

PHOTOGRAPHERS' FORMULARY

FORMULARY WINDISCH PYROCATECHIN FILM DEVELOPER

TO MAKE 25 TO 40 LITERS OF WORKING SOLUTION

The Windisch Pyrocatechin developer was formulated by Hans Windisch to develop film containing scenes of extreme high contrast and at the same time provide negatives with excellent sharpness. A 15 stop scene can be reproduced when using this developer.

The unusual range of contrast of this developer is attained by the combined effects of (1) using a very dilute working solution; (2) using a tanning developer, catechol (pyrocatechin); and (3) the release of bromide ions from the film during development.

By using a very dilute working solution, the development of the highlights is retarded by the local exhaustion of the developer. Therefore, the shadow areas develop to a greater extent than do the highlight areas.

Catechol (pyrocatechin), a tanning developer, caused the emulsion in the highlighted area to become hard, which inhibits exchange of the exhausted developer in the emulsion with the fresh developer, thus retarding development in the highlight areas while allowing development to continue in the shadow areas.

As development proceeds, bromides are released from the emulsion. The highlights produce more bromides than do the shadows, thus highlights are restrained to a greater degree than are the shadows. In addition, there is also a slight local diffusion of the released bromides resulting in a narrow underdeveloped line in the shadow area surrounding the highlights. The result is increased contrast at the boundaries and consequently increased acutance.

The tanning action of catechol will cause the negatives to turn brown. The extended contrast range will reduce the emulsion speed 1/2 to 1 f-stop. For example, Plus X (ASA 125) should be exposed at ASA 64. However, different films will vary in their response to Windisch Pyrocatechin. Therefore, make careful tests before using this developer extensively.

Your kit contains the following chemicals:

CHEMICAL	AMOUNT
Sodium sulfite	12.5 g
Catechol (pyrocatechin)	80 g
Sodium hydroxide	100 g

FOR YOUR CHEMICAL SAFETY:

All chemicals are dangerous and must be treated with respect. Please read the warning label on each package. There are two chemicals in this kit that need special attention.

CATECHOL: As a solid, vaporizes readily. Avoid smelling the vapor because it has the potential to burn membranes. When mixing a solution containing catechol, work in a well ventilated area. This chemical is also corrosive and can cause skin burns. If you should spill a solution of catechol, wash the area (or skin) with soap and water. Use rubber gloves whenever possible.

SODIUM HYDROXIDE: As a solid or in solution, is a dangerous chemical. It is corrosive and, if spilled on the skin, will cause a chemical burn. The burn occurs without pain. When working with



THATCHER COMPANY MATERIAL SAFETY DATA SHEET
PRODUCT: SODIUM SULFITE, CATALYZED
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MSDS Date: December 2, 2003
Emergency Contact: 1-800-424-9300

SECTION I

PRODUCT NAME: Sodium Sulfite, Catalyzed
CHEMICAL NAME: Sodium Sulfite, catalyzed
CHEMICAL FAMILY: Inorganic Sulfite
SYNONYMS: B 501; Catalyzed Anhydrous Sodium Sulfite
FORMULA: Na₂SO₃ + catalyst

DOT SHIPPING INFORMATION: Not DOT Regulated

SECTION II - HAZARDOUS INGREDIENTS

This material contains no ingredients which are known by Thatcher Company to be hazardous unless listed below.

HAZARDOUS MATERIAL	CAS NUMBER	w/w %	EXPOSURE LIMITS IN AIR
Sodium Sulfite	7757-83-7		TLV = 5 mg/m ³
Cobalt Sulfate (as Co)	10124-43-3		TLV = 0.05 mg/m ³ * PEL = 0.1 mg/m ³

*recommended

The specific identity of some ingredients may be withheld for confidential business purposes. However, all known potential health effects from exposure to these ingredients are being addressed.

SECTION III - PHYSICAL DATA

BOILING POINT (F): N/A

SPECIFIC GRAVITY: 2.633 @ 15.4 EC

VAPOR PRESSURE (mm Hg): N/A

% VOLATILE, BY VOLUME: N/A

VAPOR DENSITY (air = 1): N/A

EVAPORATION RATE: N/A

SOLUBILITY IN WATER: Soluble

APPEARANCE AND ODOR: White to pink crystals or powder with saline, sulfurous taste.

