Volume of Stock Solution B to be added,

$$\frac{1000}{16} \times 3 \text{ (from Beers' Chart, \#4)} = 187.5 \text{ ml}$$

Volume of water to be added,

$$\frac{1000}{16} \times 8 \text{ (from Beers' Chart, \#4)} = 500 \text{ ml}$$

The total volume will be:

312.5 + 187.5 + 500 = 1000 ml

DEVELOPMENT

A typical development run using Dr. Beers' Developer would be as follows:

Develop:	3 to 3.5 minutes
Stop:	30 seconds in acetic stop bath (cat. no. 03-0185)
Fix:	5 minutes in first bath of a two-bath fixer and 5 minutes in the second bath. Use Formulary Fixer 24 (cat. no. 03-0010).
Wash:	1 minute in running water
Clear:	2-3 minutes using Formulary Hypo Clear Agent (catalog number 03-0165)
Wash:	10-20 minutes in running water

Ansel Adams gives an excellent and detailed description of the use of Dr. Beers' developer in his book "The Print", pp. 60-65. In this method, the paper is exposed for the highlights and developed for the shadows.

Three trays of Dr. Beers' working solution are prepared. The first tray contains Beers' #1; the second, Beers' #4; and the third, Beers' #7.

Expose a test strip and develop it in Beers' #4. After the test strip has been fixed, decide which exposure produced good clean highlights with some detail. Using this exposure setting, expose a print and develop it in Beers' #4. After fixing, view the print and decide if the shadows are too light, too dark, or just right.

If the shadows are too light, develop the next print in Beers' #7. The shadows will be darker and the print will have more contrast. A slight decrease in exposure may be necessary to keep the highlights clean.

If the shadows are too dark, develop the next print in Beers' #1. A slight increase in exposure may be necessary to keep the detail in the highlights.

To further fine-tune the print, use Beers' #2 and #3 or Beers' #5 and #6, depending upon the results from the above test.

Cat. no. 02-0120
Cat. no. 02-0130

PHOTOGRAPHERS' FORMULARY INC.

P.O. Box 950 • Condon MT 59826 • 800-922-5255 • FAX 406-754-2896
E-mail: formulary@photoformulary.com

FORMULARY DR. BEERS' VARIABLE CONTRAST PAPER DEVELOPER

Directions for mixing and using Formulary Dr. Beers' Paper Developer, 1-liter size (cat. no. 02-0120) and 2-liter size (cat. no. 02-0130).

Dr. Roland F. Beers formulated his developer so that he could change print contrast using a single type of paper. Today, Dr. Beers' developer is extremely useful to fine-tune the contrast of a print.

The range of contrast that can be obtained using the Dr. Beers' developer is not large. In terms of paper contrast grades, the variation is only about 1.5 paper grades. For example, a number two paper can be printed from about grade 1.25 to about grade 2.75. However, any amount of contrast gradation within this range can be achieved by combining different proportions of the two stock solutions to obtain the working solution.

Stock Solution A contains metol, a soft-working developer. When stock Solution A is used alone a low-contrast print is obtained. Stock Solution B contains hydroquinone, a high contrast developer. When Stock Solution B is used alone, a high contrast print is obtained. Intermediate degrees of contrast are obtained by using various mixtures of Solutions A and B.

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. Please read the chemical warnings listed below, and on each package. Always use rubber gloves and a dust mask when using chemicals.

HYDROQUINONE: Considered hazardous by EPA. It is considered a skin sensitizer, and may cause eye or skin irritation. Please handle this liquid with gloves and splash goggles. If ingested or splashed in the eyes, contact a physician.

METOL: Some individuals become sensitized (develop allergic symptoms or rashes) when using metol. If this should occur, discontinue use and consult a physician.

The user assumes all risks upon accepting these chemicals. IF FOR ANY REASON YOU DO NOT WISH TO ASSUME ALL RISKS, PLEASE RETURN THE CHEMICALS WITHIN 30 DAYS FOR A FULL REFUND.

TCI AMERICA
SAFETY DATA SHEET

Revision number: 2
Revision date: 10/06/2014

1. IDENTIFICATION

Product name: 4-(Methylamino)phenol Sulfate
Product code: M0145

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborgate Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales-US@TCIchemicals.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

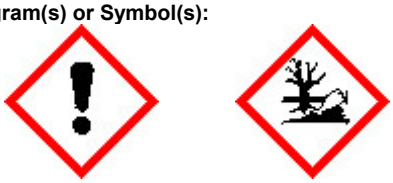
2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200:
Acute Toxicity - Oral [Category 4]
Sensitization - Skin [Category 1]
Aquatic Hazard (Acute) [Category 1]
Aquatic Hazard (Long-Term) [Category 1]

Signal word: Warning!

Hazard Statement(s):
Harmful if swallowed
May cause an allergic skin reaction
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects

Pictogram(s) or Symbol(s):



Precautionary Statement(s):

Prevention Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Avoid breathing dusts or mists. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves.

