2: CQ8750000
LD50/LC50:
CAS# 10361-37-2:
Oral, mouse: LD50 = 150 mg/kg;
Oral, rat: LD50 = 118 mg/kg;
Oral, rat: LD50 = 397 mg/kg;
.

Carcinogenicity:
CAS# 10361-37-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.

Environmental: Barium chloride accumulates in plants when it exceeds calcium and magnesium levels in soil.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	BARIUM COMPOUNDS, N.O.S.	BARIUM COMPOUNDS, N.O.S. (BARIUM CHLORIDE)
Hazard Class:	6.1	6.1
UN Number:	UN1564	UN1564
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 10361-37-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 10361-37-2: immediate, delayed.

Section 313

This material contains Barium chloride (listed as Barium compounds, n.o.s.), > 97%, (CAS# 10361-37-2) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10361-37-2 can be found on the following state right to know lists: New Jersey, (listed as Barium compounds, n.o.s.), Pennsylvania, (listed as Barium compounds, n.o.s.).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 25 Toxic if swallowed.

R 20 Harmful by inhalation.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 10361-37-2: 1

Canada - DSL/NDSL

CAS# 10361-37-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 10361-37-2 is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Barium hydroxide, anhydrous

ACC# 02420

Section 1 - Chemical Product and Company Identification

MSDS Name: Barium hydroxide, anhydrous
Catalog Numbers: 61242-2500, 61242-5000, B47-250, B47-500
Synonyms: Barium dihydroxide.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
17194-00-2	Barium hydroxide anhydrous	>95	241-234-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: transparent solid.
Danger! Causes burns by all exposure routes. Harmful if inhaled or swallowed. May cause blood abnormalities. May cause kidney damage. May cause central nervous system effects.
Target Organs: Kidneys, central nervous system, respiratory system, gastrointestinal system, muscles, cardiovascular system, eyes, skin.

Potential Health Effects

Eye: Causes eye burns.
Skin: Causes skin burns.
Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause respiratory failure. May cause kidney failure. May

cause convulsions, increased blood pressure, muscle spasms, and possible paralysis.
Inhalation: Harmful if inhaled. Causes chemical burns to the respiratory tract.
Chronic: Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid immediately.
Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.
Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.
Antidote: The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Decomposes at high temperatures, resulting in toxic and corrosive products.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Use only with adequate ventilation.
Storage: Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from strong acids. Corrosives area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Barium hydroxide anhydrous	0.5 mg/m3 TWA (as Ba) (listed under Barium, soluble compounds).	0.5 mg/m3 TWA (as Ba, except barium sulfate) (listed under Barium, soluble compounds).	0.5 mg/m3 TWA (as Ba) (listed under Barium, soluble compounds).

OSHA Vacated PELs: Barium hydroxide anhydrous: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: transparent
Odor: odorless
pH: Alkaline.

Vapor Pressure: Negligible.
Vapor Density: 10.9
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: 780 deg C
Freezing/Melting Point:78 deg C
Decomposition Temperature: Not available.
Solubility: Moderately in water (5.6 g/100 ml)
Specific Gravity/Density:2.18
Molecular Formula: BaH2O2
Molecular Weight:171.34

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Substance readily absorbs carbon dioxide from air.
Conditions to Avoid: Dust generation, excess heat.
Incompatibilities with Other Materials: Metals, strong oxidizing agents, acids.
Hazardous Decomposition Products: Barium oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 17194-00-2: CQ9200000
LD50/LC50:
CAS# 17194-00-2:
Oral, rat: LD50 = 308 mg/kg;
.

Carcinogenicity:
CAS# 17194-00-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	CORROSIVE SOLIDS, TOXIC, N.O.S.	CORROSIVE SOLID, TOXIC, N.O.S.
Hazard Class:	8	8
UN Number:	UN2923	UN2923
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 17194-00-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes

CAS # 17194-00-2: immediate, delayed.

Section 313

This material contains Barium hydroxide anhydrous (listed as Barium compounds, n.o.s.), >95%, (CAS# 17194-00-2) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 17194-00-2 can be found on the following state right to know lists: California, (listed as Barium, soluble compounds), New Jersey, (listed as Barium compounds, n.o.s.), Pennsylvania, (listed as Barium compounds, n.o.s.), Minnesota, (listed as Barium, soluble compounds).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 20/22 Harmful by inhalation and if swallowed.

R 34 Causes burns.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 17194-00-2: 1

Canada - DSL/NDSL

CAS# 17194-00-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 17194-00-2 (listed as Barium, soluble compounds) is listed on the Canadian Ingredient Disclosure List.

FISHER SCIENTIFIC CO -- BARIUM NITRATE -- 6810-00-174-9658

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

Product ID:BARIUM NITRATE
MSDS Date:10/13/1989
FSC:6810
NIIN:00-174-9658
MSDS Number: BMDMR
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC CO
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410
Country:US
Info Phone Num:201-796-7100
Emergency Phone Num:201-796-7100
Preparer's Name:GASTON PILLORI
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:BARIUM NITRATE
CAS:10022-31-8
RTECS #:CQ9625000
Fraction by Wt: 100%
Other REC Limits:NONE SPECIFIED

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

LD50 LC50 Mixture:ORAL LD50 (RAT) IS 355 MG/KG
Routes of Entry: Inhalation:NO Skin:NO Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE: INHALATION- IRRITATION OF
RESPIRATORY SYSTEM. SAME AS INGESTION. EYES- IRRITATION. SKIN-
IRRITATION. INGESTION- SEVERE GI TRACT IRRITATION, HYPOKALEMIA, CNS
DEPRESSION, KIDNEY DAMAGE OR FAILURE . CHRONIC: ANEMIA, NEPHRITIS,
CONJUNCTIVITIS.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:INHALATION: SORE THROAT, COUGHING, LABORED
BREATHING. EYES: BURNING SENSATION, STINGING, REDNESS, TEARING.
SKIN: REDNESS, ITCHING, PAIN. INGESTION: NAUSEA, VOMITING,
DIARRHEA, METALLIC TASTE, DIZZINES S, CONVULSIVE TREMORS, RINGING
IN EARS,POSSIBLE PARALYSIS, WEAKNESS.
Medical Cond Aggravated by Exposure:PRE-EXISTING CHRONIC REPIRATORY,

CARDIVASCULAR, OR SKIN DISEASES.

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

First Aid:INHALATION: REMOVE TO FRESH AIR. RESUSCITATE IF NEEDED. GET IMMEDIATE MEDICAL ATTENTION. EYES: FLUSH WITH WATER FOR 15 MINUTES. SEE DOCTOR. SKIN: REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER . INGESTION: INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY. TREAT SUPPOTIVELY AND SYSTEMATICALLY.

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

Flash Point:NONE
Extinguishing Media:DRY CHERMICAL, CARBON DIOXIDE, HALON, WATER SPRAY
Fire Fighting Procedures:WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE GEAR. REMOVE CONTAINERS FROM FIRE IF IT CAN BE DONE AT NO RISK.
Unusual Fire/Explosion Hazard:OXIDIZER. RELEASES OXYGEN ON BEING HEATED. HEATING COULD RESULT IN IGNITION, VIOLENT COMBUSTION, OR EXPLOSION.

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

Spill Release Procedures:ISOLATE AREA AND DENY ENTRY. DO NOT TOUCH SPILLED MATERIAL. KEEP COMBUSTIBLES AWAY FROM SPILL AREA. SCOOP UP MATERIAL AND PLACE IN A CLEAN CONTAINER FOR LATER DISPOSAL. SUBJECT TO SARA SECTION 313 ANN UAL TOXIC CHEMICAL RELEASE REPORTING.
Neutralizing Agent:SEE SUPPLEMENTAL INSTRUCTIONS.

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

Handling and Storage Precautions:AVOID STORING ON WOODEN FLOORS. SEPARATE FROM COMBUSTIBLES, ORGANIC, AND OTHER EASILY OXIDIZED MATERIALS.
Other Precautions:PROTECT FROM PHYSICAL DAMAGE. IMMEDIATELY CLEAN UP ANY SPILLS. AVOID CONTACT WITH EYES AND SKIN. MATERIAL MAY BE POISONOUS OR CORROSIVE.

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

Respiratory Protection:USE NIOSH/MSHA APPROVED RESPIRATOR FOR DUSTS. 250 MG/M3 = IDLH; IF THIS IS SITUATION WEAR SELF-CONTAINED BREATHING APPARATUS.
Ventilation:PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION.
Protective Gloves:PVC, NITRILE
Eye Protection:SAFETY GLASSES/CHEMICAL SPLASH GOGGLES
Other Protective Equipment:IMPERVIOUS CLOTHING TO PREVENT REPEATED OR PROLONGED CONTACT. EYE WASH STATION & SAFETY SHOWER.
Work Hygienic Practices:WASH AFTER USE. DO NOT EAT, DRINK, OR SMOKE UNTIL HANDS ARE WASHED. LAUNDER CLOTHING BEFORE REUSE.
Supplemental Safety and Health
NEUTRALIZATION: AFTER SOOPING UP MATERIAL; RINSE AREA WITH WATER; APPLY A SOLUTION OF ACIDIC FERROUS SULFATE (10 GMS FERROS SULFATE AND 2 ML SULFURIC ACID PER 100 ML WATER). LET REMAIN 5 MINUTES. ABSO RB ORINSE TO SEWER. TREAT WITH 20 % SODIUM BICARBONATE UNTIL BUBLING STOPS. REMOVE WASTES. RINSE WITH WATER.

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

HCC:D2
NRC/State Lic Num:NOT RELEVANT
Boiling Pt:B.P. Text:DECOMPOSES
Melt/Freeze Pt:=592.2C, ######F
Spec Gravity:3.24
Solubility in Water:APPRECIABLE
Appearance and Odor:ODORLESS, COLORLESS CRYSTALS

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

Stability Indicator/Materials to Avoid:YES
COMBUSTIBLES, REDUCING MATERIALS, PHOSPHATES, ESTERS, PHOPHOROUS, TIN CHLORIDE
Stability Condition to Avoid:HIGH TEMPERATURES
Hazardous Decomposition Products:TOXIC OXIDES OF NITROGEN AND BARIUM

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

Waste Disposal Methods:CONTACT LOCAL ENVIRONMENTAL MANAGER. DISPOSE OF IN ACCORDANCE WITH REQUIREMENTS OF 40 CFR 262, EPA HAZARDOUS WASTE NUMBER D005. CERCLA SECTION 103 REPORTABLE QUANTITY= 100 LBS. DISPOSE OF IN ACCORDANC E WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Material Safety Data Sheet

Bentonite

ACC# 02585

Section 1 - Chemical Product and Company Identification

MSDS Name: Bentonite
Catalog Numbers: B235-500
Synonyms: Bentonite magma; Southern bentonite; tixoton; VOLCLAY bentonite; Wilkinite.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
1302-78-9	BENTONITE	100	215-108-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: cream to gray brown powder.
Warning! Causes eye, skin, and respiratory tract irritation. May cause cancer based on animal studies. Hygroscopic (absorbs moisture from the air). The toxicological properties of this material have not been fully investigated.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation. May cause chemical conjunctivitis.
Skin: Causes skin irritation.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. The toxicological properties of this substance have not been fully investigated.
Inhalation: Causes respiratory tract irritation. The toxicological properties of this substance

have not been fully investigated. When inhaled as a dust or fume, may cause benign pneumoconiosis. Can produce delayed pulmonary edema.
Chronic: May cause cancer according to animal studies. Effects may be delayed. Chronic inhalation may cause lung changes, chest pain, breath shortness, and bronichitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Wash clothing before reuse.
Storage: Store in a cool, dry place. Store in a tightly closed container. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
BENTONITE	none listed	none listed	none listed

OSHA Vacated PELs: BENTONITE: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: cream to gray brown
Odor: odorless
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density: Not available.

Molecular Formula: Not applicable.
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Hygroscopic: absorbs moisture or water from the air.
Conditions to Avoid: Incompatible materials, excess heat, exposure to moist air or water.
Incompatibilities with Other Materials: Moisture, Increase volume significantly when water is added..
Hazardous Decomposition Products: Exposure to moist air or water.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 1302-78-9: CT9450000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 1302-78-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information foundEffects of Bentonite in workers in processing plant experienced a very high incidence of bronchial asthma, (25%) in workers examined. This was attributed to the irritating action of the bentonite dust on the bronchial epithelium.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 1302-78-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 1302-78-9 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 1302-78-9: No information available.

Canada - DSL/NDSL

CAS# 1302-78-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Material Safety Data Sheet

Bismuth

ACC# 03180

Section 1 - Chemical Product and Company Identification

MSDS Name: Bismuth
Catalog Numbers: S75054, S79921
Synonyms: None
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-69-9	Bismuth		231-177-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver- white or red solid.
Caution! May cause eye and skin irritation. May cause respiratory tract irritation. May cause digestive tract irritation with nausea, vomiting, and diarrhea. May cause central nervous system effects. May cause liver and kidney damage.
Target Organs: Kidneys, liver, nervous system.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause mild skin irritation. Low hazard for usual industrial handling. Repeated or prolonged exposure may cause a bismuth line or black spots on the gums, foul breath and salivation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May

cause headache. May cause fever, rheumatic
Inhalation: May cause respiratory tract irritation.
Chronic: Repeated or prolonged exposure may cause a bismuth line or black spots on the gums, foul breath and salivation.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Flammable when exposed to flame.
Extinguishing Media: For small fires, use water spray, dry chemical, carbon dioxide or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Remove all sources of ignition.

Section 7 - Handling and Storage

Handling: Remove all sources of ignition. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Keep away from heat, sparks and flame. Avoid ingestion and inhalation.
Storage: Keep away from heat and flame. Keep away from sources of ignition. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Bismuth	none listed	none listed	none listed

OSHA Vacated PELs: Bismuth: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: silver- white or red
Odor: odorless
pH: Not available.
Vapor Pressure: 1 mm Hg @1021.1 deg C
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not available.
Boiling Point: 1420 deg C
Freezing/Melting Point:271.3 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density:9.80

Molecular Formula: Bi
Molecular Weight:208.984

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: High temperatures, incompatible materials, ignition sources, strong oxidants.
Incompatibilities with Other Materials: Incompatible with aluminum and air, ammonium nitrate, chloric acid, chlorine, iodine pentafluoride, nitric acid, perchloric acid, nitrosyl fluoride, iodine pentafluoride and oxidizing agents.
Hazardous Decomposition Products: Bismuth oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-69-9: EB2600000
LD50/LC50:
CAS# 7440-69-9:
Oral, mouse: LD50 = 10 gm/kg;
Oral, rat: LD50 = 5000 mg/kg;
.

Carcinogenicity:
CAS# 7440-69-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7440-69-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7440-69-9: immediate, fire.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-69-9 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 7440-69-9: No information available.