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: Nonflammable

FLAMMABLE LIMITS:

Lel: N/A Uel: N/A

EXTINGUISHING MEDIA:



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Use any.

SPECIAL FIRE-FIGHTING PROCEDURES:

Wear self-contained breathing apparatus if necessary.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

When heated, catalyzed sodium sulfite decomposes and emits highly toxic fumes of sodium oxide and sulfur oxides.

SECTION V - REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS OR MATERIALS TO AVOID:

None.

HAZARDOUS DECOMPOSITION PRODUCTS:

When heated, catalyzed sodium sulfite decomposes and emits toxic fumes of sodium oxide and sulfur oxides.

SECTION VI - HEALTH HAZARD DATA

CARCINOGENIC LISTING:

NTP: No ingredients listed in this section.

IARC MONOGRAPHS: No ingredients listed in this section.

OSHA 29 CFR 1910: No ingredients listed in this section.

ENTRY ROUTES & EFFECTS OF OVEREXPOSURE:

Contact: Contact may irritate eyes.

Ingestion: If swallowed, can cause irritation of stomach, nausea and gas.

STATEMENT OF PRACTICAL TREATMENT:

Contact: Flush exposed area thoroughly with soap and water. For eyes, flush with cool water for at least 15 minutes. If irritation persists, get medical attention.

Ingestion: If swallowed, give several glasses of water and call a physician immediately.

SECTION VII - SPECIAL PRECAUTIONS



THATCHER COMPANY MATERIAL SAFETY DATA SHEET

PRODUCT: SODIUM SULFITE, CATALYZED

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HANDLING AND STORAGE PRECAUTIONS:

Store in a cool, dry area .

STEPS TO BE TAKEN IF MATERIAL SPILLS OR LEAKS:

Wear proper safety equipment. Sweep up material and put into drums. Flush residue to sewer with large amounts of water (if permitted).

WASTE DISPOSAL METHOD:

Dispose of in landfill. Comply with all local, state and federal regulations.

OTHER PRECAUTIONS:

N/A

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:

Use dust mask as needed to avoid breathing dust.

VENTILATION:

Use adequate ventilation.

EYE PROTECTION:

Wear goggles or safety glasses.

SKIN PROTECTION:

Wear rubber gloves.

OTHER PROTECTIVE EQUIPMENT:

None required.

ACGIH = American Conference of Governmental Industrial Hygienists

CL = Ceiling Level

IARC = International Agency for Research on Cancer: Monographs

OSHA = Occupational Safety and Health Administration

N/A = Not Applicable

NTP = National Toxicology Program: Annual Report on Carcinogens

PEL = Permissible Exposure Level (OSHA)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average over 8 Hours

STEL = Short Term Exposure Limit (ACGIH)

ND = Not Determined

This information is, to the best of our knowledge, accurate but may not be complete. THATCHER COMPANY furnishes this information in good faith, but without warranty, representation or guarantee of its accuracy, completeness, or reliability.

10-0340



Material Safety Data Sheet

NFPA	HMIS	Personal Protective Equipment						
	<table border="1"> <tr> <td>Health Hazard</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Fire Hazard</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Reactivity</td> <td style="text-align: center;">0</td> </tr> </table>	Health Hazard	3	Fire Hazard	1	Reactivity	0	<p>See Section 15.</p>
Health Hazard	3							
Fire Hazard	1							
Reactivity	0							

Section 1. Chemical Product and Company Identification																	
Common Name/ Trade Name	Pyrocatechol																
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985																
Commercial Name(s)	Not available																
Synonym	1,2-Benzenediol																
Chemical Name	Catechol																
Chemical Family	Not available.																
Chemical Formula	C6H6O2																
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985																
	<table border="1"> <tr> <td>Code</td> <td>P4870</td> </tr> <tr> <td>CAS#</td> <td>120-80-9</td> </tr> <tr> <td>RTECS</td> <td>UX1050000</td> </tr> <tr> <td>TSCA</td> <td>On the TSCA list.</td> </tr> <tr> <td>CI#</td> <td>Not available.</td> </tr> <tr> <td colspan="2">In case of emergency</td> </tr> <tr> <td colspan="2">CHEMTREC (24hr) 800-424-9300</td> </tr> <tr> <td colspan="2">Emergency phone: (310) 516-8000</td> </tr> </table>	Code	P4870	CAS#	120-80-9	RTECS	UX1050000	TSCA	On the TSCA list.	CI#	Not available.	In case of emergency		CHEMTREC (24hr) 800-424-9300		Emergency phone: (310) 516-8000	
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Section 2. Composition and Information on Ingredients					
		<i>Exposure Limits</i>			
Name	CAS#	TWA (mg/m3)	STEL (mg/m3)	CEIL (mg/m3)	% by Weight
Pyrocatechol	120-80-9				100
Toxicological Data on Ingredients	Pyrocatechol:				