Response If swallowed: Immediately call a poison center or doctor. Rinse mouth. If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Storage None

Disposal Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: 4-(Methylamino)phenol Sulfate

3. COMPOSITION/INFORMATION ON INGREDIENTS

Percent: >98.0%(HPLC)(N)
CAS Number: 55-55-0
Molecular Weight: 344.38
Chemical Formula: $C_{14}H_{18}N_2O_2 \cdot H_2SO_4$

4. FIRST-AID MEASURES

Inhalation: May cause coughing, difficult breathing and nausea. Call emergency medical service. Effects of exposure (inhalation) to substance may be delayed. Inhalation of vapors or contact with substance will result in contamination and potential harmful effects. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Skin contact: Call a poison center or doctor if you feel unwell. Effects of exposure (skin contact) to substance may be delayed. Remove and wash contaminated clothing before re-use. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Eye contact: If this chemical contacts the eyes, immediately wash (irrigate) the eyes with large amounts of water, occasionally lifting the lower and upper eyelids. If eye irritation persists get medical advice/attention. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Ingestion: Harmful if swallowed. Effects of exposure (ingestion) to substance may be delayed. If swallowed, seek medical advice immediately and show the container or label. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Symptoms/effects:

Acute: No data available
Delayed: May cause skin sensitization.

Immediate medical attention: WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is harmful. CAUTION: Victim may be a source of contamination. If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO_2 , water spray, or alcohol-resistant foam. Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical
Hazardous combustion products: These products include: Carbon oxides Nitrogen oxides Silicates
Other specific hazards: Closed containers may explode from heat of a fire.

Special precautions for fire-fighters:
Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. Containers may explode when heated. Move containers from fire area if you can do it without risk.
Special protective equipment for fire-fighters:
Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Personal protective equipment: Safety glasses. Wear protective clothing (chemical resistant suit and chemical resistant boots). Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures: Prevent dust cloud. In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and excercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:
ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material. Dike far ahead of spill; use dry sand to contain the flow of material. Ventilate the area.

Environmental precautions:
Keep away from living quarters. Environmental hazard. Do not let product enter drains. Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid inhalation of vapor or mist. Do not ingest. Avoid contact with skin and eyes. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.

Conditions for safe storage: Keep only in the original container in a cool well-ventilated place. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods.

Storage incompatibilities: Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:
Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection: Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Wear protective gloves.
Eye protection: Safety glasses.
Skin and body protection: Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20□C): Solid
Form: Crystal - Powder
Color: White - Deep green
Odor: No data available
Odor threshold: No data available

Melting point/freezing point:	260°C (dec.) (500°F)	**pH:**	No data available
Boiling point/range:	No data available	**Vapor pressure:**	No data available
Decomposition temperature:	No data available	**Vapor density:**	No data available
Relative density:	No data available	**Dynamic Viscosity:**	No data available
Kinematic Viscosity:	No data available		
Partition coefficient: n-octanol/water (log P_{ow})	No data available	**Evaporation rate:** (Butyl Acetate = 1)	No data available
Flash point:	No data available	**Autoignition temperature:**	531°C (988°F)
Flammability (solid, gas):	No data available	**Flammability or explosive limits:**	
		Lower:	No data available
		Upper:	No data available

Solubility(ies):
Water: Soluble (4.7g/100mL, 15°C)
Slightly soluble: Alcohols
Insoluble: Ether

10. STABILITY AND REACTIVITY

Reactivity: Not Available.
Chemical Stability: Moisture sensitive. Light sensitive.
Possibility of Hazardous Reactions: No hazardous reactivity has been reported.
Conditions to avoid: Exposure to light. Exposure to moisture. Moisture sensitive.
Incompatible materials: Oxidizing agents
Hazardous Decomposition Products: No data available

11. TOXICOLOGICAL INFORMATION

RTECS Number: SL8650000

Acute Toxicity:
ipr-rat LDLo:50 mg/kg
orl-mus LD50:565 mg/kg
orl-rat LDLo:200 mg/kg
skn-gpg LD50:>1 g/kg

Skin corrosion/irritation:
skn-hmn 1 %/48H

Serious eye damage/irritation:
No data available

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
mmo-sat 167 ug/plate (-S9)

Carcinogenicity:

No data available

IARC: No data available **NTP:** No data available **OSHA:** No data available

Reproductive toxicity:
No data available

Routes of Exposure: Inhalation, Eye contact, Ingestion, Skin contact.
Symptoms related to exposure:
Overexposure may result in serious illness or death. Skin contact may result in sensitization. Readily absorbed through skin.
Potential Health Effects:
No specific information available; skin and eye contact may result in irriatation. May be harmful if inhaled or ingested.
Target organ(s): No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity
Fish: No data available
Crustacea: No data available
Algae: No data available

Persistence and degradability: No data available
Bioaccumulative potential (BCF): No data available
Mobillity in soil: No data available
Partition coefficient: No data available
n-octanol/water (log P_{ow})
Soil adsorption (Koc): No data available
Henry's Law: No data available
constant (PaM^3/mol)

13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

Disposal of container: Dispose of as unused product. Do not re-use empty containers.

Other considerations: Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

DOT (US) Non-hazardous for transportation.

IATA Non-hazardous for transportation.

IMDG Non-hazardous for transportation.

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):
This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations

CERCLA Hazardous substance and Reportable Quantity:

SARA 313: Not Listed
SARA 302: Not Listed

State Regulations

State Right-to-Know

Massachusetts Not Listed
New Jersey Not Listed
Pennsylvania Not Listed
California Proposition 65: Not Listed

Other Information

NFPA Rating:

Health: 2
Flammability: 0
Instability: 0

HMIS Classification:

Health: 2
Flammability: 0
Physical: 0

International Inventories

WHMIS hazard class: D2A: Materials causing other toxic effects. (Very Toxic)
D2B: Materials causing other toxic effects. (Toxic)

EC-No: 200-237-1

16. OTHER INFORMATION

Revision date: 10/06/2014
Revision number: 2

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.