Canada - DSL/NDSL

CAS# 7440-69-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Material Safety Data Sheet

Bleach

ACC# 91020

Section 1 - Chemical Product and Company Identification

MSDS Name: Bleach
Catalog Numbers: S72823
Synonyms:
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7681-52-9	Sodium hypochlorite	5.0	231-668-3
497-19-8	Sodium carbonate anhydrous	<1.0	207-838-8
7732-18-5	Water	Balance	231-791-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear pale yellow liquid.
Danger! Corrosive. Causes eye and skin burns. Causes digestive tract burns. Harmful if inhaled. Causes respiratory tract irritation. May cause methemoglobinemia.
Target Organs: Blood.

Potential Health Effects

Eye: May cause irreversible eye injury. Contact with liquid is corrosive to the eyes and causes severe burns.
Skin: Causes skin burns.

Ingestion: May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. Methemoglobinemia is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), rapid heart rate and chocolate-brown colored blood.
Inhalation: Harmful if inhaled. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. May cause pulmonary edema and severe respiratory disturbances.
Chronic: Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed.
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated.
Extinguishing Media: Do NOT get water inside containers. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Discard contaminated shoes.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium hypochlorite	none listed	none listed	none listed
Sodium carbonate anhydrous	none listed	none listed	none listed
Water	none listed	none listed	none listed

OSHA Vacated PELs: Sodium hypochlorite: No OSHA Vacated PELs are listed for this chemical. Sodium carbonate anhydrous: No OSHA Vacated PELs are listed for this chemical. Water: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear pale yellow
Odor: odor of hypochlorites
pH: Not available.
Vapor Pressure: 14 mm Hg
Vapor Density: 2.58
Evaporation Rate:>1.0
Viscosity: Not available.
Boiling Point: 100 deg C
Freezing/Melting Point:0 deg C
Decomposition Temperature: Not available.
Solubility: Soluble.
Specific Gravity/Density:1.07
Molecular Formula: Not available.
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, combustible materials.
Incompatibilities with Other Materials: Sodium hypochlorite is incompatible with amines, ammonia, ammonium acetate, ammonium carbonate, ammonium nitrate, ammonium oxalate, ammonium phosphate, cellulose, and ethyleneimine, strong acids, reducing agents, amines, and ammonia salts.
Hazardous Decomposition Products: Hydrogen chloride, chlorine, sodium oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7681-52-9: NH3486300
CAS# 497-19-8: VZ4050000
CAS# 7732-18-5: ZC0110000
LD50/LC50:
CAS# 7681-52-9:
Draize test, rabbit, eye: 10 mg Moderate;
Draize test, rabbit, eye: 1.31 mg Mild;
Oral, mouse: LD50 = 5800 mg/kg;
.

CAS# 497-19-8:
Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, eye: 50 mg Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 1200 mg/m3/2H;
Inhalation, rat: LC50 = 2300 mg/m3/2H;
Oral, mouse: LD50 = 6600 mg/kg;
Oral, mouse: LD50 = 6600 mg/kg;
Oral, rat: LD50 = 4090 mg/kg;
.

CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;
.

Carcinogenicity:
CAS# 7681-52-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 497-19-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	HYPOCHLORITE SOLUTIONS	No information available.

Hazard Class:	8	
UN Number:	UN1791	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7681-52-9 is listed on the TSCA inventory.
CAS# 497-19-8 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7681-52-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7681-52-9: immediate.
CAS # 497-19-8: immediate.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 7681-52-9 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7681-52-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 497-19-8 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 31 Contact with acids liberates toxic gas.
R 34 Causes burns.

Safety Phrases:

S 28 After contact with skin, wash immediately with...
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 50 Do not mix with ... (to be specified by the manufacturer).
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 7681-52-9: 2
CAS# 497-19-8: 1
CAS# 7732-18-5: No information available.

Canada - DSL/NDSL

CAS# 7681-52-9 is listed on Canada's DSL List.
CAS# 497-19-8 is listed on Canada's DSL List.
CAS# 7732-18-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7681-52-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 497-19-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Info

Material Safety Data Sheet

Boric acid

ACC# 03260

Section 1 - Chemical Product and Company Identification

MSDS Name: Boric acid
Catalog Numbers: AC180570000, AC180570010, AC180570025, AC217080000, AC217085000, AC315180000, AC315181000, AC327130000, AC327130010, AC423480000, 42348-0020, 42348-5000, A73-1, A73-10, A73-10LC, A73-3, A73-325LB, A73-50, A73-500, A7350LC, A74-1, A74-10, A74-3, A74-500, A74-500LC, A77-10, A77-NHL, A78-10, A78-500, A79-12, A79-212, BP168-1, BP168-500, NC9269806, NC9974905
Synonyms: Boracic acid; Hydrogen borate; Orthoboric acid.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10043-35-3	Boric acid	99+	233-139-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white powder.
Warning! May impair fertility. Causes eye and skin irritation. May cause respiratory tract irritation.
Target Organs: Blood, kidneys, heart, central nervous system, liver, spleen, gastrointestinal system, eyes, reproductive system, skin.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May cause nausea and vomiting. May be harmful if swallowed. CNS effects (excitement or depression, lethargy, headache, coma, seizures), dehydration, arrhythmias, shock and metabolic acidosis have been reported in extreme adult and pediatric cases.
Inhalation: May cause respiratory tract irritation. May be harmful if inhaled.
Chronic: Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney damage. Repeated exposure may cause central nervous system damage. Repeated exposure may cause damage to the spleen. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause blood effects. May impair fertility.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Boric acid	2 mg/m3 TWA (inhalable fraction, listed under Borate compounds, inorganic); 6 mg/m3 STEL (inhalable fraction, listed under Borate compounds, inorganic)	none listed	none listed

OSHA Vacated PELs: Boric acid: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: white
Odor: odorless
pH: 3.8 - 4.8 (33g/L aq.sol.)
Vapor Pressure: 2.7 mbar @ 20 deg C
Vapor Density: Not available.

Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:169 deg C
Decomposition Temperature:100 deg C
Solubility: 49.5 g/L @ 20°C
Specific Gravity/Density: Not available.
Molecular Formula:H3BO3
Molecular Weight:61.83

Section 10 - Stability and Reactivity

Chemical Stability: Moisture sensitive.
Conditions to Avoid: Incompatible materials, dust generation, excess heat, exposure to moist air or water.
Incompatibilities with Other Materials: Caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), acetic anhydride, alkali carbonates, strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, oxides of boron.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 10043-35-3: ED4550000; ED4560000
LD50/LC50:
CAS# 10043-35-3:
Oral, mouse: LD50 = 3450 mg/kg;
Oral, rat: LD50 = 2660 mg/kg;
Oral, rat: LD50 = 2500 mg/kg;
.

Carcinogenicity:
CAS# 10043-35-3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: Teratogenic effects have occurred in experimental animals.
Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.
Mutagenicity: No information foundMutation in microorganisms:See actual entry in RTECS for complete information.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea Daphnia: LC50 = 115.0-153.0 mg/L; 48 Hr.; Static ConditionFish: Rainbow trout: LC50=150mg B/L; 24-day; Fish: Goldfish: LC50=46mg B/L; 7-day; Mosquito fish (fresh water) TLm=1800 ppm/24H Mosquito fish (fresh water) TLm=1800 ppm/24H
Environmental: Boric acid is a water-soluble white powder that may, at high concentrations, cause damage to trees or vegetation by root absorption.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated.	Not regulated.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 10043-35-3 is listed on the TSCA inventory.
Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 10043-35-3: immediate, delayed.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10043-35-3 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 60 May impair fertility.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 10043-35-3: 1

Canada - DSL/NDSL

CAS# 10043-35-3 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those

regulations.

Canadian Ingredient Disclosure List

CAS# 10043-35-3 is listed on the Canadian Ingredient Disclosure List.

ALDRICH CHEMICAL CO INC -- 28914-0, CADMIUM CARBONATE, POWDER, CA 1 (SUPDAT) -- 6810-00N056958

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

Product ID:28914-0, CADMIUM CARBONATE, POWDER, CA 1 (SUPDAT)
MSDS Date:05/02/1994
FSC:6810
NIIN:00N056958
MSDS Number: BWLZW
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 W ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

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

Ingred Name:CARBONIC ACID, CADMIUM SALT; (CADMIUM CARBONATE POWDER, CA
    2 MICRON)
CAS:513-78-0
RTECS #:FF9320000
Fraction by Wt: 98%
OSHA PEL:N/K
ACGIH TLV:N/K

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

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:ACUTE:HARMFUL IF SWALLOWED, INHALED,
    OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION.
Explanation of Carcinogenicity:CADMIUM CARBONATE:IARC MONO ON EVAL OF
    CARCINOGENIC RISK OF CHEM TO MAN, VOL 58, PG 119, 1993:GROUP 1. NTP
    7TH (SUPDAT)
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

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

First Aid:EYES/SKIN:IMMED FLUSH WITH COPIOUS AMTS OF WATER FOR @ LEAST 15 MINS WHILE REMOVING CONTAMINATED CLTHG & SHOES. INHAL:REMOVE TO FRESH AIR, IF NOT BRTHG GIVE ARTF RESP. IF BRTHG IS DFCLT, GIVE OXYGEN. INGEST:WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL PHYSICIAN. WASH THORO AFTER HANDLING. DISCARD CONTAMD CLOTHING & SHOES.

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

Extinguishing Media:NONCOMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:THIS MATL, LIKE MOST MATLS IN POWDER FORM, IS CAPABLE OF CREATING DUST EXPLOSION. REACTS VIOLENTLY WITH POTASSIUM.

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

Spill Release Procedures:EVACUATE AREA. WEAR NIOSH/MSHA SCBA, RUBBER BOOTS & HEAVY RUBB GLOVES. SWEEP UP, PLACE IN BAG & HOLD FOR WASTE DISP. AVOID RAISING DUST. VENTILATE AREA & WASH SPILL SITE AFTER MATL PICKUP IS COMPLETE.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:TOXIC. HARMFUL. MAY CAUSE CANCER. HARMFUL BY INHAL, IN CONT W/SKIN & IF SWALLOWED. DANGER; CONTAINS CADMIUM. AVOID CREATING DUST.
Other Precautions:CAN CAUSE LUNG & KIDNEY DISEASE. IN CASE OF ACCIDENT/IF YOU FEEL UNWELL, SEEK MED ADVICE IMMED (SHOW LABEL WHERE POSS). TAKE OFF IMMED ALL CONTAMD CLTHG. WEAR SUITABLE PROT CLTHG, GLOVES & EYE/FACE PR OTECTION.

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

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:CHEMICAL FUME HOOD.
Protective Gloves:CHEMICAL-RESISTANT GLOVES.
Eye Protection:ANSI APPRVD SAFETY GOGGLES .
Other Protective Equipment:OTHER PROTECTIVE CLOTHING.
Work Hygienic Practices:WASH THORO AFTER HANDLING.
Supplemental Safety and Health
MFG TRADE NAME/PART NO:MICRON, 98%. EXPLAN OF CARCIN:ANNUAL REPORT ON CARCIN, 1994:ANTIC TO BE CARCINOGEN. WASTE DISP METH:EXCESS SULFIDE W/SODIUM HYPOCHLORITE. NEUT SOLN BEFORE FLUSHING DOWN DRAIN. O BSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

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

Evaporation Rate & Reference:NOT KNOWN
Solubility in Water:NOT KNOWN
Appearance and Odor:WHITE POWDER

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

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC FUMES.

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

Waste Disposal Methods:MATL SHOULD BE DISSOLVED IN 1)WATER; 2) ACID SOLN OR 3) OXIDIZED TO WATER-SOLUBLE STATE. PRECIPITATE MATL AS SULFIDE, ADJUSTING PH OF SOLN TO 7 TO COMPLETE PRECIPITATION. FILTER INSOLUBLES & DISPOSE O F THEM IN HAZ WASTE SITE. DESTROY ANY (SUPDAT)

FISHER SCIENTIFIC -- CADMIUM SULFATE OCTAHYDRATE, C-19 -- 6810-00N036470

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

Product ID:CADMIUM SULFATE OCTAHYDRATE, C-19
MSDS Date:03/28/1991
FSC:6810
NIIN:00N036470
MSDS Number: BQQZK
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC
Address:1 REAGENT LANE
City:FAIR LAWN
State:NJ
ZIP:07410
Country:US
Info Phone Num:201-796-7100
Emergency Phone Num:201-796-7100;800-424-9300(CHEMTREC)
CAGE:1B464
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address:1 REAGENT LANE
Box:City:FAIRLAWN
State:NJ
ZIP:07410-2802
Country:US
Phone:201-796-7100
CAGE:1B464

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

Ingred Name:ING 7:COURSES. AFTER FIRST COURSE, SUBSEQUENT COURSES
SHOULD NOT EXCEED 50 MG/KG/DAY. DAILY URINALYSES SHOULD BE (ING 9)
RTECS #:9999999ZZ

Ingred Name:ING 8:DONE DURING TREATMENT PERIOD. DOSAGE SHOULD BE
REDUCED IF ANY UNUSUAL URINARY FINDINGS APPEAR. FOR (ING 10)
RTECS #:9999999ZZ

Ingred Name:ING 9:INTRAMUSCULAR ADMIN, GIVE 20% SOLN (200 MG/ML), 12.5
MG/KG BODY WT EVERY 4-6 HRS. DILUTE EACH DOSE W/AN (ING 11)
RTECS #:9999999ZZ

Ingred Name:ING 10:EQUAL VOL OF 1% PROCAINE. DOSE LIMITATION IS SAME AS
THAT GIVEN ABOVE. ANTIDOTE SHOULD BE ADMIN BY (ING 12)
RTECS #:9999999ZZ

Ingred Name:ING 11:QUALIFIED MED PERSONNEL.
RTECS #:9999999ZZ

Ingred Name:WASTE DISP METH:CONTACT THE DISTRICT DIRECTOR OF THE EPA.
RTECS #:9999999ZZ

Ingred Name:RESP PROT:MODE. SUPPLIED-AIR RESP W/FULL FACEPIECE OPERATED
IN PRESS-DEMAND OR OTHER POS PRESS MODE IN (ING 15)
RTECS #:9999999ZZ

Ingred Name:ING 14:COMBINATION W/AN AUXILIARY SCBA OPERATED IN PRESS-DEMAND OR OTHER POS PRESS MODE. ESCAPE:AIR-PURIFYING (ING 16)
RTECS #:9999999ZZ

Ingred Name:ING 15:FULL FACEPIECE RESPIRATOR W/HIGH-EFFICIENCY PARTICULATE FILTER. ESCAPE-TYPE SCBA.
RTECS #:9999999ZZ

Ingred Name:CADMIUM SULFATE (1:1) HYDRATE (3:8); (CADMIUM SULFATE OCTAHYDRATE). PEL:0.1 MG(CD)/M3
CAS:7790-84-3
RTECS #:EV2850000
Fraction by Wt: 100%
OSHA PEL:SEE INGREDIENT NAME
ACGIH TLV:0.01 MG(CD)/M3

Ingred Name:FIRST AID PROC:NO CHEM REMAINS (15-20 MINS). GET MD IMMED. INGEST:GIVE MILK OR BEATEN EGGS EVERY 4 HRS TO (ING 3)
RTECS #:9999999ZZ