Section 3. Hazards Identification	
Potential Acute Health Effects	Extremely dangerous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Very dangerous in case of skin contact (sensitizer, permeator). Corrosive to eyes and skin. Severe over-exposure can result in death. Can be fatal if inhaled or ingested. This product may irritate eyes and skin upon contact. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Potential Chronic	Extremely dangerous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Very dangerous in case of skin contact (sensitizer, permeator). CARCINOGENIC

Health Effects

EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. The substance is toxic to lungs, mucous membranes. Toxicity of the product to the reproductive system: Not available. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.
Skin Contact	If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
Hazardous Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention.
Hazardous Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.
Ingestion	Remove dentures if any. Watch for an obstruction in the victim's mouth. Remove if possible what is causing the obstruction but do not force fingers or a hard object between the victim's teeth. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Seek immediate medical attention.
Hazardous Ingestion	Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Remove dentures if any. Watch for an obstruction in the victim's mouth. Remove if possible what is causing the obstruction but do not force fingers or a hard object between the victim's teeth. If a soft pad can be inserted between the victim's teeth, it will protect the tongue from being bitten. A badly bleeding tongue immensely complicates the patient's problems. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. If convulsions occur, do not restrain the victim, but do remove objects with which he (she) might injure himself (herself) or orient the victim to prevent him (her) from striking fixed heavy objects. If the convulsions cease, turn the victim on the side or face down so that any fluid in the mouth will drain. Seek immediate medical attention.

Section 5. Fire and Explosion Data

Flammability of the Product	Combustible.
Auto-Ignition Temperature	Not available.
Flash Points	CLOSED CUP: 127.22.C (261.F) OPEN CUP: 136.67.C (278.F)
Flammable Limits	Not available.

Products of Combustion	These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances	No specific information is available in our database regarding the flammability of this product in presence of various materials.
Explosion in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.
Special Remarks on Fire Hazards	No additional remark.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container.
Large Spill	Poisonous solid. Stop leak if without risk. DO NOT get water inside container. DO NOT touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Call for assistance on disposal.

Section 7. Handling and Storage

Precautions	Keep locked up. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. DO NOT ingest. DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.
Storage	Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves (impervious). Wear appropriate respirator when ventilation is inadequate.
Personal	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus

Protection in
Case of a
Large Spill

sufficient; consult a specialist BEFORE handling this product.

Exposure
Limits

TWA: 5 (ppm) TWA: 20 (mg/m) Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	Odor	Slight.
Molecular Weight	110.11	Taste	Sweet. Bitter.
pH (1% soln/water)	Not available.	Color	Colorless.
Boiling Point	245.5.C (473.9.F)		
Melting Point	105.C (221.F)		
Critical Temperature	Not available.		
Specific Gravity	1.344 (Water = 1)		
Vapor Pressure	Not available.		
Vapor Density	3.79 (Air = 1)		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water.		
Solubility	Soluble in cold water.		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	No specific information is available in our database regarding the reactivity of this material in presence of various other materials.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry	Ingestion. Skin contact. Inhalation.
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Toxicity to Animals Acute oral toxicity (LD50): 210 mg/kg (Guinea pig). Acute dermal toxicity (LD50): 800 mg/kg (Rabbit).

Chronic Effects on Humans The substance is toxic to lungs, mucous membranes. Toxicity of the product to the reproductive system: Not available.

Other Toxic Effects on Humans Extremely dangerous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion, of inhalation. Very dangerous in case of skin contact (sensitizer, permeator).

Special Remarks on Toxicity to Animals No additional remark.

Special Remarks on Chronic Effects on Humans No additional remark.

Special Remarks on other Toxic Effects on Humans No additional remark.

Section 12. Ecological Information

Ecotoxicity Not available.

BOD5 and COD Not available.