Material Safety Data Sheet

Creation Date 20-Jan-2010 **Revision Date** 20-Jan-2010 **Revision Number** 1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **Sodium sulfite anhydrous**

Cat No. **BP355-500 S430-3 S430-10 S430-500 S447-3 S447-500**

Synonyms Disodium sulfite; Sulfurous acid, disodium salt (Crystalline/Powder/Certified ACS/Low Phosphate)

Recommended Use Laboratory chemicals

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 703-527-3887

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview

Contact with acids liberates toxic gas. May cause eye, skin, and respiratory tract irritation . May cause central nervous system effects.

Appearance Off-white **Physical State** Solid **odor** odorless

Target Organs Central nervous system (CNS)

Potential Health Effects

Acute Effects
Principle Routes of Exposure

Eyes May cause irritation.
Skin May cause irritation. May be harmful in contact with skin.
Inhalation May cause irritation of respiratory tract. May be harmful if inhaled.
Ingestion May be harmful if swallowed. May cause central nervous system effects. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects Mutagenic effects have occurred in experimental animals..

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Haz/Non-haz

Component	CAS-No	Weight %
Sodium sulfite	7757-83-7	97

4. FIRST AID MEASURES

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.

Ingestion Do not induce vomiting. Obtain medical attention.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point No information available.
Method No information available.

Autoignition Temperature No information available.

Explosion Limits
Upper No data available
Lower No data available

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire..

Unsuitable Extinguishing Media No information available.

Hazardous Combustion Products No information available.

Sensitivity to mechanical impact No information available.
Sensitivity to static discharge No information available.

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

NFPA **Health** 1 **Flammability** 0 **Instability** 1 **Physical hazards** N/A

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes and clothing.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Do not breathe dust. Avoid contact with skin, eyes and clothing. Keep away from acids.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near acids.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

NIOSH IDLH: *Immediately Dangerous to Life or Health*

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Respiratory Protection 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

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	Off-white
odor	odorless
Odor Threshold	No information available.
pH	8.5-10 5% aq.sol.
Vapor Pressure	No information available.
Vapor Density	No information available.
Viscosity	No information available.
Boiling Point/Range	No information available.
Melting Point/Range	>500°C / 932°F
Decomposition temperature °C	500
Flash Point	No information available.
Evaporation Rate	No information available.
Specific Gravity	2.630
Solubility	Partly soluble in water
log Pow	No data available

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight	126.04
Molecular Formula	Na2SO3

10. STABILITY AND REACTIVITY

Stability	Air sensitive. Moisture sensitive.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to air. Exposure to moisture.
Incompatible Materials	Strong oxidizing agents, Acids
Hazardous Decomposition Products	Sulfur oxides, Sodium oxides
Hazardous Polymerization	Hazardous polymerization does not occur
Hazardous Reactions .	Contact with acids liberates toxic gas.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium sulfite	820 mg/kg (Rat)	Not listed	22 mg/L (Rat) 1 h 5.5 mg/L (Rat) 4 h

Irritation	No information available.
Toxicologically Synergistic Products	No information available.

Chronic Toxicity

Carcinogenicity	There are no known carcinogenic chemicals in this product
Sensitization	No information available.
Mutagenic Effects	Mutagenic effects have occurred in experimental animals.
Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.
Other Adverse Effects	See actual entry in RTECS for complete information.

Endocrine Disruptor Information No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium sulfite	Not listed	Not listed	EC50 = 770 mg/L 17 h	LC50 24 h 330 mg/L

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available

Mobility .

Component	log Pow
Sodium sulfite	-4

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	CHINA	KECL
Sodium sulfite	X	X	-	231-821-4	-		X	X	X	X	KE-31612 X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313
Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act
Not applicable

Clean Air Act
Not applicable

OSHA
Not applicable

CERCLA
Not Applicable

California Proposition 65
This product does not contain any Proposition 65 chemicals.

State Right-to-Know
Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

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

WHMIS Hazard Class
Non-controlled

16. OTHER INFORMATION

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Tel: (412) 490-8929

Creation Date 20-Jan-2010

Print Date 20-Jan-2010

Revision Summary "***", and red text indicates revision

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS

Sodium Carbonate Monohydrate

Safety Data Sheet in accordance with Regulation (EC) 1272/2008 and Regulation (EU) 453/2010

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Product Name	Sodium carbonate monohydrate
Chemical Name	Sodium carbonate monohydrate
CAS Number	497-19-8
EC Number	207-838-8
Index Number	011-005-00-2
REACH Registration number	01-2119485498-19-0018

1.2 Relevant identified uses of the substance/mixture and uses advised against

Used as a water softener in laundry operations, as a household cleaner ingredient and as a general alkali.