Ingred Name:ING 2:RELIEVE GI IRRIT. REMOVE UNABSORBED CADMIUM BY CATHARSIS W/FLEET'S PHOSPHO-SODA, 30-60 ML DILUTED 1:4 IN (ING 4)
RTECS #:9999999ZZ

Ingred Name:ING 3:WATER. TREATMENT MUST BE ADMIN BY MED PERS. ANTIDOTE: CADMIUM POISONING:DO NOT GIVE DIMERCAPROL (BAL). IF (ING 5)
RTECS #:9999999ZZ

Ingred Name:ING 4:SYMPS PERSIST, ADMIN OF CALCIUM DISODIUM EDETATE IS RECOM. GIVE 15-25 MG/KG (0.08-0.125 ML OF 20% SOLN PER (ING 6)
RTECS #:9999999ZZ

Ingred Name:ING 5:KILOGRAM OF BODY WT) IN 250-500 ML OF 5% DEXTROSE IV OVER 1-2 HR PERIOD, TWICE DAILY. MAX DOSE SHOULD NOT (ING 7)
RTECS #:9999999ZZ

Ingred Name:ING 6:EXCEED 50 MG/KG/DAY. THE DRUG SHOULD BE GIVEN IN 5-DAY COURSES W/A REST PERIOD OF AT LEAST 2 DAYS BETWEEN (ING 8)
RTECS #:9999999ZZ

========== 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:YES
Health Hazards Acute and Chronic:ACUTE: INHAL:4-10 HRS AFTER INHALING FUMES/DUST OF CADMIUM CMPDS, TIGHTNESS IN CHEST/SUBSTERNAL PAIN, DYSPNEA & COUGH W/HEMOPTYSIS, FOLLOWED BY PNEUMONITIS & PULM EDEMA MAY OCCUR. IN SEV CASES, SYMPS MAY BE PROGRESSIVE, W/DEATH IN 7-10 DAYS. BLOOD DISORDERS & LIVER/RENAL DAM MAY OCCUR. HDCH, MUSCLE (EFTS OF OVEREXP)
Explanation of Carcinogenicity:CADMIUM SULFATE OCTAHYDRATE: GROUP 2A (IARC); ANTICIPATED TO BE A CARCINOGEN (NTP); OSHA REGULATED.
Effects of Overexposure:HLTH HAZ:ACHE, NAUS, VOM & DIARR ARE POSS. SKIN/EYES:MAY CAUSE IRRIT. INGEST:CADMIUM SALTS MAY CAUSE HDCH, MUSCLE ACHES, SALIVATION, NAUS, VOM, ABDOM PAIN, DIARR, LIVER/KIDNEY DAM & RENAL FAILURE. CHR ONIC: INHAL:RPTD/PRLNGD EXPOS

TO CADMIUM CMPDS MAY CAUSE EMPHYSEMA, RENAL/LIVER DAM, ANEMIA, WEIGHT LOSS, (SUPP DATA)
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

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

First Aid:INHAL:REMOVE TO FRESH AIR IMMED. IF BRTHG HAS STOPPED, PERFORM ARTF RESP. KEEP PERS WARM/AT REST. TREAT SYMPTOMATICALLY/SUPPORTIVELY. GET MD IMMED. SKIN:REMOVE CONTAMD CLTHG/SHOES IMMED. WASH AFFECTED AREA W/SOAP/MILD DETERGENT & LGE AMTS OF WATER UNTIL NO CHEM REMAINS (15-20 MINS). GET MD IMMED. EYES:WASH IMMED W/LGE AMTS OF WATER/NORM SALINE, OCCASNLY LIFTING UPPER/LOWER LIDS, UNTIL (ING 2)

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

Extinguishing Media:DRY CHEM, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM. FOR LGR FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP . MOVE CONTR FROM FIRE AREA IF YOU CAN W/OUT RISK. AVOID BRTHG VAPORS/DUST. KEEP UPWIND.
Unusual Fire/Explosion Hazard:NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

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

Spill Release Procedures:OCCUPATIONAL SPILL:STOP LEAK IF YOU CAN W/OUT RISK. SMALL SPILL:TAKE UP W/SAND OR OTHER ABSORBENT MATERIAL & PLACE INTO CLEAN, DRY CONTAINER FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE H AZARD AREA & DENY ENTRY.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:AVOID CONTACT W/STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS OR OPEN FLAME.
Other Precautions:NONE SPECIFIED BY MANUFACTURER.

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

Respiratory Protection:SPECIFIC RESP SELECTED MUST BE BASED ON CONTAM LEVELS FOUND IN WORK PLACE, MUST NOT EXCEED WORKING LIMITS OF RESP & BE APPRVD BY NIOSH/MSHA. AT ANY DETECTABLE CONC: SCBA W/FULL FACEPIECE OPERATED IN P RESS-DEMAND OR OTHER POS PRESS (ING 14)
Ventilation:PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.
Protective Gloves:PROTECTIVE GLOVES.
Eye Protection:CHEM WORK GOG W/FULL LENGTH FSHLD
Other Protective Equipment:PROTECTIVE (IMPERVIOUS) CLOTHING & EQUIPMENT TO PREVENT REPEATED/PROLONGED SKIN CONTACT W/THIS SUBSTANCE.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
EFTS OF OVEREXP:IRRITABILITY, ULCERATION OF NASAL SEPTUM, ANOSMIA & DISCOLOR OF TEETH. SOME STUDIES INDICATE OCCUP EXPOS TO CADMIUM IN SOME FORM INCR RISK OF PROSTATE, RESP & GENITOURINARY CANCERS. SK IN:RPTD/PRLNGD EXPOS W/IRRITANTS MAY LEAD TO DERM. EYE:RPTD/PRLNGD EXPOS W/IRRITANTS MAY CAUSE CONJ. INGEST:NO DATA.

Physical/Chemical Properties

HCC:T7
Melt/Freeze Pt:M.P/F.P Text:107F,42C
Spec Gravity:3.1
Solubility in Water:SOLUBLE
Appearance and Odor:COLORLESS MONOCLINIC CRYSTALS; ODORLESS.

Stability and Reactivity Data

Stability Indicator/Materials to Avoid:YES
AVOID CONTACT W/STRONG OXIDIZERS.
Stability Condition to Avoid:MAY BURN BUT DOES NOT IGNITE READILY.
AVOID CONTACT W/EXCESSIVE HEAT, SPARKS OR OPEN FLAME.
Hazardous Decomposition Products:THERMAL DECOMPOSITION PRODUCTS INCLUDE
TOXIC FUMES OF CADMIUM & SULFUR OXIDES.

Disposal Considerations

Waste Disposal Methods:CADMIUM-REG LEVEL:1 MG/L. MATL WHICH CONT
SUBSTANCE AT/ABOVE REG LEVEL MEET EPA CHARACT OF TOX & MUST BE
DISPOSED OF I/A/W 40CFRPART262. EPA HAZ WASTE NO D006. OBSERVE ALL
FED, STATE & LOC REGS WHEN S TORING/DISPOSING OF SUBSTANCE. FOR
ASSIST,(ING 13)

Calcium

- Calcium, metal and alloys, pyrophoric
- Calcium alloys, pyrophoric

Formula	Ca
Structure	
Description	Soft silver-white crystalline alkaline-earth metal.
Uses	As industrial catalyst for polyester fibers.

Registry Numbers and Inventories.

CAS	7440-70-2
NIH PubChem CID	5460341
EC (EINECS/ELINCS)	231-179-5
EC Index Number	020-001-00-X
EC Class	F; R15
RTECS	EW8040000
UN (DOT)	1401
Merck	13,1644
Beilstein/Gmelin	16277 (G)
Swiss Giftliste 1	G-6808
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	Ca
Formula mass	40.08
Melting point, °C	850
Boiling point, °C	1484
Vapor density (air=1)	1.4
Density	1.54 g/cm3

Solubility in water	Decomposes
Thermal expansion	2.1E-05/K
Heat of fusion	12.4 kJ/mol

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Do not expose to air. Store protected from moisture. Store under an inert atmosphere.
Handling	Wash thoroughly after handling. Use only in a well ventilated area. Do not allow water to get into the container because of violent reaction. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation. Handle under an inert atmosphere. Store protected from air. Keep from contact with moist air and steam.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Do not expose spill to water. Place under an inert atmosphere.
Disposal code	26
Stability	Combines vigorously or explosively with water. May ignite spontaneously if exposed to air or kept in the presence of moisture.
Incompatibilities	Acids, oxidizing agents, carbonates, dinitrogen tetraoxide, halogens, sulfur, chlorine, chlorine trifluoride, fluorine, air, moisture, water, water and mixtures containing water (e.g. aqueous solutions, water).
Decomposition	Irritating and toxic fumes and gases, hydrogen gas, calcium oxide, calcium hydroxide.

Fire.

Fire fighting	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Water Reactive. Material will react with water and may release a flammable and/or toxic gas. This chemical poses an explosion hazard. Reacts with water to form explosive hydrogen gas. May ignite or explode on contact with steam or moist air. May re-ignite after fire is extinguished. Extinguishing media: Do NOT get water inside containers. Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out. DO NOT USE WATER OR FOAM. For small fires use dry chemical, soda ash, lime or sand. For large fires use dry sand, dry chemical, soda ash or lime or withdraw from area and let fire burn.

Fire potential		Flammable/combustible material.
Hazards		Produce flammable gases on contact with water. May ignite on contact with water or moist air. Some react vigorously or explosively on contact with water. May be ignited by heat, sparks or flames. May re-ignite after fire is extinguished. Some are transported in highly flammable liquids. Runoff may create fire or explosion hazard.
Combustion products		Fumes from burning calcium are highly irritating to skin, eyes and mucous membranes.
NFPA	**Health**	3
	Flammability	1
	Reactivity	2
	Special	W

Health.

Poison_Class	2
Exposure effects	Chronic ingestion of calcium carbonate may cause irritability, lethargy, stupor, and coma, depending on the amount and duration of ingestion. These symptoms are secondary to hypercalcemia, alkalosis, and renal impairment. Chronic ingestion of calcium carbonate in doses 4 to 60 g/day for 2 to 30 days has resulted in these symptoms; however, at doses less than 10 g/day, pre-existing factors such as renal dysfunction, concurrent thiazide therapy, volume depletion, or hyperparathyroidism were usually present in patients developing these sequelae.
Ingestion	May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation	May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. May cause severe respiratory tract irritation and possible burns.
Skin	Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.
Eyes	Causes eye irritation and possible burns.

First aid

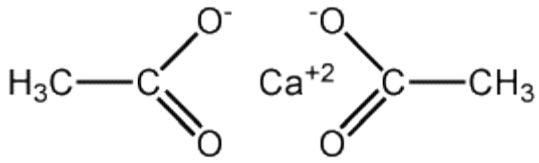
Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.
Inhalation	Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Skin	Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Eyes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid. Do NOT allow victim to rub or keep eyes closed.

Transportation.

UN number	1401
Response guide	138
Hazard class	4.3
Packing Group	II
USCG CHRIS Code	CAM
HS Code	2805 12 00
Std. Transport #	4916171

Calcium acetate

- Calcium di(acetate)
- Brown acetate of lime
- Calcium diacetate
- Gray acetate
- Gray acetate of lime
- Lime acetate

Formula	$Ca(CH_3COO)_2$
Structure	
Description	Colorless crystals or white powder. Slight odor of acetic acid.
Uses	In manufacture of acetic acid, acetone, in dying, tanning & curing skins, in lubricants, as food stabilizer, as corrosion inhibitor.

Registry Numbers and Inventories.

CAS	62-54-4
NIH PubChem CID	6116
EC (EINECS/ELINCS)	200-540-9
RTECS	AF7525000
RTECS class	Mutagen
Merck	12,1683
Beilstein/Gmelin	44753 (G)
FEMA	2228
Swiss Giftliste 1	G-4717
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	C4H8CaO5

Formula mass	158.17
Melting point, °C	160 (decomposes)
Decomposition point, °C	160
Vapor density (air=1)	5.5
Density	1.509 g/cm3
Solubility in water	250 g/L

Hazards and Protection.

Storage	Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.
Handling	Wash thoroughly after handling. Wash hands before eating. Use with adequate ventilation. Avoid contact with skin and eyes. Avoid ingestion and inhalation. Keep from contact with moist air and steam.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Clean up spills immediately, using the appropriate protective equipment. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Flush down the spill with a large amount of water. Provide ventilation. Do not get water inside containers.
Stability	Stable under normal temperatures and pressures.
Incompatibilities	Strong oxidizing agents and moisture.
Decomposition	Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, calcium oxide, acetone.

Fire.

Fire fighting	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Extinguishing media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Do NOT get water inside containers. In case of fire use water spray, dry chemical, carbon dioxide, or appropriate foam.

Health.

Poison_Class	5
Exposure effects	Chronic ingestion of calcium carbonate may cause irritability, lethargy, stupor, and coma, depending on the amount and duration of ingestion. These symptoms are secondary to hypercalcemia, alkalosis, and renal impairment.

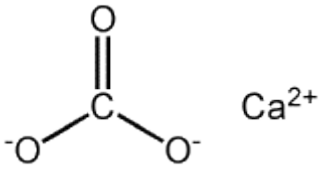
Ingestion	Ingestion of large amounts may cause gastrointestinal irritation.
Inhalation	May cause respiratory tract irritation.
Skin	May cause skin irritation.
Eyes	May cause eye irritation.

First aid

Ingestion	If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid if irritation or symptoms occur.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Skin	Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately

Calcium carbonate

- Calcite
- Limestone
- Marble
- Chalk

Formula	$CaCO_3$
Structure	
Description	White powder. Odorless.
Uses	Used to produce viscous solutions or dispersions, to impart body, improve consistency, or stabilize emulsions, including suspending and bodying agents, setting agents, jellying agents, and bulking agents. Stabilizers and thickeners, from table.

Registry Numbers and Inventories.

CAS	471-34-1
NIH PubChem CID	10112
EC (EINECS/ELINCS)	207-439-9
EC Class	S: 22 24/25
RTECS	FF9335000
RTECS class	Primary Irritant
Merck	13,1658
Beilstein/Gmelin	8544 (G)
EPA OPP	73502
Swiss Giftliste 1	G-7458
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	CCaO3
Formula mass	100.09
Melting point, °C	825
Density	2.93 g/cm3
Solubility in water	Insoluble
Heat of fusion	53.2 kJ/mol

Hazards and Protection.

Storage	Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from strong acids.
Handling	Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Provide ventilation.
Disposal code	14
Stability	Stable under normal shipping and handling conditions.
Incompatibilities	Will ignite on contact with fluorine; incompatible with acids, alum, ammonium salts and mercury + hydrogen.
Decomposition	Calcium oxide.

Fire.

Flash Point,°C		825
Fire fighting		Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Non-combustible, substance itself does not burn but may decompose upon heating to produce irritating, corrosive and/or toxic fumes. Extinguishing media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
NFPA	**Health**	1
	Flammability	0
	Reactivity	0

Health.