Products of Biodegradation These products are carbon oxides (CO, CO2).

Toxicity of the Products of Biodegradation The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation No additional remark.

Section 13. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local or regional authorities.

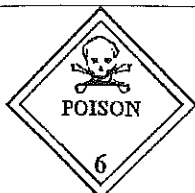
Section 14. Transport Information

DOT Classification DOT CLASS 6.1: Poisonous material.

Identification Toxic solid, organic, n.o.s. (Pyrocatechol) UN2811 III

Special Provisions for Transport No additional remark.

DOT (Pictograms)



Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

Pyrocatechol

Pensylvania Right-To-Know, Hazardous substance List, Hazardous Substances and Special hazardous Substances on the list must be identified when present in products. Components present in this product at a level which could require reporting under the statute are:

Pyrocatechol

Massachusetts Right-To-Know, Substance List (MSL) Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. Components present in this product at a level which could require reporting under the statute are:

Pyrocatechol

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal or greater than the reportable quantities (RQs) in 40 CFR 302.4. Components present in this product at a level which could require reporting under the statute are:

Pyrocatechol

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

NONE

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC)

R39- Danger of very serious irreversible effects.
R41- Risk of serious damage to eyes.
R21/22- Harmful in contact with skin and

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
 WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

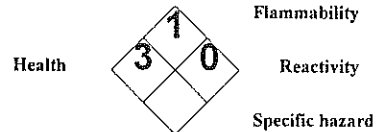
DSCL (EEC)

R39- Danger of very serious irreversible effects.
 R41- Risk of serious damage to eyes.
 R21/22- Harmful in contact with skin and if swallowed.
 R26/27/28- Very toxic by inhalation, in contact with skin and if swallowed.
 R42/43- May cause sensitization by inhalation and skin contact.

HMIS (U.S.A.)

Health Hazard	2
Fire Hazard	1
Reactivity	0
Personal Protection	0

National Fire Protection Association (U.S.A.)



Personal Protective Equipment



Protective Gloves (impervious).



Lab coat.



Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.



Splash goggles.

Section 16. Other Information**References** Not available.**Catalog Number(s)** P1455**Other Special Considerations** No additional remark.**Validated by** E. Brull on 12/17/96.**Verified by** E. Brull.
Name**Emergency Phone:** (310)516-8000

Notice to Reader All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Chemical Mfg. Corp. assumes no responsibility for the completeness or accuracy of the information contained herein.

Solvay Minerals



P.J.Luzmoor, Safety/Training Dept.
 Solvay Minerals, Inc., Green River, WY.
 Date: September 18, 1996
 Supersedes edition: 06-09-95
 Purpose of revision: 14.3 & 15.1.

SOLVAY MINERALS, INC.
 M.S.D.S. NUMBER 011

MATERIAL SAFETY DATA SHEET

The following information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations of mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

Telephone No. - General Information : 1-800-443-2788 or 307-872-6638(7:00 AM-5:00 PM, M - F) M.S.T.
 (Solvay Minerals, Inc., Green River, Wyoming)
 Telephone No. - Emergencies (USA) : 1-307-872-6607(Solvay Minerals caustic control)
 Telephone No. - Emergencies (USA) : 1-800-424-9300 (CHEMTREC)
 Telephone No. - Emergencies (INTERNATIONAL/MARITIME) : 1-703-527-3887 (CHEMTREC)
 Telephone No. - Emergencies (CANADA) : 0-613-966-6666 (CANUTEC)
 Telephone No. - Emergencies(MEXICO) 91-800-00-214(MEX. REPUBLIC)-0-11-52-5-575-0838(SETIO)

1. PRODUCT IDENTIFICATION	
1.1	Product Name: CAUSTIC SODA-ANHYDROUS
1.2	Chemical Name: SODIUM HYDROXIDE.
1.3	Synonyms: CAUSTIC SODA(beads-flakes-micropearls).
1.4	Trade Names: CAUSTIC SODA, SODIUM HYDROXIDE-SOLID.
1.5	Formula: NaOH
1.6	Molecular Weight: 40.01
1.7	CAS No.: 1310-73-2

2. COMPOSITION/INFORMATION ON INGREDIENTS			
INGREDIENTS/FORMULA	CAS #	PIN #	PERCENT
Sodium Hydroxide-NaOH	1310-73-2	1823	>99.000%
Sodium Carbonate-Na ₂ CO ₃	0497-19-8	None	<.005%

3. HAZARD IDENTIFICATION

3.1 Sodium hydroxide-solid is a white, crystalline, translucent corrosive material. Causes severe eye and skin burns. Reacts with moisture to release heat and reacts with metals to release hydrogen.