1.2.1 Uses advised against

Do not mix with acids

1.3 Details of the supplier of the safety data sheet

Company Details: East Lancashire Chemical Co Limited, Edge Lane, Droylsden, Manchester, M43 6AU
Telephone: +44 (0) 161 3715585
Fax: +44 (0) 161 3011990
E-mail address: info@eastlancschemical.com

1.4 Emergency Telephone Number

Emergency Number 07836 697940

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) 1272/2008
Eye irritant 2

2.1.2 Classification according to EU Directive 67/548/EEC
Irritating to eyes

2.2 Label elements

2.2.1 Labelling according to Regulation (EC) 1272/2008

Hazard Pictogram

Signal Word: Warning

Hazard Statements
H319: Causes serious eye irritation

Precautionary Statements:
P102: Keep out of reach of children
P264: Wash hands thoroughly after handling
P280 Wear protective gloves/protective clothing/eye protection/face protection
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Rremove contact lenses, if present and easy to do. Continue rinsing
P337 + P313: If eye irritation persists: Get medical advice/attention

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2.2.2 Labelling according to Directive 67/548/EEC

Symbol: X - irritant

Risk Phrases

R36: Irritating to eyes

Safety Phrases:

S2: Keep out of the reach of children

S22: Do not breathe dust

S24: Avoid contact with skin

S25: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

2.3 Other hazards

The substance does not meet the criteria for PBT or vPvB according to Annex XIII of the REACH Regulation EC 1907/2006 (an inorganic substance)

No other hazards identified.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1/2 Substance/Mixture

Main constituent	Formula	Purity %w/w (typical)	CAS Number	EC Number
Sodium carbonate monohydrate	$Na_2CO_3.H_2O$	80-85% Na_2CO_3	497-19-8	207-838-8
Total water:	15-20% w/w			
Impurities:	No impurities identified.			

4. FIRST AID MEASURES

4.1 Description of first aid measures

4.1.1	General advice	Take off all contaminated clothing. No known delayed effects.
	Inhalation	Move to fresh air, keep warm and at rest. If symptoms persist seek medical advice.
	Skin contact	Remove contaminated clothing. Wash the skin with plenty of water until no 'soapy' feeling remains. Obtain medical attention if symptoms, e.g. redness or irritation, develop.
	Eye contact	Remove contact lenses if present. The eye should be thoroughly irrigated with clean water for not less than 15 minutes. Obtain medical attention if symptoms develop.
	Ingestion	Wash out mouth with water and give plenty of water to drink. Do not induce vomiting. If patient feels unwell obtain medical attention.
	Further Medical Treatment	Symptomatic treatment and supportive therapy as indicated.

4.2 Most important symptoms and effects, both acute and delayed

Skin contact: Irritation may occur.

Eye contact: Redness or irritation may occur.

Ingestion: May cause coughing..

Inhalation: There may be shortness of breath with a burning sensation in the throat. Exposure may cause coughing.

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4.3 Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media
Non-combustible although packaging may burn.

5.1.1 Suitable extinguishing media
Use extinguisher suitable for surrounding fire conditions.

5.1.2 Unsuitable extinguishing media
No further information available.

5.2 Special hazards arising from the substance or mixture
None identified.

5.3 Advice for fire fighters
No special precautions required.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non emergency personnel
Keep dust levels to a minimum.

6.1.2 For emergency responders
In the event of accidental release of bulk solid wear suitable gloves and eye/face protection. Use vacuum suction or shovel into containers for re-use or disposal according to local legislation. The affected area can be cleaned with plenty of water.

6.2 Environmental precautions
Prevent uncontrolled discharges into the environment.

6.3 Methods and material for containment and cleaning up
Refer to 6.1 above

6.4 Reference to other sections
For personal protection see Section 8.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Always follow good personal hygiene when working with this product. Wash promptly with soap and water if skin becomes contaminated. Do not breathe dust. Avoid contact with skin and eyes. Keep dust levels to a minimum. Ensure adequate ventilation.

7.2 Conditions for safe storage, including any incompatibles
Store in a cool well-ventilated place in the original closed containers. Avoid contact with acids and finely divided aluminium, zinc, tin and their alloys. The product will melt at 32/33° C.
In open containers, the product may lose water of crystallisation.
Keep out of the reach of children.

7.3 Specific end use(s)
Refer to label on container.

8. EXPOSURE CONTROLS /PERSONAL PROTECTION

8.1 Control parameters

Exposure limits (WEL) 10mg/m3 total dust; 5mg/m3 respirable dust.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Provide adequate general ventilation. Provide appropriate exhaust ventilation at places where dust is formed. Apply technical measures to comply with the occupational exposure limits.

8.2.2 Personal protective equipment

Respiratory protection	In the case of high dust levels wear suitable respiratory protective equipment e.g. dust mask or respirator, that conform international standard, EN143. Recommended filter type P2..
Eye protection	Wear eye/face protection rated to protect eyes against dust (EN166) e.g. safety eye shields with dust protection, goggles or face visor.
Skin protection	Dust impervious protective suit rubber or plastic boots where appropriate. Gloves are recommended for people with sensitive or damaged skin. Avoid prolonged contact with skin. Rinse hands after use.
Industrial Hygiene	Normal standards of industrial hygiene should be observed.
Disposal	Empty container thoroughly before disposal, Rinse empty container with water and recycle where possible.