Poison_Class	-
Exposure effects	Chronic ingestion may cause hypercalcemia, alkalosis, and kidney damage. May also produce milk-alkali syndrome characterized by neurological symptoms such as irritability, lethargy, stupor, and coma.
Ingestion	Ingestion of large amounts may cause gastrointestinal irritation. Expected to be a low ingestion hazard.
Inhalation	Low hazard for usual industrial handling. Excessive inhalation may cause minor respiratory irritation.
Skin	Causes skin irritation. Chronic ingestion may cause hypercalcemia, alkalosis, and kidney damage. May also produce milk-alkali syndrome characterized by neurological symptoms such as irritability, lethargy, stupor, and coma.
Eyes	May cause eye irritation.

First aid

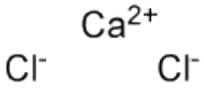
Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Skin	Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Eyes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transportation.

USCG CHRIS Code	CSR
USCG Compatatibility Group	34 Esters
HS Code	2836 50 00
IMO Chemical Code	18
IMO Pollution Category	III

Calcium chloride

- Hydrophilite
- Calcosan
- Dowflake
- Liquidow

Formula	$CaCl_2$
Structure	
Description	White, crystalline solid. Odorless. Solutions are clear to light yellow. Hygroscopic or deliquescent.
Uses	Pavement deicer.

Registry Numbers and Inventories.

CAS	10043-52-4
NIH PubChem CID	24854
EC (EINECS/ELINCS)	233-140-8
EC Index Number	017-013-00-2
EC Class	Xi; R36
RTECS	EV9800000
RTECS class	Tumorigen; Mutagen; Human Data
Merck	13,1660
Beilstein/Gmelin	17127 (G)
EPA OPP	75605
Swiss Giftliste 1	G-4896
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	CaCl2

Formula mass	110.99
Melting point, °C	772
Boiling point, °C	1600
Density	2.174 g/cm3
Solubility in water	745 g/L
Thermal expansion	0.0000227/K
Heat of fusion	26.31 kJ/mol
Heat of vaporization	235 kJ/mol

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.
WHMIS	D2B
Handling	Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Wash clothing before reuse.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear impervious gloves. Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Provide ventilation.
Disposal code	14
Stability	Stable under normal shipping and handling conditions.
Incompatibilities	Moisture.
Decomposition	Chlorine.

Fire.

Fire fighting		Fire control: Use water, dry chemical, carbon dioxide or foam to extinguish. Do not extinguish fire unless release can be stopped. Cool fire-exposed containers with water.
Fire potential		Nonflammable.
NFPA	**Health**	2
	Flammability	0
	Reactivity	0

Health.

Poison_Class	-
Exposure effects	Effects may be delayed.
Ingestion	May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. May cause cardiac disturbances. May be harmful if swallowed. In very severe cases, seizures, rapid respiration, slow heartbeat, or death, may
Inhalation	May cause severe irritation of the upper respiratory tract with pain, burns, and inflammation.
Skin	Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.
Eyes	Contact with eyes may cause severe irritation, and possible eye burns.

First aid

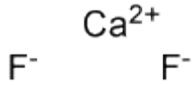
Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. DO NOT use mouth-to-mouth respiration.
Skin	Get medical aid. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transportation.

USCG CHRIS Code	CLC
HS Code	2827 20 00

Calcium fluoride

- Calcium difluoride
- Fluorite
- Fluorspar

Formula	CaF_2
Structure	
Description	Odorless gray powder or granules.
Uses	Main primary source of fluorine & its compd, in ferrous metallurgy as flux to incr fluidity of slag, synthetic fluorspar is used in optical industry (transmits uv rays), pure form used as catalyst in dehydration & dehydrogenations, used to fluoridate drinking water.

Registry Numbers and Inventories.

CAS	7789-75-5
NIH PubChem CID	84512
EC (EINECS/ELINCS)	232-188-7
EC Class	S: 22 24/25
RTECS	EW1760000
RTECS class	Mutagen; Reproductive Effector
Merck	13,1669
Beilstein/Gmelin	18380 (G)
Swiss Giftliste 1	G-1988
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	CaF2
Formula mass	78.08
Melting point, °C	1418

Boiling point, °C	2500
Vapor pressure, mm_{Hg}	16 (1910 C)
Density	3.18 g/cm3
Solubility in water	1.6 mg/L (18 C)
Refractive index	1.4328
Heat of fusion	29.8 kJ/mol
Heat of vaporization	336.1 kJ/mol

Hazards and Protection.

Storage	Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.
Handling	Wash thoroughly after handling. Wash hands before eating. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation. Wash clothing before reuse.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Provide ventilation.
Stability	Stable under normal temperatures and pressures.
Incompatibilities	Reacts with hot concentrated sulfuric acid to liberate hydrogen fluoride.
Decomposition	Irritating and toxic fumes and gases, fluoride fumes.

Fire.

Fire fighting		Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use extinguishing media appropriate to the surrounding fire. Substance is noncombustible. Extinguishing media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Fire potential		Nonflammable.
NFPA	**Health**	3
	Flammability	0

Reactivity	0

Health.

Exposure limit(s)	TLV (as fluoride): 2.5 mg/m3 A4 (as TWA) (ACGIH 1998)
Poison_Class	5
Exposure effects	Prolonged or repeated exposure may cause permanent bone structure abnormalities. May cause kidney injury. Chronic inhalation may cause lung damage, bronchitis, and silicosis. May decrease blood clotting. Chronic exposure to fluoride compounds may cause systemic toxicity.
Ingestion	May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion of large amounts of fluoride may include salivation, nausea, vomiting, abdominal pain, fever, labored breathing. Exposure to fluoride compounds can result in systemic toxic effects on the heart, liver, and kidneys. It may also deplete calcium levels in the body leading to hypocalcemia and death. May cause bone structure abnormalities.
Inhalation	Causes respiratory tract irritation. May cause heart disturbances, possibly leading to cardiac arrest and death. May cause hyperactive reflexes and muscular spasms. May cause respiratory arrest.
Skin	Causes skin irritation. Chronic inhalation may cause lung damage, bronchitis, and silicosis. May decrease blood clotting.
Eyes	Causes eye irritation.

First aid

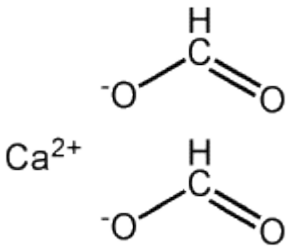
Ingestion	Induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation	Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Skin	Get medical aid immediately. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Eyes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transportation.

USCG CHRIS Code	CAF
HS Code	2826 19 00

Calcium formate

- Calcium diformate
- Calcoform

Formula	$C_2H_2CaO_4$
Structure	
Description	Orthorhombic crystals.
Uses	Food preservative.

Registry Numbers and Inventories.

CAS	544-17-2
NIH PubChem CID	10997
EC (EINECS/ELINCS)	208-863-7
RTECS	LQ5600000
RTECS class	Primary Irritant
Merck	12,1711
Beilstein/Gmelin	37258 (G)
Swiss Giftliste 1	G-7496
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	C2H2CaO4
Formula mass	130.11
Melting point, °C	300

Density	2.009 g/cm3
Solubility in water	166 g/L (20 C)

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.
Handling	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.
Small spills/leaks	Clean up spills immediately, using the appropriate protective equipment. Sweep up, then place into a suitable container for disposal. Provide ventilation.
Stability	Stable under normal temperatures and pressures.
Incompatibilities	Strong oxidizing agents.
Decomposition	Carbon monoxide, carbon dioxide.

Fire.

Fire fighting		Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. To extinguish fire, use carbon dioxide, dry chemical powder or appropriate foam.
NFPA	**Health**	1
	Flammability	0
	Reactivity	0

Health.

Poison_Class	4
Exposure effects	Effects may be delayed.
Ingestion	May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation	Aspiration may lead to pulmonary edema. Causes irritation of the mucous membrane and upper respiratory tract.
Skin	Causes skin irritation.

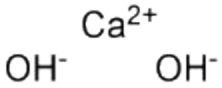
Eyes	Causes moderate eye irritation. May cause chemical conjunctivitis.

First aid

Ingestion	Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation	Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Skin	Get medical aid immediately. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Calcium hydroxide

- Calcium dihydroxide
- Calcium hydrate
- Hydrated lime
- Slaked lime

Formula	$Ca(OH)_2$
Structure	
Description	White crystals or soft powder or granules, impure material has gray or buff color, odorless, readily absorbs carbon dioxide from the air to form calcium carbonate.
Uses	In lubricants, drilling fluid, pesticides, fireproofing coatings, water paint, as egg preservative, manufacture of paper pulp, in sbr rubber vulcanization, dehairing hides, in water treatment, in mortar, plaster, cement and other binding and paving materials.

Registry Numbers and Inventories.

CAS	1305-62-0
NIH PubChem CID	14777
EC (EINECS/ELINCS)	215-137-3
EC Class	Xi, R: 34, S: 26-36/37/39-45
RTECS	EW2800000
RTECS class	Agricultural Chemical and Pesticide; Mutagen; Primary Irritant
UN (DOT)	1759
Merck	13,1675
Beilstein/Gmelin	8815
EPA OPP	75601
Swiss Giftliste 1	G-1012
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	CaH2O2
Formula mass	74.10
Melting point, °C	550
Vapor density (air=1)	2.6
Odor threshold	Odorless
Density	2.24 g/cm3
Solubility in water	0.18 g /100 ml
Refractive index	1.555
Thermal expansion	3.14E5/K (25 C)

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not exceed 25-30C.
WHMIS	E.
Handling	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use only in a chemical fume hood.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions.
Disposal code	14
Stability	Stable at room temperature in closed containers under normal storage and handling conditions. Readily absorbs carbon dioxide from air forming calcium carbonate.
Incompatibilities	Phosphorus, maleic anhydride, nitromethane, nitroethane, nitroparaffins, nitropropane, polychlorinated phenols + postassium nitrate.
Decomposition	Calcium oxide, forms chlorinated benzodioxins when mixed with polychlorinated phenols and potassium nitrate.

Fire.

Fire fighting	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Substance is nonflammable. Runoff from fire control or dilution water may cause pollution. Extinguishing media: Use dry chemical.

Fire potential		Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
Hazards		Contact with metals may evolve flammable hydrogen gas.
Combustion products		Fire may produce irritating, corrosive and/or toxic gases.
NFPA	**Health**	3
	Flammability	0
	Reactivity	0

Health.

Exposure limit(s)	TLV: 5 ppm; mg/m3 (ACGIH 1996). OSHA PEL: TWA 15 mg/m3 (total) 5 mg/m3 (resp) NIOSH REL: TWA 5 mg/m3
Poison_Class	4
Exposure effects	Prolonged or repeated skin contact may cause dermatitis. Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion. Prolonged or repeated exposure may cause corneal damage and the development of cataracts and glaucoma.
Ingestion	Causes gastrointestinal tract burns. May cause circulatory system failure. May cause perforation of the digestive tract. Causes severe pain, nausea, vomiting, diarrhea, and shock. Effects may be delayed.
Inhalation	Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Inhalation may produce burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Causes irritation of the mucous membrane and upper respiratory tract.
Skin	Causes severe skin irritation and burns. May be harmful if absorbed through the skin.
Eyes	May result in corneal injury. Contact with liquid or vapor causes severe burns and possible irreversible eye damage. May cause temporary corneal clouding.

First aid

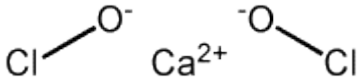
Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation	Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do not use mouth-to-mouth respiration if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Skin	Get medical aid immediately. Wash clothing before reuse. Rinse area with large amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.

Transportation.

UN number	1759
Response guide	154
Hazard class	8
Packing Group	I; II; III
USCG CHRIS Code	CAH
USCG Compatatibility Group	5 Caustics
HS Code	2825 90 19
IMO Chemical Code	18
IMO Pollution Category	D

Calcium hypochlorite, dry

- Calcium hypochlorite mixture, dry, with more than 39% available Chlorine (8.8% available Oxygen)
- Chlorinated lime
- Losantin
- Pittchlor
- Calcium dihypochlorite

Formula	$CaCl_2O_2$
Structure	
Description	White powder or flat plates. Strong chlorine odor.
Uses	Algicide, bactericide, deodorant, fungicide, in sugar refining, oxidizing agent, bleaching agent, disinfectant.

Registry Numbers and Inventories.

CAS	7778-54-3
NIH PubChem CID	24504
EC (EINECS/ELINCS)	231-908-7
EC Index Number	017-012-00-7
EC Class	O; R8 , Xn; R22, R31, C; R34, N; R50
RTECS	NH3485000
RTECS class	Agricultural Chemical and Pesticide; Tumorigen; Mutagen; Human Data
UN (DOT)	1748
Merck	13,2111
Beilstein/Gmelin	120905 (G)
EPA OPP	14701
Swiss Giftliste 1	G-54974
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed
Israel	Listed

Properties.

Formula	CaCl2O2
Formula mass	142.98
Melting point, °C	100
Density	2.35 g/cm3
Solubility in water	Slightly soluble

Hazards and Protection.

Storage	Keep away from heat, sparks, and flame. Keep away from sources of ignition. Do not store near combustible materials. Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids.
Handling	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well ventilated area. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid contact with clothing and other combustible materials. Do not ingest or inhale. Discard contaminated shoes.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation. Do not get water inside containers. Do not use combustible materials such as paper towels to clean up spill.
Stability	Stable at room temperature in closed containers under normal storage and handling conditions.
Incompatibilities	Reducing agents, carbontetrachloride, ammonia, alliphatic amines, aromatic amines, sulfur, sulfides (inorganic, e.g. ferric sulfide, lead sulfide, sodium sulfide), metal oxides, glycerol, phenols, diethylene glycol monomethyl ether, carbon, acetic acid + potassium, cyanides (e.g. potassium cyanide, sodium cyanide), ammonium chloride, charcoal, N,N-dichloromethylamine + heat, ethanol, menthol, iron oxide, rust, 1-propanethiol, isobutanethiol, turpentine, sodium hydrogen sulfate + starch + sodium carbonate, acetylene, hydroxy compounds (e.g. ethanol, ethylene glycol, gycerol, sugar), combustible materials (e.g. anthracene, grease, oil, mercaptans, methyl carbitol, nitromethane, organic matter, and propylmercaptan).
Decomposition	Hydrogen chloride, irritating and toxic fumes and gases, oxygen, chlorine.

Fire.

Fire fighting		Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with combustible materials may cause a fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Use water with caution and in flooding amounts. Contaminating or mixing with foreign materials such as combustibles, grease, and fuels can cause fire. Containers may explode when heated. Extinguishing media: Use water spray to cool fire-exposed containers. Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out. For small fires DO NOT use dry chemicals, carbon dioxide, halon or foams. USE WATER ONLY. For large fires, flood fire area with water from a distance.
Fire potential		Slightly flammable. But evolves chlorine and at higher temperatures, oxygen.
Hazards		Poisonous gases may be produced when heated
Combustion products		Poisonous gases may be produced when heated.
NFPA	**Health**	3
	Flammability	0
	Reactivity	1
	Special	O

Health.