3.2 Route(s) of Entry: *Inhalation? yes Skin? yes Ingestion? Yes*

3.3 Effects of exposure:

Corrosive. Causes severe eye and skin burns. Eye, skin, and respiratory tract irritant.

Inhalation: Inhalation of mists and dusts cause burns of the nasal passage, severe irritation of the respiratory tract and gastrointestinal tract damage. May cause pulmonary edema.

Eyes: Intense irritation and burns to the eyes and eyelids. Potential loss of sight.

Skin: Intense irritation and burns, reddening and swelling to the skin. Deep ulcerations, difficult to heal. Upon contact with product in solution, the skin becomes "soapy" to the touch.

Ingestion: Intense irritation and burns to the mouth, throat, esophagus and stomach. Ingestion of concentrated solutions has caused death in animals and humans. (Gosselin, Smith, and Hodge, 1984; PB 234-899, 1984).

4. FIRST AID MEASURES**4.1 First Aid:**

Inhalation: Remove individual from area of exposure to fresh air, support breathing as necessary. Seek **immediate** medical attention.

Eyes: **Immediately** flush eyes and surrounding area for at least 15 minutes, using large amounts of water. Lift eyelids to insure the flushing of entire eye surface and the underside of eyelids. Seek **immediate** medical attention.

Skin: **Immediately** direct individual under a shower. Remove contaminated clothing including footwear. Wash affected skin with water until "soapy" feel is gone. Continue irrigation and seek **immediate** medical attention if contact is extended or with a hot solution.

Ingestion: **IN ALL CASES, CALL A PHYSICIAN IMMEDIATELY. REQUEST AMBULANCE TRANSPORT TO NEAREST HOSPITAL.** Do not attempt to give anything by mouth to an unconscious person. Treat for shock.

4.2 Medical Conditions Aggravated by Exposure:

Skin and lung disorders may be affected adversely by sodium hydroxide; an individual's specific medical condition and type of exposure determine the likelihood of an adverse effect.

5. FIRE FIGHTING MEASURES

5.1 Flash Point: Non combustible. *Method:* Not applicable.

5.2 Autoignition Temperature: Not applicable.

5.3 Flammability Limits: *Lower & Upper Limit:* Non flammable.

5.4 Unusual Fire and Explosion Hazards: Non combustible.

5.5 Common Extinguishing Methods: Not applicable.

5.6 Fire Fighting Procedures: Extinguish fire using agent suitable for surrounding fire. Use water spray to keep containers cool. Keep water away from direct contact with material.

6. ACCIDENTAL RELEASE MEASURES

6.1 Spills: Wear proper protective clothing (see section 8). Keep water away from the area of release. Stop or control the spill without undue risk to personnel. Prompt cleanup and removal are necessary. In case of rain, protect product with the aid of a plastic sheet to avoid the run-off of solution into the sewer. Shovel material into a suitable dry container. Isolate discharged material for disposal in accordance with applicable federal, state, and local environmental laws and regulations.

7. HANDLING AND STORAGE

7.1 Handling: Avoid contact with the skin, eyes, or clothing. **DO NOT WEAR CONTACT LENSES, EVEN WITH PROPER EYE PROTECTION, WHEN HANDLING THIS PRODUCT.** Use adequate ventilation and use NIOSH/MSHA approved full face respiratory protection when exposure to excessive dust is possible. Wash exposed areas immediately and thoroughly after skin contact from working with this product and before eating, drinking, using tobacco products or using the rest room. The effects of exposure can cause burns which are not immediately painful or visible.

7.2 Storage: Keep in a closed, properly labeled container in a well ventilated, dry area away from acids, water, oxidizing materials, and metals (tin, aluminum, and zinc). Protect from physical damage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure Limits: ACGIH 1994-1995 ceiling = 2 mg/m₃, OSHA PEL ceiling = 2 mg/m₃.

8.2 Ventilation: Effective ventilation should be provided to meet established exposure limits. Local exhaust ventilation advised when working with solution or when excessive mists are present.