8.2.3 Environmental exposure controls

Contain any large spillage, avoid large discharges to the environment. Dispose of any large rinse water in accordance with local and national regulations.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	fine white crystals
Odour	odourless
Odour threshold	currently not available
pH	>11 (saturated solution)
Melting point/Freezing Point	not applicable
Initial boiling point and boiling point range	not applicable
Flash point	not applicable
Evaporation rate	currently not available
Flammability (solid, gas)	does not ignite
Upper flammability or explosive limits	currently not available
Vapour pressure	currently not available
Vapour density	currently not available
Relative density (pouring density)	1.1g/ml approx.
Solubility(ies):	212.5 g/l @20 deg C(wrt anhydrous salt). Insoluble residue (up to 1%)
Partition coefficient: n-octanol/water	currently not available
Autoignition temperature	Does not burn
Decomposition temperature	loses w of c at 100 deg C
Viscosity	not applicable
Explosive properties	not explosive
Oxidising properties	not an oxidising product

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9.2 Other information
No other information available.

10. STABILITY AND REACTIVITY

10.1	**Reactivity**	Reaction with strong acids causes evolution of carbon dioxide.
10.2	**Chemical stability**	Loses water of crystallisation on prolonged standing in air and when heated to 32° C.
10.3	**Possibility of hazardous reactions**	Liberates carbon dioxide when mixed with acid. Solutions may react with new surfaces of aluminium and zinc and their alloys to produce hydrogen.
10.4	**Conditions to avoid**	Strong heat causing the product to melt and then dry out.
10.5	**Incompatible materials**	Acids, aluminium and zinc.
10.6	**Hazardous decomposition products**	None.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
No specific information available.

Inhalation	High concentrations of dust will irritate the respiratory system.
Skin contact	May cause skin irritation resulting from removal of natural greases.
Eye contact	Irritating to the eyes. May cause corneal damage in severe circumstances.
Ingestion	May result in a burning sensation in the mouth and throat, inability to swallow, and irritation of the gastro-intestinal tract with nausea and vomiting.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No specific information available.

12.2 Persistence and degradability
Not applicable.

12.3 Bioaccumulative potential
No bioaccumalation expected.

12.4 Mobility in soil
Readily absorbed into soil.

12.5 Results of PBT and vPvB assessment
Not a PBT or a PvB substance.

12.6 Other adverse effects
Based on bulk product.
High concentrations in receiving waters can cause long term adverse effects on the aquatic environment by raising pH. Low toxicity to fish.
No environmental hazard is likely provided the product is handled and disposed of with due care in accordance with normal household practice on following the instructions on the label.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Disposal should be in accordance with local, county or national legislation. Small quantities may be washed away using plenty of water. Dispose of contents by using as per directions for use. Rinse empty container and recycle where possible.

14. TRANSPORT INFORMATION

In its normal packaging this product is not classified as hazardous for transport.

15 REGULATORY INFORMATION

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

Health, safety and environmental details to be shown on label. Ref. Regulation (EC) 1272/2008 and EU Directive 67/548/EEC.
Refer to Section 2.

15.2 Chemical safety assessment

A Chemical safety assessment has been undertaken on sodium carbonate by our supplier.

16. OTHER INFORMATION

List of relevant R-phrases and symbols not included in Sections 2 and 3
No further statements included.
Abbreviations and acronyms

PBT Persistent, Bioaccumulative, Toxic
vPvB very Persistent, very Bioaccumulative
WEL Workplace exposure limit

The product information in this Data Sheet is, to the best of Dri-Pak's knowledge, correct as at the date of publication. No warranty is implied with respect to the quality or the specification of the product. The user must satisfy himself/herself that the product is suitable for his/her purpose.

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COLUMBUS CHEMICAL INDUSTRIES INC.

Safety Data Sheet

Potassium Bromide, Crystal Purified/Photo

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Potassium Bromide, Crystal Purified/Photo

Synonyms/Generic Names: Bromide salt of Potassium; Tripotassium tribromide

Product Number: 4195

Product Use: Industrial, Manufacturing or Laboratory use

Manufacturer: Columbus Chemical Industries, Inc.
N4335 Temkin Rd.
Columbus, WI. 53925

For More Information Call: 920-623-2140 (Monday-Friday 8:00-4:30)

In Case of Emergency Call: CHEMTREC - 800-424-9300 or 703-527-3887 (24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

OSHA Hazards: Target Organ Effect, Irritant, Mutagen

Target Organs: Central nervous system, Eyes

Signal Word: Warning

Pictograms:

GHS Classification:

Acute toxicity, Oral	Category 5
Skin irritation	Category 2
Eye irritation	Category 2A
Specific target organ toxicity - single exposure	Category 3
Acute aquatic toxicity	Category 3

GHS Label Elements, including precautionary statements:

Hazard Statements:

H303	May be harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H402	Harmful to aquatic life.

Precautionary Statements:

P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Potential Health Effects

Eyes	Causes eye irritation.
Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Ingestion	May be harmful if swallowed.

NFPA Ratings

Health	1
Flammability	0
Reactivity	0
Specific hazard	Not Available

HMIS Ratings

Health	1
Fire	0
Reactivity	0
Personal	E

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Weight %	CAS □	EINECS□/ ELINCS□	Formula	Molecular Weight
Potassium Bromide	100	7758-02-3	231830-3	KBr	119.00 g/mol

4. FIRST-AID MEASURES

Eyes	In case of eye contact, rinse with plenty of water and seek medical attention.
Inhalation	Move casualty to fresh air and keep at rest. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Skin	Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and wash using soap. Get medical attention.
Ingestion	**Do Not Induce Vomiting!** Never give anything by mouth to an unconscious person. If conscious, wash out mouth with water. Get medical attention.

