

A 1000-watt quartz lamp and photofloods can be used, as well as the sun. If you are using fluorescent black light remember to adjust your negatives accordingly, as these types of lights tend to print flat.

DRYING THE PAPER:

Suspend the print to dry on a line in your work area. Drying normally takes overnight or several hours with a smaller print. Dry the print naturally. Force drying the paper with heat could affect the registration on subsequent coats.

PRINTING SECOND AND THIRD EMULSION COATINGS:

This will build depth in the print. A color combination in "free form" gum printing is what makes gum printing "fun". For example if you print a blue coat first followed by a red coat the result is a purple magenta looking print. There are many combinations, you just need to find the right combination that you like best for the images you are printing.

DEVELOPING THE PRINT:

This procedure is done under low-light conditions (a 40-watt bulb) until the print is fully under the water.

You will need three trays of 68°F (20°C) clean water. Once exposed remove the negative and "quickly" place the paper in the first water bath, **FACE DOWN**. Gently poke a few times to keep the print submerged. Ten minutes in each tray. When finished hang to dry.

CLEARING THE DICHROMATE STAIN:

This final stage should be carried out when the printing is completely finished. If you are doing three emulsion coatings, you will not clear the print until the end, after all three colors have been applied to the paper. Do this step once per print. Mix 5 grams of Potassium Metabisulfite with 500 ml of distilled water and put it into a plastic spray bottle. This solution should be mixed just before clearing the prints. Spray this solution on the image surface of your print and let sit for one minute, then wash the print for ten minutes. Be careful at this stage, as the surface is susceptible to damage. If you are testing colors and wish to see the "true" color you must clear the print of the dichromate stain.

PHOTOGRAPHERS' FORMULARY

P.O. Box 950 • Condon MT 59826 • 800-922-5255 • FAX 406-754-2896

Gum Bichromate Kits 07-0100 & 07-0105

Contains chemicals to make approximately 35-40 8 x 10 prints

The following is a general overview on how to gum print. It is meant simply as a summary of the process.

For complete details on gum printing please refer to *Gum Printing* by Stephen Livick, available from Photographers' Formulary Inc. (cat. No. 08-0055), or from the author at www.livick.com

CHEMICALS CONTAINED IN THIS KIT

This kit contains the following chemicals:

| Chemical | Amount |
|-----------------------------|----------|
| Potassium Dichromate | 40 grams |
| Pure 100% Liquid Gum Arabic | 250 ml |
| Potassium Metabisulfite | 10 grams |
| Gelatin | 10 grams |
| Glyoxal | 15 ml |
| Pigment(s) | 1 or 3 |

It is also recommended that you purchase a gram scale capable of measuring down to 1/2 gram if you wish to be proficient in gum printing.

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. This kit contains one chemical that needs special attention. Potassium Dichromate: This is both a toxic and an oxidizer. To dispose of excess potassium dichromate, always wash the solid down a drain with copious amounts of water. Never dispose of the solid in a wastepaper basket. Spillage of a dichromate solution on the skin will cause a chemical burn, which will appear as an ulceration. In addition, all chromium salts are potential carcinogens. We strongly advise you to use disposable rubber gloves when handling this compound or its solutions. Clean all trays and containers thoroughly with water followed by soap and water. Dispose of all excess dichromate salts and their solutions down a drain with large volumes of water.

Contact local sewer and water authorities regarding proper disposal of darkroom chemicals in your area.

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 CREDIT OR EXCHANGE.

MIXING THE SOLUTIONS

The Dichromate Solution

Mix the 40 grams of Potassium Dichromate with 250 ml of warm DISTILLED water, 120°F. Allow to cool to 70°F. When cooled, there will be small crystals at the bottom of the bottle.

All chemicals and pigments should be carefully weighed or measured before mixing and recorded in a notebook to help maintain consistency.

THE GUM EMULSION:

The first step before you can mix or coat the emulsion is to determine the ratio of gum to watercolor pigment you will start with.