Poison_Class	3
Exposure effects	Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects.
Ingestion	May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. May be harmful if swallowed.
Inhalation	Causes chemical burns to the respiratory tract. Aspiration may lead to pulmonary edema. May cause systemic effects. Causes corrosive action on the mucous membranes.
Skin	Causes severe burns with delayed tissue destruction.
Eyes	Causes eye burns. May result in corneal injury. May cause blepharitis (inflammation of the margins of the eyelids).

First aid

Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation	Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Skin	Get medical aid immediately. Immediately flush skin with plenty of soap and water for

	at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Eyes	Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation is required (at least 30 minutes).

Transportation.

UN number	1748
Response guide	140
Hazard class	5.1
Packing Group	II
USCG CHRIS Code	CHY
USCG Compatatibility Group	5 Caustics
Std. Transport #	4918715
IMO Chemical Code	17
IMO Pollution Category	B (C)

Barium oxide solid soln. with calcium oxide, magnesium oxide, phosphorus oxide, strontium oxide and zinc oxide, cerium and manganese-doped

Formula	Unspecified

Registry Numbers and Inventories.

CAS	101356-94-9
NIH PubChem CID	3805637 (SID)
EC (EINECS/ELINCS)	309-890-8
UN (DOT)	1564
Beilstein/Gmelin	NA
Korea ECL	Listed

Properties.

Hazards and Protection.

Storage	Keep in a cool, dry, dark location in a tightly sealed container or cylinder. Keep away from incompatible materials, ignition sources and untrained individuals. Secure and label area. Protect containers/cylinders from physical damage.
Handling	All chemicals should be considered hazardous. Avoid direct physical contact. Use appropriate, approved safety equipment. Untrained individuals should not handle this chemical or its container. Handling should occur in a chemical fume hood.
Protection	Wear appropriate protective gloves, clothing and goggles.
Respirators	Wear positive pressure self-contained breathing apparatus (SCBA).
Small spills/leaks	ELIMINATE all ignition sources. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET WATER INSIDE CONTAINERS.
Stability	No data.

Fire.

Fire fighting	Extinguish using agent most appropriate for surrounding fire.
Fire potential	Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
Hazards	Contact with metals may evolve flammable hydrogen gas.
Combustion products	Fire may produce irritating, corrosive and/or toxic gases.

Health.

Exposure effects

Ingestion	See Inhalation.
Inhalation	TOXIC; inhalation, ingestion, or skin contact with material may cause severe injury or death. Effects of contact or inhalation may be delayed.
Skin	Contact with molten substance may cause severe burns to skin and eyes. See Inhalation.
Eyes	See Inhalation.

First aid

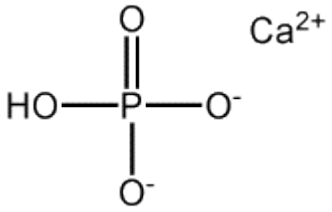
Ingestion	Seek medical assistance.
Inhalation	Move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult.
Skin	Remove and isolate contaminated clothing and shoes. Immediately flush with running water for at least 20 minutes. For minor skin contact, avoid spreading material on unaffected skin.
Eyes	Immediately flush with running water for at least 20 minutes.

Transportation.

UN number	1564
Response guide	154
Hazard class	6.1
Packing Group	II; III

Calcium hydrogen phosphate

- Calcium acid phosphate
- Calcium dibasic phosphate
- Calcium hydrogen orthophosphate
- Calcium monohydrogen phosphate
- Calcium phosphate (1:1)
- Calcium phosphate

Formula	$CaHPO_4$
Structure	
Description	White crystals or crystalline powder.
Uses	Control acidity in powdered drink mixes, ingredient in effervescent tablets, as a plastics stabilizer, and in ceramics. Its single largest application is as a leavening agent in bread, cake mixes, and self-rising flour.

Registry Numbers and Inventories.

CAS	7757-93-9
NIH PubChem CID	24441
EC (EINECS/ELINCS)	231-826-1
Merck	12,1739
Beilstein/Gmelin	10909 (G)
Swiss Giftliste 1	G-7156
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	CaHO4P
Formula mass	136.06

Melting point, °C	370
Decomposition point, °C	230
Density	2.89 g/cm3 (20 C)
Solubility in water	0.1 g/L

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.
WHMIS	Insufficient information.
Handling	Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Wash clothing before reuse.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Provide ventilation.
Stability	Stable under normal temperatures and pressures.
Incompatibilities	Strong oxidizing agents.
Decomposition	Oxides of phosphorus, irritating and toxic fumes and gases, calcium oxide.

Fire.

Fire fighting		Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. To extinguish fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use agent most appropriate to extinguish fire.
Fire potential		Nonflammable.
NFPA	**Health**	2
	Flammability	0
	Reactivity	0

Health.

Poison_Class	-

Exposure effects

Ingestion	Causes gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation	Dust is irritating to the respiratory tract.
Skin	Causes skin irritation.
Eyes	Causes eye irritation. May result in corneal injury.

First aid

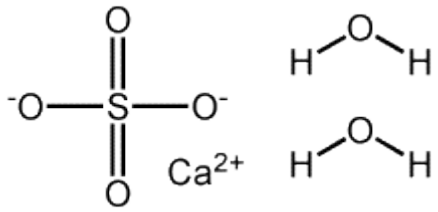
Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Skin	Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transportation.

HS Code	2835 25 10

Calcium sulfate dihydrate

- Phosphogypsum
- Compactrol
- Landplaster

Formula	$CaSO_4.2H_2O$
Structure	
Description	White or nearly white, odorless crystals. Some forms of calcium sulfate have a fibrous appearance.
Uses	Used to make portland cement, plaster of paris and artificial marble; used in agriculture as a soil conditioner; used as a white pigment, filler or glaze in paints, enamels, pharmaceuticals, paper, insecticide dusts, yeast manufacture and polishing powders; in manufacture of sulfuric acid, calcium carbide and ammonium sulfate.

Registry Numbers and Inventories.

CAS	10101-41-4
NIH PubChem CID	24928
EC (EINECS/ELINCS)	600-148-1
EC Class	S: 22 24/25
RTECS	EW4150000
RTECS class	Agricultural Chemical and Pesticide
Merck	13,1711
Beilstein/Gmelin	7487 (G)
EPA OPP	203
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Philippiens PICCS	Listed

Properties.

Formula	CaH4O6S
Formula mass	172.17
Melting point, °C	150 (decomposes)

Density	2.32 g/cm3 (20 C)
Solubility in water	Slightly soluble
Refractive index	1.5248
Dielectric constant	4,98 (25 C)

Hazards and Protection.

Storage	Store in a cool, dry place. Keep container closed when not in use.
WHMIS	Does not meet criteria
Handling	Wash thoroughly after handling. Wash hands before eating. Use only in a well ventilated area. Avoid contact with skin and eyes. Avoid ingestion and inhalation.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Reduce airborne dust and prevent scattering by moistening with water. Clean up spills immediately, using the appropriate protective equipment.
Stability	Stable under normal temperatures and pressures.
Incompatibilities	Strong oxidizing agents and moisture.
Decomposition	Oxides of sulfur, irritating and toxic fumes and gases, calcium oxide.

Fire.

Fire fighting	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Extinguishing media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

Health.

Poison_Class	F (Not subject to toxicity classification)
Exposure effects	May cause cancer according to animal studies. Repeated inhalation may cause nasal and tracheal inflammation. Chronic inhalation may lead to decreased pulmonary function.
Ingestion	Ingestion of large amounts may cause gastrointestinal irritation.
Inhalation	Causes respiratory tract irritation.
Skin	May cause skin irritation.
Eyes	May cause eye irritation.

First aid

Ingestion	If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Skin	Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transportation.

HS Code 2833 29 90

Material Safety Data Sheet

Carborundum

ACC# 20700

Section 1 - Chemical Product and Company Identification

MSDS Name: Carborundum
Catalog Numbers: C192-500
Synonyms: Silicon Carbide.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
409-21-2	SILICON CARBIDE	100.0	206-991-8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless to black solid.
Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause lung damage. May cause cancer based on animal studies.
Target Organs: No data found.

Potential Health Effects

Eye: Dust may cause mechanical irritation.
Skin: Dust may cause mechanical irritation.
Ingestion: May cause irritation of the digestive tract.
Inhalation: Dust is irritating to the respiratory tract. May cause lung damage. Contains crystalline silica which may lead to respiratory abnormalities and silicosis.
Chronic: Chronic inhalation of dust may lead to silicosis. May cause lung damage. May

cause silicosis-disabling pulmonary fibrosis characterized by fibrotic changes and miliary nodules in the lungs, dry cough, shortness of breath, emphysema, decreased chest expansion and increased susceptibility to tuberculosis.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material will not burn. Use extinguishing media appropriate to the surrounding fire. Dousing metallic fires with water may generate hydrogen gas, an extremely dangerous explosion hazard.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Avoid ingestion and inhalation.
Storage: Store in a dry area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
SILICON CARBIDE	10 mg/m3 TWA (nonfibrous, inhalable fraction, particulate matter containing no asbestos and <1% crystalline silica); 3 mg/m3 TWA (nonfibrous, respirable fraction, particulate matter containing no asbestos and <1% crystalline silica); 0.1 fiber/cm3 TWA (respirable fibers, includin	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

OSHA Vacated PELs: SILICON CARBIDE: 10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Personal Protective Equipment
Eyes: Wear safety goggles approved for the handling of explosive materials.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: colorless to black
Odor: none reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not applicable.
Freezing/Melting Point:2700 deg C
Decomposition Temperature: Not available.
Solubility: insoluble in water
Specific Gravity/Density:3.2
Molecular Formula: SiC
Molecular Weight:40.0855

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Dust generation, excess heat.
Incompatibilities with Other Materials: None reported.
Hazardous Decomposition Products: Oxides of silicon.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 409-21-2: VW0450000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 409-21-2:

- **ACGIH:** A2 - Suspected Human Carcinogen (fibrous, including whiskers)
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Not listed.

Epidemiology: An examination of 53 silicon carbide crushers showed 15 cases of pneumoconiosis in workers employed on the crushing, sieving and packing of silicon carbide

have been reported.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information reported.
Environmental: No information reported.
Physical: No information reported.
Other: None

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 409-21-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 409-21-2 can be found on the following state right to know lists: New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 409-21-2: No information available.

Canada - DSL/NDSL

CAS# 409-21-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Material Safety Data Sheet

Celite 545

ACC# 02895

Section 1 - Chemical Product and Company Identification

MSDS Name: Celite 545
Catalog Numbers: AC349670000, AC349670025, AC349675000
Synonyms: Calcinated diatomaceous earthDiatomite
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
68855-54-9	Kieselguhr, soda ash flux-calcined	100	272-489-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available.
Target Organs: Lungs.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation: Harmful if inhaled. May cause respiratory tract irritation.
Chronic: Possible risk of irreversible effects.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: ; Flammability: ; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not breathe dust.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Kieselguhr, soda ash flux-calcined	none listed	none listed	none listed

OSHA Vacated PELs: Kieselguhr, soda ash flux-calcined: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Not available.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: white
Odor: odorless
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Negligible.
Specific Gravity/Density: Not available.
Molecular Formula:O2Si
Molecular Weight:60.08

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong acids, hydrogen fluoride.
Hazardous Decomposition Products: None.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 68855-54-9 unlisted.
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 68855-54-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 68855-54-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 68855-54-9 can be found on the following state right to know lists: Pennsylvania.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 40 Limited evidence of a carcinogenic effect.
R 20 Harmful by inhalation.

Safety Phrases:
S 36/37 Wear suitable protective clothing and gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 68855-54-9: No information available.

Canada - DSL/NDSL

CAS# 68855-54-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 68855-54-9 is listed on the Canadian Ingredient Disclosure List.

ALDRICH CHEMICAL CO SUB OF SIGMA-ALDRICH -- 22175-9 AMMONIUM CERIUM(IV)SULFATE -- 6810-00F025682

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

Product ID:22175-9 AMMONIUM CERIUM(IV)SULFATE
MSDS Date:01/08/1991
FSC:6810
NIIN:00F025682
MSDS Number: BPSNJ
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO SUB OF SIGMA-ALDRICH
Address:1001 W ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850 FAX: 414-273-4979
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

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

Ingred Name:AMMONIUM CERIUM SULFATE
92/3
CAS:13840-04-5

========== 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: HARMFUL, MUCOUS MEMBRANES & UPPER RESPIRATORY TRACT IRRITATION. INGESTION: HARMFUL. SKIN: HARMFUL ABSORPTION & IRRITATION. EYES: IRRITATION.
Explanation of Carcinogenicity:NONE

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

First Aid:EYES: WASH W/WATER FOR AT LEAST 15 MINS. SKIN: WASH W/SOAP & WATER FOR AT LEAST 15 MINS. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGESTION: WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

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

Extinguishing Media:WATER SPRAY, CO2, DRY CHEMICAL POWDER. ALCOHOL OR POLYMER FOAM.
Fire Fighting Procedures:WEAR SELF-CONTAINED BREATHING APPARATUS & PROTECTIVE CLOTHING TO PREVENT CONTACT W/SKIN/EYES.
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITION. CONTACT W/OTHER MATERIAL MAY CAUSE FIRE.

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

Spill Release Procedures:WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS & HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN A BAG & HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA & WASH SPILL SITE AFTER MATERIAL PI CKUP IS COCOPLETE.

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

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE. KEEP AWAY FROM COMBUSTIBLE MATERIALS, HEAT, SPARKS, & OPEN FLAMES.
Other Precautions:DON'T BREATH DUST. AVOID CONTACT W/EYES/SKIN/CLOTHES.

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

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation:MECHANICAL EXHAUST: REQUIRED
Protective Gloves:COMPATIBLE CHEMICAL RESISTANT
Eye Protection:CHEMICAL SAFETY GOGGLES
Other Protective Equipment:SAFETY SHOWER & EYE BATH, RUBBER BOOTS.
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING. REMOVE & WASH CONTAMINATED CLOTHES BEFORE REUSE.
Supplemental Safety and Health

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

Appearance and Odor:YELLOW-ORANGE POWDER, ODORLESS.

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

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS, COMBUSTIBLE MATERIALS
Stability Condition to Avoid:HEAT, SPARKS & OPEN FLAMES.
Hazardous Decomposition Products:NITROGEN OXIDES & SULFUR OXIDES.

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

Waste Disposal Methods:DISSOLVE IN WATER/ACID SOLUTION/OXIDIZED TO WATER SOLUBLE STATE. PRECIPITATE AS SULFIDE/ADJUST PH TO 7 TO COMPLETE PRECIPITATION. FILTER INSOLUBLE/DISPOSE IN HAZARDOUS WASTE SITE. DESTROY W/SODIUM HYP OCHLORITE. NEUTRALIZE BEFORE FLUSHING TO DRAIN.