5. FIRE-FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media	Product is not flammable. Use appropriate media for adjacent fire. Cool containers with water.
Special protective equipment and precautions for firefighters	Wear self-contained, approved breathing apparatus and full protective clothing, including eye protection and boots.
Specific hazards arising from the chemical	Emits toxic fumes (hydrogen bromide gas, potassium oxides) under fire conditions. (See also Stability and Reactivity section).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	See section 8 for recommendations on the use of personal protective equipment.
Environmental precautions	Prevent spillage from entering drains. Any release to the environment may be subject to federal/national or local reporting requirements.
Methods and materials for containment and cleaning up	Prevent spillage from entering drains. Pick up and arrange disposal without creating dust. Sweep up and place in suitable, closed containers for disposal. Clean surfaces thoroughly with water to remove residual contamination. Dispose of all waste and cleanup materials in accordance with regulations.

7. HANDLING AND STORAGE

Precautions for safe handling
See section 8 for recommendations on the use of personal protective equipment. Use with adequate ventilation. Wash thoroughly after using. Keep container closed when not in use. Avoid formation of dusts.

Conditions for safe storage, including any incompatibilities
Store in cool, dry well ventilated area. Keep away from incompatible materials (see section 10 for incompatibilities).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls: Contains no substances with occupational exposure limit values.

Personal Protection

Eyes	Wear chemical safety glasses or goggles.
Inhalation	Provide local exhaust, preferably mechanical. If exposure levels are excessive, use an approved respirator.
Skin	Wear nitrile or rubber gloves, apron or lab coat.
Other	Not Available

Other Recommendations
Provide eyewash stations, quick-drench showers and washing facilities accessible to areas of use and handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.)	White crystalline solid.
Odor	Odorless.
Odor threshold	Not Available
pH	Not Available
Melting point/freezing point	730°C (1346°F)
Initial boiling point and boiling range	1435°C (2615°F)
Flash point	Not Flammable
Evaporation rate	Not Available
Flammability (solid, gas)	Not Flammable
Upper/lower flammability or explosive limit	Not Explosive
Vapor pressure	Not Available

Vapor density	Not Available
Density	2.75 (Water = 1)
Solubility (ies)	Easily soluble in cold water, hot water. Slightly soluble in diethyl ether. Insoluble in acetate.
Partition coefficient: n-octanol/water	Not Available
Auto-ignition temperature	Not Available
Decomposition temperature	Not Available

10. STABILITY AND REACTIVITY

Chemical Stability	Stable
Possibility of Hazardous Reactions	Will not occur.
Conditions to Avoid	Moisture.
Incompatible Materials	Strong oxidizing agents, strong acids, heavy metal salts, aluminum, potassium.
Hazardous Decomposition Products	Hydrogen bromide gas, potassium oxides.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Skin	Not Available
Eyes	Not Available
Respiratory	Not Available
Ingestion	LD50 Oral - rat - 3,070 mg/kg

Carcinogenicity

IARC	No components of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH	No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP	No components of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA	No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs Symptoms of Exposure

Skin	Irritation, redness, itchiness.
Eyes	Irritation, redness, watering eyes, itchiness, enlarge pupils with subnormal reaction to light, miosis, diplopia.
Respiratory	Irritation, coughing, wheezing.
Ingestion	Irritation, nausea, vomiting, diarrhea.

Chronic Toxicity	Not Available
Teratogenicity	Not Available
Mutagenicity	May affect genetic material.
Embryotoxicity	Not Available
Specific Target Organ Toxicity	Not Available
Reproductive Toxicity	Not Available
Respiratory/Skin Sensitization	Not Available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic Vertebrate	LC50 - Pimephales promelas (fathead minnow) - > 30 mg/l - 96 h
Aquatic Invertebrate	Not Available
Terrestrial	Not Available

Persistence and Degradability	Not Available
Bioaccumulative Potential	Not Available
Mobility in Soil	Not Available
PBT and vPvB Assessment	Not Available
Other Adverse Effects	Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

Waste Residues	Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container.
Product Containers	Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product may significantly change the characteristics of the material and alter the waste classification and proper disposal methods.

14. TRANSPORTATION INFORMATION

US DOT	Not Dangerous Goods
TDG	Not Dangerous Goods
IMDG	Not Dangerous Goods
Marine Pollutant	No
IATA/ICAO	Not Dangerous Goods

15. REGULATORY INFORMATION

TSCA Inventory Status	All ingredients are listed on the TSCA inventory.
DSCL (EEC)	All ingredients are listed on the DSCL inventory.
California Proposition 65	Not Listed
SARA 302	Not Listed
SARA 304	Not Listed
SARA 311	Potassium bromide
SARA 312	Potassium bromide
SARA 313	Not Listed
WHMIS Canada	CLASS D-2B: Material causing other toxic effects (TOXIC).

16. OTHER INFORMATION

Revision	Date
Revision 1	08-06-2012

SAFETY DATA SHEET

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

Product identifier

Product name: Eastman(TM) Hydroquinone, European Pharma Grade

Product No.: EAN 978227. 08992-0E, P08992E1, P08992E2, P08992E3

Synonyms, Trade Names: 08992-0E

Additional identification

Chemical name:	1,4-benzenediol
CAS-No.:	123-31-9

Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Chemical Intermediate, Inhibitor, Photographic processing chemical.