8.3 Respiratory Protection: Wear full face respirators approved by NIOSH/MSHA if dusts are expected or exceeds established exposure limits.

8.4 Protective Gloves: Wear chemical resistant gloves such as natural or butyl rubber, neoprene, or PVC.

8.5 Eye Protection: Wear chemical safety goggles and chemical face shield. **DO NOT WEAR CONTACT LENSES, EVEN WITH EYE PROTECTION.**

8.6 Other Protective Clothing or Equipment: Wear rubber or vinyl impervious boots, pants, coat, or apron with long sleeves, and other protective clothing suitable for use conditions to prevent contact with skin or eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

- | | |
|-----|---|
| 9.1 | Melting Point: 318°C (604°F). |
| 9.2 | Boiling Point: 1390°C (2534°F). |
| 9.3 | Specific Gravity (H ₂ O=1): 2.13 @ 15.5°C (60°F). |
| 9.4 | Vapor Density (air=1): Not applicable. |
| 9.5 | Vapor Pressure: 1.5 mm HG, 0.2 kPa @ 20°C (68°F). |
| 9.6 | Solubility: Completely soluble in water(50% solution @ >10°C 50°F) accompanied by a significant release of heat). |
| 9.7 | Decomposition Temperature: Not available. |
| 9.8 | Viscosity: 50 cps @ 36°C (97°F) for a 50% solution. |
| 9.9 | pH: 14.0 (5% solution). |

10. STABILITY AND REACTIVITY

- | | |
|------|--|
| 10.1 | Stability: Slightly reactive. |
| 10.2 | Hazardous Decomposition Products: None. |
| 10.3 | Conditions to Avoid: Strong alkali. When in contact with water, may generate sufficient heat(with splattering) to ignite combustible materials. Reacts with some metals producing hydrogen, a flammable gas, when moist. |
| 10.4 | Materials and Substances to Avoid: Contact with acids, flammable liquids, organic halogen compounds, nitro compounds, and amphoteric metals, such as aluminum, magnesium, and zinc. |

11. TOXICOLOGICAL INFORMATION

- | | |
|------|---|
| 11.1 | Acute toxicity: LD ₅₀ -oral 400 mg/kg species: rabbit |
| 11.2 | Chronic toxicity: Prolonged exposure to high concentrations can cause ulceration of nasal passages and lung irritation. |

12. ECOLOGICAL INFORMATION

- | | |
|------|--|
| 12.1 | Aquatic toxicity classification: Reference RTECS, 1981-1982
NIOSH RTECS NO. 79 - 100 TLm96 = 100 - 10 ppm |
|------|--|

13. DISPOSAL CONSIDERATIONS

- | | |
|------|---|
| 13.1 | Waste treatment: If considered a waste, Caustic Soda may be a characteristic hazardous waste under 40 CFR 261. All residual Sodium Hydroxide-solid should be removed from any container prior to disposal. It is recommended that Sodium Hydroxide-solid waste be disposed of in a EPA approved disposal facility in accordance with applicable environmental laws and regulations. |
| 13.2 | RCRA waste #: 40 CFR 261.22, characteristic of corrosivity(D002)-see section 13.1. |

14. TRANSPORT INFORMATION	
14.1	UN #: 1823
14.2	TDG class: 8 TDG packing group.: II TDG subsidiary class(es): (9.2) RL for division 9.2: 50 Kg.
14.3	DOT ERG guide #: 154
14.4	Hazard class: IMO: 8 DOT: 8(Corrosive).
14.5	Proper shipping name: TDG,IMO,DOT: Sodium hydroxide, solid,

15. REGULATORY INFORMATION			
15.1	NFPA: Health - 3 Flammability - 0 Reactivity - 1 Special-W	HMIS: Health - 3 Fire - 0 Reactivity - 1 Pers. Protection-J	WHMIS: Class E-CORROSIVE
15.2	Regulatory/Carcinogenicity Status: NTP: None (1987). IARC: None (1990). OSHA: None (1987).		
15.3	CERCLA reportable quantity: 1000 pounds (454 KG).		
15.4	SARA listing: Yes. Sodium hydroxide-solid - CAS 1310-73-2		
15.5	TSCA inventory: Yes.		

16. OTHER INFORMATION
ALWAYS add sodium hydroxide-solid to water with constant agitation. NEVER add water to the sodium hydroxide-solid.