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

Material Safety Data Sheet

Cetylpyridinium chloride monohydrate

ACC# 79578

Section 1 - Chemical Product and Company Identification

MSDS Name: Cetylpyridinium chloride monohydrate
Catalog Numbers: AC226990000, AC226990050, AC226991000, AC226995000
Synonyms: 1-Hexadecylpyridinium chloride monohydrate; N-Cetylpyridinium chloride monohydrate.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
6004-24-6	Cetylpyridinium chloride monohydrate	>96	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white powder.
Danger! May be fatal if inhaled. Harmful if swallowed. Dust causes severe irritation of the eyes, skin and respiratory tract. May be harmful if absorbed through the skin.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye: Contact with eyes may cause severe irritation, and possible eye burns.
Skin: Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion: Harmful if swallowed. May cause irritation of the digestive tract.
Inhalation: May be fatal if inhaled. Dust is irritating to the respiratory tract.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid immediately.
Skin: In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid. Wash clothing before reuse.
Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion. Runoff from fire control or dilution water may cause pollution.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 4; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Evacuate unnecessary personnel. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not breathe dust. Do not breathe spray or mist. Use only with adequate ventilation or respiratory protection.

Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cetylpyridinium chloride monohydrate	none listed	none listed	none listed
Pyridinium, 1-hexadecyl-, chloride, anhydrous	none listed	none listed	none listed

OSHA Vacated PELs: Cetylpyridinium chloride monohydrate: No OSHA Vacated PELs are listed for this chemical. Pyridinium, 1-hexadecyl-, chloride, anhydrous: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: white
Odor: characteristic odor
pH: 5.2 (10g/l H2O)
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:80-83 deg C
Decomposition Temperature:234 deg C
Solubility: Soluble.

Specific Gravity/Density: Not available.
Molecular Formula:C21H38ClN.H2O
Molecular Weight:358.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation, confined spaces.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Hydrogen chloride, nitrogen oxides, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
CAS# 6004-24-6: UU5075000
CAS# 123-03-5: UU4900000
LD50/LC50:
Not available.

CAS# 123-03-5:
Draize test, rabbit, eye: 1%;
Draize test, rabbit, eye: 100 mg;
Draize test, rabbit, skin: 50 mg/24H Moderate;
Inhalation, rat: LC50 = 90 mg/m3/4H;
Oral, mouse: LD50 = 108 mg/kg;
Oral, rabbit: LD50 = 400 mg/kg;
Oral, rat: LD50 = 200 mg/kg;
.
Sensitization test (guinea pig): negative.
Carcinogenicity:
CAS# 6004-24-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 123-03-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Carp: 0.01 mg/l; 96 h; LC50 No data available.
Environmental: Biodegradable.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TOXIC SOLIDS, ORGANIC, N.O.S.	TOXIC SOLID ORGANIC NOS (CETYLPYRIDINIUM CHLORIDE)
Hazard Class:	6.1	6.1
UN Number:	UN2811	UN2811
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 6004-24-6 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 123-03-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 123-03-5: immediate.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 6004-24-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 123-03-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+ N

Risk Phrases:

R 25 Toxic if swallowed.
R 26 Very toxic by inhalation.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37 Wear suitable protective clothing and gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 28A After contact with skin, wash immediately with plenty of water .
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 6004-24-6: No information available.
CAS# 123-03-5: 3

Canada - DSL/NDSL

CAS# 123-03-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1A, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Material Safety Data Sheet

Chromium

ACC# 05000

Section 1 - Chemical Product and Company Identification

MSDS Name: Chromium
Catalog Numbers: S79965, S799651, S93176
Synonyms: Chrome
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-47-3	CHROMIUM	>=99%	231-157-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver-gray solid.
Warning! Causes eye and skin irritation. May cause allergic skin reaction. Causes severe respiratory tract irritation. May cause lung damage. May cause kidney damage. May cause liver damage.
Target Organs: Liver.

Potential Health Effects

Eye: Causes eye irritation. May cause conjunctivitis.
Skin: Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause irritation of the digestive tract. May cause liver damage.

Inhalation: Causes respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause asthma and shortness of breath. May cause headache, coughing, fever, weight loss, and pneumoconiosis.
Chronic: Prolonged inhalation may cause respiratory tract inflammation and lung damage.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: Evacuate area and fight fire from a safe distance. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. May burn with invisible flame. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Dust can be an explosion hazard when exposed to heat or flame. Finely divided dusts may exhibit pyrophoric tendencies.
Extinguishing Media: Use dry sand or earth to smother fire. Use dry chemical to fight fire. Contact professional fire-fighters immediately.
Flash Point: Not applicable.
Autoignition Temperature: 400 deg C (752.00 deg F)
Explosion Limits, Lower:.0230oz/ft3
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Remove all sources of ignition. Isolate area and deny entry. Place under an inert atmosphere. Do not use combustible materials such as paper towels to clean up spill.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Handle under an inert atmosphere.
Storage: Keep away from heat, sparks, and flame. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids. Keep containers tightly closed. Do not expose to air. Store under an inert atmosphere.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
CHROMIUM	0.5 mg/m3 TWA	0.5 mg/m3 TWA 250 mg/m3 IDLH	1 mg/m3 TWA

OSHA Vacated PELs: CHROMIUM: 1 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: silver-gray
Odor: odorless
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: 2640 deg C
Freezing/Melting Point:1857.2 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density:7.2 @28°C
Molecular Formula: Cr
Molecular Weight:51.996

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, dust generation, exposure to air.
Incompatibilities with Other Materials: Ammonium nitrate, hydrogen peroxide, lithium, nitric oxiode, potassium chlorate, sulfuri dioxide, strong oxidizers, hydrochloric acid, sulfuric acid, nitrogen oxide,
Hazardous Decomposition Products: Toxic chromium oxide fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-47-3: GB4200000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7440-47-3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Certain hexavalent chromium compounds have been demonstrated to be carcinogenic on the basis of epidemiological investigations on workers and experimental studies in animals.Increased incidences of respiratory cancer have been found in chromium (VI) workers.There is an increased incidence of lung cancer in industrial workers exposed to chromium (VI) compounds. Please refer to IARC volume 23 for a more detailed discussion.IARC Group 3: Suspected animal carcinogenic substance of potential relevance to

humans.IARC Group 3: Limited or insufficient evidence for carcinogenicity in both animals and humans.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7440-47-3 is listed on the TSCA inventory.
Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-47-3: 5000 lb final RQ (no reporting of releases of this hazardous substance is requir

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7440-47-3: immediate, delayed, fire.

Section 313

This material contains CHROMIUM (CAS# 7440-47-3, >=99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 7440-47-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-47-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-47-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 40 Limited evidence of a carcinogenic effect.

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 7440-47-3: No information available.

Canada - DSL/NDSL

CAS# 7440-47-3 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those

regulations.

Canadian Ingredient Disclosure List

CAS# 7440-47-3 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

Material Safety Data Sheet

Chromium (III) Potassium Sulfate Dodecahydrate

ACC# 19330

Section 1 - Chemical Product and Company Identification

MSDS Name: Chromium (III) Potassium Sulfate Dodecahydrate
Catalog Numbers: S72229C, S72229F, S79967, C337-500, S76786
Synonyms: Chromium (III) Potassium sulfate, dodecadrate; Chromic Alum (Dodecahydrate); Potassium Chromium Alum Dodecahydrate.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7788-99-0	Chromium (III) Potassium Sulfate Dodecahydrate	100	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: grey crystals.
Warning! May cause allergic respiratory reaction. May cause allergic skin reaction. May cause eye and skin irritation. May cause respiratory and digestive tract irritation.
Target Organs: Lungs.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: No hazard expected in normal industrial use.

Inhalation: Dust is irritating to the respiratory tract. Causes irritation of mucous membrane.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chromium (III) Potassium Sulfate Dodecahydrate	none listed	none listed	none listed

OSHA Vacated PELs: Chromium (III) Potassium Sulfate Dodecahydrate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystals
Appearance: purple - grey
Odor: none reported
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 400 deg C
Freezing/Melting Point:88.9 deg C
Decomposition Temperature: Not available.

Solubility: 19.6 % in water
Specific Gravity/Density:1.8
Molecular Formula: CrKSS2O8.12H20
Molecular Weight:556.9495

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, heat.
Hazardous Decomposition Products: Oxides of sulfur, chromium fumes.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
CAS# 7788-99-0: GB6850000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7788-99-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: Mutation data reported.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR

Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not Regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7788-99-0 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7788-99-0: immediate, delayed.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the

CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7788-99-0 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36/38 Irritating to eyes and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 7788-99-0: No information available.

Canada - DSL/NDSL

None of the chemicals in this product are listed on the DSL or NDSL list.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7788-99-0 is not listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Chromium (III) Sulfate Hydrate

ACC# 04970

Section 1 - Chemical Product and Company Identification

MSDS Name: Chromium (III) Sulfate Hydrate
Catalog Numbers: C338-500
Synonyms: Chromic sulfate; dichromium sulfate; sulfuric acid chromium salt
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10101-53-8	Chromium (III) Sulfate Hydrate	100%	233-253-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: green to violet to red solid.
Warning! Causes eye, skin, and respiratory tract irritation. May cause allergic skin reaction.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Causes respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medi cal aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Runoff from fire control or dilution water may cause pollution.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Minimize dust generation and accumulation. Avoid contact with skin and eyes.

Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chromium (III) Sulfate Hydrate	none listed	none listed	none listed

OSHA Vacated PELs: Chromium (III) Sulfate Hydrate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: green to violet to red
Odor: odorless
pH: 1.0-2.5 5% solution
Vapor Pressure: Negligible.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Soluble in water.
Specific Gravity/Density:1.7-3.0
Molecular Formula: Cr2(SO4)3.nH2O
Molecular Weight:392.1648

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: None reported.
Incompatibilities with Other Materials: Hydrogen gas may be evolved from moist chromic sulfate. If damp material is sealed for a prolonged period of time, the container may rupture because of the pressure of hydrogen. Reacts violently with reducing agents, combustibles, ammonia, halides, phosphorous, sodium azide, elemental sulfur and urea.
Hazardous Decomposition Products: Oxides of sulfur, oxides of sulfur.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 10101-53-8: GB7200000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 10101-53-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: Mutagenic effects have occurred in humans.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 10101-53-8 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 10101-53-8: 1000 lb final RQ; 454 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 10101-53-8: immediate, delayed.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 10101-53-8 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10101-53-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 10101-53-8: 1

Canada - DSL/NDSL

CAS# 10101-53-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 10101-53-8 is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Citric Acid Anhydrous

ACC# 87772

Section 1 - Chemical Product and Company Identification

MSDS Name: Citric Acid Anhydrous
Catalog Numbers: A940-250LB
Synonyms: 2-Hydroxy-1,2,3-propanetricarboxylic acid.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
77-92-9	Citric acid	99.0	201-069-1

Hazard Symbols: XI
Risk Phrases: 36/37/38

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: White powder. **Caution!** Causes respiratory tract irritation. May cause digestive tract irritation. Moisture sensitive. Causes severe eye irritation. May cause skin sensitization by skin contact. Causes skin irritation.
Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes severe eye irritation and possible injury.
Skin: Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Excessive intake of citric acid may cause erosion of the teeth.
Inhalation: Causes respiratory tract irritation.
Chronic: Repeated exposure may cause sensitization dermatitis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid. Do NOT allow victim to rub or keep eyes closed.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam. Use agent most appropriate to extinguish fire. Do NOT get water inside containers.
Flash Point: 100 deg C (212.00 deg F)
Autoignition Temperature: 1850 deg F (1,010.00 deg C)
Explosion Limits, Lower:.28
Upper: 2.29
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Very fine particles can cause a fire or explosion. Eliminate all ignition sources. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid

generating dusty conditions. Remove all sources of ignition. Provide ventilation. Spill may be carefully neutralized with lime (calcium oxide, CaO). Do not get water inside containers.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Do not allow contact with water. Keep from contact with moist air and steam.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Citric acid	none listed	none listed	none listed

OSHA Vacated PELs: Citric acid: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: White powder
Odor: Odorless.
pH: Not available.

Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:153 - 154.5 deg C
Decomposition Temperature: Not available.
Solubility: 59.2% (20°C)
Specific Gravity/Density:1.6650g/cm3
Molecular Formula:C6H8O7
Molecular Weight:192.12

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, dust generation, moisture, exposure to moist air or water.
Incompatibilities with Other Materials: Oxidizing agents, sulfides (inorganic, e.g. ferric sulfide, lead sulfide, sodium sulfide), metal nitrates, alkali carbonates, alkalis, potassium tartrate, acetates, bicarbonates.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 77-92-9: GE7350000
LD50/LC50:
CAS# 77-92-9:
Draize test, rabbit, eye: 750 ug/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Oral, mouse: LD50 = 5040 mg/kg;
Oral, rat: LD50 = 3 gm/kg;<BR.

Carcinogenicity:
CAS# 77-92-9: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: No information available.
Other Studies: No data available.

Section 12 - Ecological Information

Ecotoxicity: No data available. Fish toxicity: LC100 goldfish 894 mg/l lifetime exposure in hard water, LD0 goldfish 625 mg/l lifetime exposure in hard water (Ellis,M.M.Detection and measurement of Stream Pollution 1937,22,XLVII,365,US Brit.Fisheries Bull.) Invertebrate toxicity: LD100 Daphnia magna 120 mg/l lifetime exposure in soft water, LD0 Daphnia magna 80 mg/l lifetime exposure in soft water. Toxicity threshold: Pseudomonas putida > 10 g/l; Scenedesmus quadricauda 640 mg/l; Entosiphon sulcatum 485 mg/l (Bringmann,G.et al Water Res. 1980,14,231-241).
Environmental: Nitrification inhibition. Nitrosomonas sp 100 mg/l no inhibition of ammonia oxidation (Hockenbury,M.R. et al J.Water Pollut.Control Fed.1799,49(5),768-777). Degradation studies. 70-100% removal by activated sludge at 20øC for 120 hr (Muto,N.et al Kenkyu Hokuku-Kanto Gakuin Daigaku Kogakubu 1987,31(2),257-266 (Japan)).
Physical: No information available.
Other: BOD5 0.420; BOD20 0.610; ThOD 0.686 mg/l O2 respectively (Meinck,F. et al Les Eaux Residuaires Industrielles 1970). Biodegradable (Ministry of International Trade and Industry (MITI) Report 1984, Japan).

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	No information available.				No information available.
Hazard Class:					
UN Number:					
Packing Group:					

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 77-92-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 77-92-9: acute.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 77-92-9 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XI
Risk Phrases:
R 36/37/38 Irritating to eyes, respiratory system
and skin.

Safety Phrases:
S 26 In case of contact with eyes, rinse immediately
with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face

protection.

WGK (Water Danger/Protection)
CAS# 77-92-9: 0
Canada - DSL/NDSL
CAS# 77-92-9 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2B.
Canadian Ingredient Disclosure List
CAS# 77-92-9 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits

ALDRICH CHEMICAL CO INC -- COBALT (II, III) OXIDE 99.995%, 20311-4 -- 6810-00N062198

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

Product ID:COBALT (II, III) OXIDE 99.995%, 20311-4
MSDS Date:09/26/1994
FSC:6810
NIIN:00N062198
MSDS Number: BYSTT
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO INC
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

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

Ingred Name:COBALT OXIDE; (COBALT (II, III) OXIDE)
CAS:1308-06-1
RTECS #:GG2500000
Fraction by Wt: 99.995%
OSHA PEL:N/K
ACGIH TLV:N/K

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

LD50 LC50 Mixture:LD50:(ORAL,RAT) >5 GM/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:TARGET ORGAN:LUNGS. ACUTE:HARMFUL IF INHALED/SWALLOWED. MAY CAUSE ALLERGIC SKIN REACTION. TO BEST OF MFR'S KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVE STIGATED. CHRONIC:NONE LISTED BY MANUFACTURER.
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:IMMED FLUSH W/COPIOUS AMTS OF WATER FOR AT LEAST 15

MINS. SKIN:IMMED WASH WITH SOAP & COPIOUS AMTS OF WATER.
INHAL:REMOVE TO FRESH AIR. IF NOT BRTHG GIVE ARTF RESP. IF BRTHG IS DFCLT, GIVE OXYG. INGEST:WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL PHYS. WASH CONTAMD CLOTHING BEFORE REUSE.