Uses advised against: None known.

Details of the supplier of the safety data sheet

Manufacturer / Supplier

Eastman Chemical Company
200 South Wilcox Drive
Kingsport, TN 37660-5280 US
+14232292000

Visit our website at www.EASTMAN.com or email emnmsds@eastman.com

Emergency telephone number:

For emergency health, safety, and environmental information, call 1-423-229-4511 or 1-423-229-2000.

For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

SECTION 2: Hazards identification

Hazard Classification:

Health Hazards

Acute toxicity (Oral)	Category 4
Serious eye damage	Category 1
Skin sensitizer	Category 1
Germ Cell Mutagenicity	Category 2
Specific Target Organ Toxicity - Single Exposure (Dermal)	Category 2

OSHA Specified Hazards:

Combustible dust	If converted to small particles during further processing, handling or by other means may form combustible dust concentrations in air.

Warning label items including precautionary statement:

Pictogram:

Signal Words: DANGER!

Hazard Statement(s):
H302: Harmful if swallowed.
H318: Causes serious eye damage.
H317: May cause an allergic skin reaction.
H341: Suspected of causing genetic defects.
H371: May cause damage to organs.
If converted to small particles during further processing, handling or by other means may form combustible dust concentrations in air.

Precautionary Statement:

Prevention:
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P281: Use personal protective equipment as required.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P260: Do not breathe dust/fume/gas/mist/vapors/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P272: Contaminated work clothing should not be allowed out of the workplace.

Response:
P309+P311: IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330: Rinse mouth.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
P363: Wash contaminated clothing before reuse.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.

Storage:
P405: Store locked up.

Disposal:
P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC): None known.

SECTION 3: Composition/information on ingredients

Substances / Mixtures

General information:

Chemical name	Concentration	Additional identification	Notes
hydroquinone	100%	CAS-No.: 123-31-9	#

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
# This substance has workplace exposure limit(s).

SECTION 4: First aid measures

Description of first aid measures

Inhalation: Move to fresh air. Treat symptomatically. Get medical attention if symptoms persist.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin contact: Immediately remove contaminated clothing and shoes and wash skin with soap and plenty of water. If skin irritation or an allergic skin reaction develops, get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Call a physician or poison control center immediately. Only induce vomiting at the instruction of medical personnel. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed: May irritate and cause redness and pain. Symptoms may be delayed.

Indication of any immediate medical attention and special treatment needed

Hazards: None known.

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

General Fire Hazards: Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or grounding procedures.

Extinguishing media

Suitable extinguishing media: Water spray. Dry chemical. Carbon Dioxide. Water spray. Carbon Dioxide. Dry chemical.

Unsuitable extinguishing media: None known. None known.

Special hazards arising from the substance or mixture: Powdered material may form explosive dust-air mixtures.

Advice for firefighters

Special fire fighting procedures: Minimize dust generation and accumulation.

Special protective equipment for fire-fighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: Wear appropriate personal protective equipment.

Environmental Precautions: Do not release into the environment.

Methods and material for containment and cleaning up: Sweep up and place in a clearly labeled container for chemical waste. Large Spillages: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

Notification Procedures: In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

SECTION 7: Handling and storage:

Precautions for safe handling: Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

Conditions for safe storage, including any incompatibilities: Keep container closed. Keep away from food, drink and animal feeding stuffs.

Specific end use(s): Inhibitor Chemical Intermediate Photographic processing chemical.

SECTION 8: Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Country specific exposure limits have not been established or are not applicable unless listed below.

Chemical name	type	Exposure Limit Values	Source
hydroquinone	TWA	1 mg/m3	US. ACGIH Threshold Limit Values (01 2010)
	PEL	2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	ST ESL	20 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (03 2014)
	AN ESL	2 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (03 2014)

Exposure controls

Appropriate engineering controls: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information: Eye bath. Washing facilities. Safety shower.

Eye/face protection: Chemical goggles and face shield are recommended. Wear a full-face respirator, if needed.

Skin protection

Hand Protection: Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information. Wash hands after contact.

Other: No data available.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Hygiene measures: Observe good industrial hygiene practices.

Environmental Controls: No data available.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance	
Physical state:	solid
Form:	solid (crystal)
Color:	white
Odor:	Odorless
Odor Threshold:	No data available.
pH:	No data available.
Melting Point	172.3 °C
Boiling Point:	287 °C
Flash Point:	165 °C (closed cup)
Evaporation Rate:	No data available.
Flammability (solid, gas):	not applicable
Flammability Limit - Upper (%)–:	No data available.
Flammability Limit - Lower (%)–:	No data available.

Vapor pressure:	0.000032 hPa (25 °C)
Vapor density (air=1):	3.8
Specific Gravity:	1.33 (15 °C)
Solubility(ies)	
Solubility in Water:	72 g/l (25 °C)
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	log Pow: 0.59
Autoignition Temperature:	515 °C
Decomposition Temperature:	Thermal stability not tested. Low stability hazard expected at normal operating temperatures.
Dynamic viscosity:	not applicable
Kinematic viscosity:	not applicable
Explosive properties:	Not classified.
Oxidizing properties:	Not classified.

SECTION 10: Stability and reactivity

Reactivity:	None known.
Chemical Stability:	Stable
Possibility of Hazardous Reactions:	None known.
Conditions to Avoid:	Heat, sparks, flames. Light.
Incompatible Materials:	Strong oxidizing agents. Strong alkalis.
Hazardous Decomposition Products:	Carbon Dioxide. Carbon Monoxide.

SECTION 11: Toxicological information

Information on likely routes of exposure

Inhalation:	None known.
Ingestion:	Harmful if swallowed.
Skin contact:	May cause an allergic skin reaction. May cause skin depigmentation.
Eye contact:	Causes serious eye damage.

Information on toxicological effects

Oral

Product:	No data available.
Specified substance(s):	
hydroquinone	Oral LD-50: (Rat): > 375 mg/kg

Dermal

Product:	No data available.

Specified substance(s):

hydroquinone	Dermal LD-50: (Rabbit): > 2,000 mg/kg

Inhalation

Product: No data available.

Repeated dose toxicity

Product: No data available.

Specified substance(s):

hydroquinone	NOAEL (Rat, Oral Study, 90 d): 20 mg/kg NOAEL (Rat, Dermal Study, 90 d): 73.9 mg/kg (highest dose tested)

Skin Corrosion/Irritation

Product: No data available.

Specified substance(s):

hydroquinone	(Rabbit, 24 h): none

Serious Eye Damage/Eye Irritation

Product: No data available.

Specified substance(s):

hydroquinone	(Human): corneal opacity

Respiratory or Skin Sensitization

Product: No data available.

Specified substance(s):

hydroquinone	Skin Sensitization: (Mouse): sensitizing Skin Sensitization: (Guinea Pig): Not a skin sensitizer.

Carcinogenicity

Product: No data available.

Toxicity to reproduction

Product: No data available.

Developmental toxicity

Product: No data available.

Germ Cell Mutagenicity

In vitro

Product: No data available.

Specified substance(s):

hydroquinone	Mutagenicity - Bacterial: negative Chromosomal aberration: negative Chromosomal aberration: positive Chromosomal aberration: negative Mutagenicity - Mammalian: positive

In vivo

Product: No data available.

Specified substance(s):

hydroquinone — Chromosomal aberration intraperitoneal injection (Mouse): positive
Chromosomal aberration oral: gavage (Rat): negative

Specific Target Organ Toxicity - Single Exposure

Product: No data available.

Specific Target Organ Toxicity - Repeated Exposure

Product: No data available.

Aspiration Hazard

Product: No data available.

Other effects: No data available.

SECTION 12: Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: No data available.

Specified substance(s):

hydroquinone — LC-50 (Fish, 96 h): 0.638 mg/l

Aquatic Invertebrates

Product: No data available.

Specified substance(s):

hydroquinone — EC-50 (daphnid, 48 h): 0.134 mg/l

Chronic hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic Invertebrates

Product: No data available.

Specified substance(s):

hydroquinone — NOEC: (daphnid, 21 d): 0.0057 mg/l

Toxicity to Aquatic Plants

Product: No data available.

Specified substance(s):

hydroquinone — EC-50 (Alga, 72 h): 0.33 mg/l
NOEC: (Alga, 72 h): 0.019 mg/l

Persistence and Degradability

Biodegradation

Product: No data available.

Specified substance(s):
hydroquinone 70 % (14 d, Ready Biodegradability: Modified MITI Test (I)) Readily biodegradable

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available.

Partition Coefficient n-octanol / water (log Kow)
Product: Log Kow: 0.59 20 °C

Mobility in Soil: No data available.

Known or predicted distribution to environmental compartments
hydroquinone Log Koc: 0.97 - 1.7 (QSAR model)

Other Adverse Effects: No data available.

SECTION 13: Disposal considerations

Waste treatment methods

General information: No data available.

Disposal methods: Dispose of waste and residues in accordance with local authority requirements. Incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied.

SECTION 14: Transport information

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT

Class 9, Packing Group III when material is shipped in quantities in one package at or above the Reportable Quantity and when no other hazard class applies; otherwise, not regulated.

Reportable Quantity: 45.4 kg (hydroquinone)
Marine pollutant.: hydroquinone
Possible Shipping Description(s):

UN 3077 Environmentally hazardous substances, solid, n.o.s. (hydroquinone) 9 III

IMDG - International Maritime Dangerous Goods Code

Marine pollutant.: (hydroquinone)

Possible Shipping Description(s):

UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (hydroquinone) 9 III

IATA

Possible Shipping Description(s):

UN 3077 Environmentally hazardous substance, solid, n.o.s. (hydroquinone) 9 III

SECTION 15: Regulatory information

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

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.
WHMIS (Canada) Status: controlled
WHMIS (Canada) Hazard Classification: D/1/B, D/2/B

SARA 311-312 Hazard Classification(s):
immediate (acute) health hazard
delayed (chronic) health hazard

US EPCRA (SARA Title III) Section 313 - Toxic Chemical List
HYDROQUINONE

OSHA: hazardous

TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): This product is listed on the DSL or otherwise complies with CEPA new substance notification requirements.

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): This product is listed on AICS or otherwise complies with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): This product is listed in the Handbook or has been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.

SECTION 16: Other information

HMIS® Hazard Ratings: Health - 2*, Flammability - 1, Chemical Reactivity - 0

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

Revision Information:	New SDS
Key literature references and sources for data:	No data available.
Training information:	No data available.
Issue Date:	05/16/2015
SDS No.:	
Disclaimer:	This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.