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

Extinguishing Media:NONCOMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

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

Spill Release Procedures:WEAR NIOSH/MSHA APPRVD RESP, CHEM SFTY GOGG, RUBB BOOTS & HEAVY RUBB GLOVES. SWEEP UP, PLACE IN BAG & HOLD FOR WASTE DISP. AVOID RAISING DUST. VENT AREA & WASH SPILL SITE AFTER MATL PICKUP IS COMPLETE .
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

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

Handling and Storage Precautions:HARMFUL IF INHALED/SWALLOWED. MAY CAUSE IRRIT. MAY CAUSE ALLERGIC SKIN RXN. WEAR SUITABLE PROTECTIVE CLOTHING. HYGROSCOPIC.
Other Precautions:KEEP TIGHTLY CLOSED.

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

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves:LONG RUBB/NEOPRENE GLOVES.
Eye Protection:ANSI APPRVD CHEM WORKERS GOGGLES .
Other Protective Equipment:ANSI APPRVD EMERGENCY EYE WASH & DELUGE SHOWER .
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

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

Melt/Freeze Pt:M.P/F.P Text:1643F,895C
Spec Gravity:6.110
Evaporation Rate & Reference:NOT KNOWN
Solubility in Water:NOT KNOWN
Appearance and Odor:BLACK POWDER.

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

Stability Indicator/Materials to Avoid:YES
MOISTURE, REDUCING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC FUMES.

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

Waste Disposal Methods:BURY IN LANDFILL SITE APPRVD FOR DISP OF CHEMICAL & HAZARDOUS WASTES. OBSERVE ALL FEDERAL, STATE & LOCAL ENVIRONMENTAL REGULATIONS.

Material Safety Data Sheet

Cobalt Chloride

ACC# 91786

Section 1 - Chemical Product and Company Identification

MSDS Name: Cobalt Chloride
Catalog Numbers: AC, S75088
Synonyms: Cobalt dichloride, Cobaltous dichloride; Cobalt muriate.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7646-79-9	Cobaltous chloride	100	231-589-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear light-blue solid.
Warning! Harmful if swallowed. Causes respiratory tract irritation. Causes eye and skin irritation. May cause cancer based on animal studies. Hygroscopic (absorbs moisture from the air). May cause sensitization by inhalation and by skin contact.
Target Organs: Lungs, cardiovascular system, skin.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Causes skin irritation. Chronic exposure may result in sensitization.
Ingestion: Harmful if swallowed. Causes gastrointestinal tract irritation.
Inhalation: Causes respiratory tract irritation. May cause asthmatic attacks due to allergic

sensitization of the respiratory tract.
Chronic: Cobalt compounds may cause cancer based upon animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Use of chelators such as BAL penicillamine and N-acetylpenicillamine should be considered.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cobaltous chloride	0.02 mg/m3 TWA (as Co) (listed under Cobalt, inorganic compounds).	none listed	none listed

OSHA Vacated PELs: Cobaltous chloride: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate clothing to prevent skin exposure.
Respirators: Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: clear light-blue
Odor: slight - sharp odor
pH: Not available.
Vapor Pressure: 40 mm Hg @ 770C
Vapor Density: 4.5
Evaporation Rate: Not available.
Viscosity: Not available.

Boiling Point: 1049 deg C @ 760 mmHg
Freezing/Melting Point:735 deg C
Decomposition Temperature:400C (sublimes)
Solubility: soluble in alcohol and acetone
Specific Gravity/Density:3.3560g/cm3
Molecular Formula: Cl2Co
Molecular Weight:129.84

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation, excess heat.
Incompatibilities with Other Materials: Moisture - oxidizing agents - alkali metals.
Hazardous Decomposition Products: Hydrogen chloride, chlorine, irritating and toxic fumes and gases, chloride fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7646-79-9: GF9800000
LD50/LC50:
CAS# 7646-79-9:
Oral, mouse: LD50 = 80 mg/kg;
Oral, rat: LD50 = 80 mg/kg;
Oral, rat: LD50 = 418 mg/kg;
.

Carcinogenicity:
CAS# 7646-79-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans (listed as 'Cobalt, inorganic compounds').
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen (listed as Soluble cobalt (II) salts).

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S. *	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.
Hazard Class:	6.1	6.1
UN Number:	UN2927	UN2927
Packing Group:	I	I

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7646-79-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7646-79-9: immediate, delayed, reactive.

Section 313

This material contains Cobaltous chloride (listed as Cobalt compounds), 100%, (CAS# 7646-79-9) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7646-79-9 (listed as Cobalt compounds) is listed as a hazardous a ir pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7646-79-9 can be found on the following state right to know lists: Pennsylvania, (listed as Cobalt compounds), Minnesota, (listed as Cobalt, inorganic compounds).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 22 Harmful if swallowed.
R 42/43 May cause sensitization by inhalation and skin contact.
R 49 May cause cancer by inhalation.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 22 Do not breathe dust.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 7646-79-9: 2

Canada - DSL/NDSL

CAS# 7646-79-9 is listed on Canada's DSL List.

Canada - WHMIS

not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7646-79-9 is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Cobalt, certified powder, mesh 300 and finer

ACC# 05250

Section 1 - Chemical Product and Company Identification

MSDS Name: Cobalt, certified powder, mesh 300 and finer
Catalog Numbers: C363-100
Synonyms: Color Index No. 77320.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-48-4	Cobalt	>98	231-158-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver gray or bluish white or black solid.
Danger! Flammable solid. Can be explosive when exposed to heat or flames. May cause allergic respiratory reaction. Causes eye and skin irritation. May cause allergic skin reaction. May cause lung damage. May cause cancer based on animal studies.
Target Organs: Lungs, skin.

Potential Health Effects

Eye: Causes eye irritation. May cause conjunctivitis.
Skin: Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May

cause allergic reaction.
Inhalation: Causes respiratory tract irritation. May cause asthmatic attacks due to allergic sensitization of the respiratory tract. May cause asthma and shortness of breath.
Chronic: Repeated exposure may cause sensitization dermatitis. Repeated exposure may cause allergic respiratory reaction (asthma). Chronic inhalation of dust may lead to restricted pulmonary function and interstitial fibrosis.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dusts at sufficient concentrations can form explosive mixtures with air. Material can spontaneously ignite (pyrophoric) when exposed to air at normal or slightly elevated temperatures. Flammable solid.
Extinguishing Media: Use dry sand or earth to smother fire. DO NOT USE WATER!
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 2; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Keep away from sources of ignition. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cobalt	0.02 mg/m3 TWA	0.05 mg/m3 TWA (dust and fume) 20 mg/m3 IDLH (dust and fume)	0.1 mg/m3 TWA (dust and fume)

OSHA Vacated PELs: Cobalt: 0.05 mg/m3 TWA (dust and fume)
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: silver gray or bluish white or black
Odor: none reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not applicable.
Evaporation Rate: Not available.

Viscosity: Not applicable.
Boiling Point: 2870 deg C
Freezing/Melting Point:1495 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density:8.92
Molecular Formula: Co
Molecular Weight:58.9332

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, dust generation, strong acids, oxidizers.
Incompatibilities with Other Materials: Pyrophoric cobalt decomposes acetylene in the cold and the metal becomes incandescent. Fused ammonium nitrate can react explosively with powdered cobalt. Pyrophoric cobal, a black powder, burns brilliantly when exposed to air.
Hazardous Decomposition Products: Oxides of cobalt.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-48-4: GF8750000; GF8850000; GG0375000
LD50/LC50:
CAS# 7440-48-4:
Oral, rat: LD50 = 6171 mg/kg;
.

Carcinogenicity:
CAS# 7440-48-4:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 7/1/92 (powder)
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.

Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	METAL POWDERS, FLAMMABLE, N.O.S.	No information available.
Hazard Class:	4.1	
UN Number:	UN3089	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7440-48-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 7440-48-4: Effective 6/1/87, Sunset 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7440-48-4: immediate, delayed, fire.

Section 313

This material contains Cobalt (CAS# 7440-48-4, >98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-48-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Cobalt, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 42/43 May cause sensitization by inhalation and skin contact.

R 53 May cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 22 Do not breathe dust.

S 24 Avoid contact with skin.

S 37 Wear suitable gloves.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 7440-48-4: 1

Canada - DSL/NDSL

CAS# 7440-48-4 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7440-48-4 is listed on the Canadian Ingredient Disclosure List.

Material Safety Data Sheet

Cobalt(II) Nitrate Hexahydrate, P.A.

ACC# 00456

Section 1 - Chemical Product and Company Identification

MSDS Name: Cobalt(II) Nitrate Hexahydrate, P.A.
Catalog Numbers: AC219210000, AC219211000, AC219215000
Synonyms: Nitric Acid Cobalt Salt Hexahydrate
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10026-22-9	COBALT (II) NITRATE HEXAHYDRATE	100	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: red to brown solid.
Danger! Strong oxidizer. Contact with other material may cause a fire. May cause allergic respiratory reaction. May cause allergic skin reaction. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. May be harmful if swallowed. May cause blood abnormalities. May cause cardiac disturbances.
Target Organs: Heart, respiratory system, red blood cells.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed. Excessive ingestion may increase red blood cells and decrease blood pressure. May cause sensation of heat and enlargement of the
Inhalation: Dust is irritating to the respiratory tract. May cause methemoglobinemia,

cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, tachycardia, dyspnea (labored breathing), and death. May cause asthmatic attacks due to allergic sensitization of the respiratory tract.
Chronic: Repeated exposure may cause allergic respiratory reaction (asthma).

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Administration of calcium disodium EDTA may be useful in acute poisoning with its use at the discretion of qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with other material may cause fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Noncombustible.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash hands before eating. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials.
Storage: Do not store near combustible materials. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
COBALT (II) NITRATE HEXAHYDRATE	0.02 mg/m3 TWA (as Co) (listed under Cobalt, inorganic compounds).	none listed	none listed

OSHA Vacated PELs: COBALT (II) NITRATE HEXAHYDRATE: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: red to brown
Odor: odorless
pH: Not available.
Vapor Pressure: Negligible.

Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point:55-56C
Decomposition Temperature:74 deg C
Solubility: Soluble.
Specific Gravity/Density:2.49
Molecular Formula: Co(NO3)2.6H2O
Molecular Weight:291.0234

Section 10 - Stability and Reactivity

Chemical Stability: Stable. However, may decompose if heated.
Conditions to Avoid: Incompatible materials, excess heat, combustible materials, reducing agents, temperatures above 100°C.
Incompatibilities with Other Materials: Reacts violently if mixed with reducing agents, organic matter, and other flammable and combustible materials including wood, paper, sulfur, aluminum, phosphorus, hydroxylamine, phosphinates, alky esters, ammounium hexacyanoferrate (4-), carbon, tin (II) chloride, and flammable liquids.
Hazardous Decomposition Products: Nitrogen oxides, irritating and toxic fumes and gases.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 10026-22-9: QU7355500
LD50/LC50:
CAS# 10026-22-9:
Oral, rat: LD50 = 691 mg/kg;
.

Carcinogenicity:
CAS# 10026-22-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans (listed as 'Cobalt, inorganic compounds').
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen (listed as Soluble cobalt (II) salts).

Epidemiology: No information available.

Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NITRATES, INORGANIC, N.O.S.	No information available.
Hazard Class:	5.1	
UN Number:	UN1477	
Packing Group:	II	

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 10026-22-9 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 10026-22-9: immediate, delayed, fire.

Section 313

This material contains COBALT (II) NITRATE HEXAHYDRATE (listed as Cobalt compounds), 100%, (CAS# 10026-22-9) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 10026-22-9 (listed as Cobalt compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10026-22-9 can be found on the following state right to know lists: Pennsylvania, (listed as Cobalt compounds), Minnesota, (listed as Cobalt, inorganic compounds).

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN O

Risk Phrases:

R 22 Harmful if swallowed.

R 42/43 May cause sensitization by inhalation and skin contact.

R 8 Contact with combustible material may cause fire.

Safety Phrases:

S 17 Keep away from combustible material.

S 22 Do not breathe dust.

S 24 Avoid contact with skin.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37 Wear suitable gloves.

S 28A After contact with skin, wash immediately with plenty of water
.

WGK (Water Danger/Protection)

CAS# 10026-22-9: 2

Canada - DSL/NDSL

None of the chemicals in this product are listed on the DSL or NDSL list.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 10026-22-9 is not listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

Material Safety Data Sheet

Cobalt(II) sulfate heptahydrate

ACC# 05370

Section 1 - Chemical Product and Company Identification

MSDS Name: Cobalt(II) sulfate heptahydrate
Catalog Numbers: S79974, S799741, C386-500
Synonyms: Cobalt sulfate heptahydrate; Cobalt(II) sulfate (1:1) heptahydrate.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
10026-24-1	Cobalt sulfate heptahydrate	100	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: red-pink solid.
Warning! Causes respiratory tract irritation. Causes eye and skin irritation. May be harmful if swallowed. May cause cancer based on animal studies. Potential cancer hazard.
Target Organs: No data found.

Potential Health Effects

Eye: Causes eye irritation.
Skin: Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.

Inhalation: Causes respiratory tract irritation.
Chronic: Cobalt compounds may cause cancer based upon animal studies.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cobalt sulfate heptahydrate	0.02 mg/m3 TWA (as Co) (listed under Cobalt, inorganic compounds).	none listed	none listed
Cobalt sulfate anhydrous	none listed	none listed	none listed

OSHA Vacated PELs: Cobalt sulfate heptahydrate: No OSHA Vacated PELs are listed for this chemical. Cobalt sulfate anhydrous: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: red-pink
Odor: none reported
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.

Boiling Point: 420 deg C
Freezing/Melting Point:96.7 deg C
Decomposition Temperature:420 deg C
Solubility: 60.4% (3 C)
Specific Gravity/Density: 1.948 @ 25°C
Molecular Formula: CoSO4.7H2O
Molecular Weight:281.0846

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Dust generation, moisture.
Incompatibilities with Other Materials: None reported. .
Hazardous Decomposition Products: Oxides of sulfur.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 10026-24-1: GG3200000
CAS# 10124-43-3: GG3100000
LD50/LC50:
CAS# 10026-24-1:
Oral, rat: LD50 = 582 mg/kg;
.

CAS# 10124-43-3:
Oral, mouse: LD50 = 584 mg/kg;
Oral, rat: LD50 = 424 mg/kg;
Oral, rat: LD50 = 424 mg/kg;
.

Carcinogenicity:
CAS# 10026-24-1:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans (listed as 'Cobalt, inorganic compounds').
- **California:** carcinogen, initial date 6/2/00
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

CAS# 10124-43-3:

- **ACGIH:** Not listed.

- **California:** carcinogen, initial date 5/20/05
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

Epidemiology: IARC Group 2B: Proven animal carcinogenic substance of potential relevance to humans.IARC Group 2B: No data available on human carcinogenicity, however sufficient evidence of carcinogenicity in animals.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information found.
Physical: No information found.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 10026-24-1 is not on the TSCA Inventory because it is a hydrate. It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 10124-43-3 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 10026-24-1: immediate, delayed.

Section 313

This material contains Cobalt sulfate heptahydrate (listed as Cobalt, inorganic compounds), 100%, (CAS# 10026-24-1) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 10026-24-1 (listed as Cobalt compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 10026-24-1 can be found on the following state right to know lists: New Jersey, (listed as Cobalt compounds), Pennsylvania, (listed as Cobalt compounds), Minnesota, (listed as Cobalt, inorganic compounds).

CAS# 10124-43-3 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Cobalt sulfate heptahydrate, a chemical known to the

state of California to cause cancer. WARNING: This product contains Cobalt sulfate anhydrous, a chemical known to the state of California to cause cancer.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 22 Harmful if swallowed.
R 42/43 May cause sensitization by inhalation and skin contact.
R 49 May cause cancer by inhalation.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 22 Do not breathe dust.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardous waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 10026-24-1: No information available.
CAS# 10124-43-3: 2

Canada - DSL/NDSL

CAS# 10124-43-3 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 10026-24-1 is not listed on the Canadian Ingredient Disclosure List.
CAS# 10124-43-3 is listed on the Canadian Ingredient Disclosure List.

FISHER SCIENTIFIC CO -- COBALTOUS CHLORIDE HEXAHYDRATE -- 6810-00-227-0409

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

Product ID:COBALTOUS CHLORIDE HEXAHYDRATE
MSDS Date:03/15/1989
FSC:6810
NIIN:00-227-0409
MSDS Number: BDKPL
=== Responsible Party ===
Company Name:FISHER SCIENTIFIC CO
Address:52 FADEM RD
City:SPRINGFIELD
State:NJ
ZIP:07081-3116
Country:US
Info Phone Num:201-379-1400
Emergency Phone Num:201-796-7100
Preparer's Name:GASTON L. PILLORI
CAGE:94480
=== Contractor Identification ===
Company Name:FISHER SCIENTIFIC COMPANY
Address:52 FADEM ROAD.DOMESTIC DIVISION
City:SPRINGFIELD
State:NJ
ZIP:07081
Country:US
Phone:201-796-7100
CAGE:94480

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

Ingred Name:COBALT CHLORIDE
CAS:7791-13-1
RTECS #:GG0200000
Fraction by Wt: 100%
OSHA PEL:0.1 MG/M3 (CO)
ACGIH TLV:0.05 MG/M3 (CO)

========== 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:ACUTE: INHALATION- DEATH, RHINITIS, IRRITATION OF RESPIRATORY SYSTEM, TRACHEITIS. EYES- IRRITATION. SKIN-IRRITATION, DERMATITIS. INGESTION- ABDOMINAL DISTRESS, NERVE DEAFNESS, DEATH. CHRONIC: ASTHMA, PNEUMONITIS, DERMATITIS. DAMAGE TO LIVER AND KIDNEYS.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:INHALATION: HEADACH, WEAKNESS, WHEEZING, SNEEZING. EYES: BURNING SENSATION, STINGING. SKIN: REDNESS, ITCHING, RASH. INGESTION: STOMACH PAIN, VOMITING, DIARRHEA, SKIN RASH, TINNITIS.
Medical Cond Aggravated by Exposure:PRE-EXISTING SKIN AND RESPIRATORY CONDITIONS MAY BE AGGRAVATED.

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

First Aid:INHALATION: GET TO FRESH AIR. RESUSCITATE IF NEEDED. SKIN: REMOVE CONTAMINATED CLOTHING. WASH SKIN WITH SOAP AND WATER FOR 20 MINUTES. EYE: WASH FOR 20 MINUTES. INGESTION: IF CONSCIOUS, GIVE 2 TO 4 GL ASSES OF WATER AND INDUCE VOMITING. SEEK MEDICAL ATTENTION FOR ALL THE ABOVE CONDITIONS.

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

Flash Point:NONE
Extinguishing Media:USE MEDIA APPROPRIATE FOR SURROUNDING FIRE.
Fire Fighting Procedures:WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE GEAR. MOVE CONTAINERS FROM FIRE IF IT CAN BE DONE AT NO RISK. DO NOT SCATTER SPILLED MATERIAL.
Unusual Fire/Explosion Hazard:NONE SPECIFIED BY MANUFACTURER.

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

Spill Release Procedures:OCCUPATIONAL SPILL: WHEN NOT INVOLVED IN FIRE, DO NOT ALLOW MATERIAL TO CONTAMINATE SEWERS AND WATER SOURCES. ABSORB MATERIAL IN INERT ABSORBANT AND PLACE IN CONTAINER FOR DISPOSAL.
Neutralizing Agent:NONE

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

Handling and Storage Precautions:STORE AWAY FROM INCOMPATIBLE MATERIALS. KEEP IN TIGHTLY CLOSED CONTAINER. STORE IN A COOL, DRY AREA.
Other Precautions:IMMEDIATELY DEADLY TO LIFE AND HEALTH (IDLH) CONDITIONS = 20 MG/M3 (CO). POISONING MAY AFFECT LIVER, KIDNEYS, BLOOD, RESPIRATORY, CARDIOVASCULAR, ENDOCRINE, GATROINTESTINAL, AND NERVOUS SYSTEMS. SKIN SENSITIZER.

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

Respiratory Protection:USE NIOSH/MSHA APPROVED RESPIRATOR FOR DUST AND MISTS.
Ventilation:USE ADEQUATE MECHANICAL VENTILATION.
Protective Gloves:RUBBER
Eye Protection:SAFETY GLASSES/CHEMICAL SPLASH GOGGLES
Other Protective Equipment:CLOTHING TO PREVENT PROLONGED OR REPEATED CONTACT. EYE WASH STATION & SAFETY SHOWER.
Work Hygienic Practices:PRACTICE GOOD PERSONAL HYGENE AFTER USE. DO NOT EAT, DRINK, OR SMOKE UNTIL HANDS ARE WASHED.
Supplemental Safety and Health
DO NOT WEAR CONTACT LENSES WHEN USING.

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

HCC:N1
Boiling Pt:B.P. Text:1920F,1049C
Melt/Freeze Pt:M.P/F.P Text:189F,87C
Spec Gravity:1.9
pH:4.2
Solubility in Water:APPRECIABLE

Appearance and Odor:PINK TO RED,SLIGHTLY DELIQUESCENT,PRISMATIC CRYSTL

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

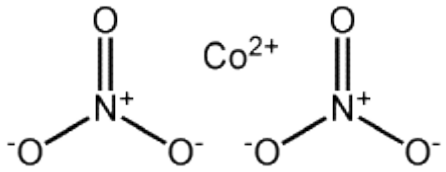
Stability Indicator/Materials to Avoid:YES
METALS, POTASSIUM, AND SODIUM. STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:EXCESSIVE HEAT, SPARKS, OPEN FLAME.
Hazardous Decomposition Products:TOXIC OXIDES OF COBALT AND CORROSIVE FUMES OF CLORINE.

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

Waste Disposal Methods:CONTACT LOCAL ENVIRONMENTAL MANAGER. DIPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Cobaltous nitrate

- Cobalt dinitrate
- Cobalt(2+) nitrate
- Cobalt(II) nitrate (1:2)

Formula	$Co(NO_3)_2$
Structure	
Description	Odorless red solid.
Uses	Manufacture of cobalt pigments & invisible inks, decorating stoneware & porcelain, prepn of catalyst, prodn of vitamin b12 supplements.

Registry Numbers and Inventories.

CAS	10141-05-6
NIH PubChem CID	25000
EC (EINECS/ELINCS)	233-402-1
RTECS	GG1109000
RTECS class	Tumorigen; Reproductive Effector
UN (DOT)	1477
Merck	12,2505
Beilstein/Gmelin	20108 (G)
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Japan ENCS (MITI)	Listed
Korea ECL	Listed
Philippiens PICCS	Listed

Properties.

Formula	CoN2O6
Formula mass	182.94
Melting point, °C	55.0

Odor threshold	Odorless
Density	2.49 g/cm3
Solubility in water	soluble

Hazards and Protection.

Storage	Keep in a cool, dry, dark location in a tightly sealed container or cylinder. Keep away from incompatible materials, ignition sources and untrained individuals. Secure and label area. Protect containers/cylinders from physical damage.
Handling	All chemicals should be considered hazardous. Avoid direct physical contact. Use appropriate, approved safety equipment. Untrained individuals should not handle this chemical or its container. Handling should occur in a chemical fume hood.
Protection	Wear appropriate protective gloves, clothing and goggles.
Respirators	Wear positive pressure self-contained breathing apparatus (SCBA).
Small spills/leaks	Keep away from combustible materials. Avoid contact unless wearing appropriate protective clothing. Stop leak if you can do it without risk. With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
Stability	Normally stable, reactive under extreme conditions.
Incompatibilities	May react explosively.

Fire.

Fire fighting	Fire fighting phases: use water spray. Wear self-contained breathing apparatus due to decomposition above 165 degrees fahrenheit, with release of toxic gaseous oxides of nitrogen.
Fire potential	Nonflammable.
Hazards	May explode from heat or contamination. May react explosively with hydrocarbons (fuels). May ignite combustibles.
Combustion products	Toxic oxides of nitrogen may form in fire.
Special	O

Health.

Exposure limit(s)	IDHL: 20 mg/m3
Carcinogin	G-A3, I-2B
Exposure effects	Administration of cobalt chloride to pregnant rats in doses up to 100 mg/kg/day did not produce teratogenicity or fetotoxicity. CASE REPORT - A 31-year-old woman with severe cobalt-induced pulmonary fibrosis delivered a normal full term infant. Throughout the pregnancy, supplemental oxygen was required during exercise due to deterioration of respiratory capacity. Inhalation exposureor respiratory disease is present.
Ingestion	Ingestion or inhalation of cobalt causes nausea, vomiting, diarrhea, and colicky

	abdominal pain.
Inhalation	An interstitial fibrotic pulmonary process has been described among hard metal workers and diamond polishers.
Skin	Contact may result in injury, burns and death.
Eyes	See Skin.

First aid

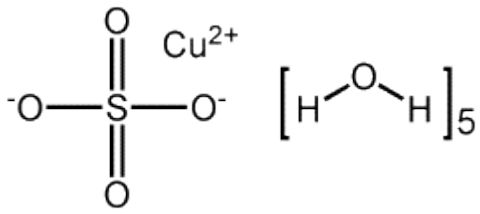
Ingestion	Give large amount of water; induce vomiting; call a doctor.
Inhalation	Move to fresh air; if breathing has stopped, begin artificial respiration and call a doctor.
Skin	Flush with water.
Eyes	Flush with water for at least 15 min.

Transportation.

UN number	1477
Response guide	140
Hazard class	5.1
Packing Group	II; III
USCG CHRIS Code	CCO
USCG Compatatibility Group	20 Alcohols, Glycols
IMO Pollution Category	D

Copper(II) sulfate, pentahydrate

- Cupric sulfate pentahydrate
- Bluestone
- Blue vicking
- Blue vitriol
- Calcanthite
- Blue copperas

Formula	$CuSO_4.5H_2O$
Structure	
Description	Blue crystalline granules or powder. Odorless. White when dehydrated.
Uses	Algaecide, fungicide, insecticide, water treatment, molluscicide, nematicide.

Registry Numbers and Inventories.

CAS	7758-99-8
NIH PubChem CID	24463
EC (EINECS/ELINCS)	616-477-9
EC Index Number	029-004-00-0
EC Class	Xn; R22, Xi; R36/38, N; R50-53
RTECS	GL8900000
RTECS class	Agricultural Chemical and Pesticide; Tumorigen; Mutagen; Human Data
UN (DOT)	9109
Merck	13,2682
Beilstein/Gmelin	7192 (G)
EPA OPP	24401
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Philippiens PICCS	Listed

Properties.

Formula	CuH10O9S

Formula mass	249.68
Melting point, °C	110 (decomposes)
Vapor density (air=1)	8.64
Density	2.284 g/cm3 (20 C)
Solubility in water	316 g/L (20 C)
Dielectric constant	7.8 (17 - 22 C)
Thermal expansion	0.000096/K
Heat of fusion	28.88 kJ/mol

Hazards and Protection.

Storage	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store protected from moisture. Store under an inert atmosphere.
Handling	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well ventilated area. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate protective gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.
Small spills/leaks	Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, using the appropriate protective equipment. Avoid generating dusty conditions. Provide ventilation. Place under an inert atmosphere.
Stability	Stable at room temperature in closed containers under normal storage and handling conditions. Air sensitive
Incompatibilities	Moisture, air, steel, finely powdered metals, hydroxylamine, magnesium, hydrazine, nitromethane.
Decomposition	Oxides of sulfur, irritating and toxic fumes and gases, oxides of copper, copper fumes.

Fire.

Fire fighting	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Substance is noncombustible. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion. Extinguishing media: Use extinguishing media most appropriate for the surrounding fire. In case of fire use water spray, dry chemical, carbon dioxide, or appropriate foam.

Fire potential		Nonflammable
Hazards		Containers may explode when heated.
Combustion products		Fire may produce irritating, corrosive and/or toxic gases.
NFPA	**Health**	2
	Flammability	0
	Reactivity	0

Health.

Poison_Class	3 (Strong toxins)
Exposure effects	Prolonged or repeated eye contact may cause conjunctivitis. May cause liver and kidney damage. May cause anemia and other blood cell abnormalities. Individuals with Wilson's disease are unable to metabolize copper. Thus, copper accumulates in various tissues and may result in liver, kidney, and brain damage. Laboratory experiments have resulted in mutagenic effects. May cause allergic skin reaction in some individuals. Chronic copper poisoning in man is recognized in the form of Wilson's disease.
Ingestion	Harmful if swallowed. May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. Ingestion of large amounts of copper salts may cause bloody stools and vomit, low blood pressure, jaundice and coma. Ingestion of copper compounds may produce systemic toxic effects to the kidney and liver and central nervous excitation followed by depression.
Inhalation	May cause ulceration and perforation of the nasal septum if inhaled in excessive quantities. Causes respiratory tract irritation with possible burns.
Skin	May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin irritation and possible burns. May cause itching eczema.
Eyes	Exposure to particulates or solution may cause conjunctivitis, ulceration, and corneal abnormalities. Causes eye irritation and possible burns.

First aid

Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation	Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Skin	Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Eyes	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Transportation.

UN number	9109
Response guide	171
Hazard class	9.2
HS Code	2833 25 00