For one 8-x-10 print start with 1 gram of watercolor pigment to 6ml of gum solution. This is a special mix for Sennelier pigments. Consider this to be your base mix. For an 8X10 print, mix only 1 gram of pigment to 6 ml of gum solution and 6 ml of Potassium Dichromate solution. You will have a little emulsion left over after brushing the emulsion onto the paper. Watercolor pigment to gum solution ratios can go as high as 4 or 6 grams of pigment or as low as 1/2 gram to 12 ml gum depending on the color, the nature of the pigment and the required saturation.

The mixing of the gum/pigment solution with the potassium dichromate should be done in low light (one 60-watt light bulb).

MAKING A SUITABLE NEGATIVE FOR GUM PRINTING:

The negative is critical to your final results and should be created especially for the gum process. Gum printing is a contact procedure and your negative must be the same size you wish the final image.

Generally speaking, a rich or full shadow detail negative, one that has a slightly flat tonal range, is needed to obtain good results. Gum printing produces its best results in the mid tone areas of negatives. It is best to expose your negative for full shadow detail or use subjects which lend themselves to the printing characteristics of the process.

There are a number of different negative options that can be used; these include continuous tone negatives, lithographic or inkjet negs.

SHRINKING THE PAPER:

Pre-shrinking the paper is a key element of ensuring accurate registration.

Watercolor paper expands when wet and shrinks to a smaller than original size when dry. Watercolor paper should be pre-shrunk for 30 minutes in 140° F water and fully dried before adding the gelatin coating.

GELATINIZE THE PAPER:

Sizing keeps the emulsion on the surface of the paper. Without sizing the image can settle into the paper, resulting in poor quality and difficulty in clearing the emulsion that was not exposed.

If you are doing one coat gum prints it may not be necessary to use a gelatin sizing. Try prints with sizing and prints without to determine for yourself which method you prefer. Mix 3.25 grams of gelatin into 125 ml of DISTILLED WATER, and let stand 1/2 hour. Then warm the gelatin but do not boil. Add 5 ml of Glyoxal as the hardener.

Brush this mixture onto the area where you will coat the emulsion onto your paper. Do not over-brush. Brush the sizing on the paper with your natural bristle brush with quick, direct strokes, then do only one quick smoothing. Make sure you cover all the image area.

COATING THE EMULSION ONTO THE PAPER:

Storing emulsion-coated paper does not work in gum printing as the emulsion quickly deteriorates. **WORK ONE SHEET AT A TIME.** Moisten the bristle brush. Quickly brush the emulsion on the paper. Do not over-brush - do only one quick smoothing of the emulsion with the same coating brush.

EXPOSING THE EMULSION

It is impossible for anyone to tell you the correct exposure times for your particular gum to pigment ratio, combined with your light source and type of negative. The amount of pigment you have in the emulsion may require a longer exposure time.

Exposure is affected by the ultra violet light source you use, the distance the light is from the contact frame, the density of the negative and the amount of pigment to gum ratio. The best light source is the metal halide with a bulb designed for bichromated emulsions



10-1000
COLUMBUS CHEMICAL INDUSTRIES INC.

P.O. BOX 8
COLUMBUS, WISCONSIN 53925-0008
(920) 623-2140
FAX (920) 623-2577

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (as Used on Label and List)

Potassium Dichromate

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

Section I

Manufacturers /Distributor Address Number Street City State and Zip Code

Columbus Chemical Industries, Inc.

N4335 Temkin Road

Columbus, Wisconsin 53925

Emergency Telephone Number

CHEMTREC: 1 (800) 424-9300

Telephone Number for Information

1 (920) 623-2140

Date Prepared

04-26-2005

Signature of Preparer (optional)

Section II - Hazardous Ingredients/Identity Information

| Hazardous Components (Specific Chemical Identity, Common Name(s)) | CAS # | OSHA PEL | ACGIH TLV | Other Limits Recommended | % (optional) |
|--|-----------|--|---------------------------------|-------------------------------------|--------------|
| Potassium Dichromate* ** | 7778-50-9 | 0.1 mg/m ³ as CrO ₃ | 0.05 mg/m ³ as Cr | 0.001 mg/m ³ REL 10hr | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

*Subject to SARA Section 313 Reporting Requirements.

** Synonyms: Potassium Bichromate, Bichromate of Potash

Section III - Physical/Chemical Characteristics

| | | | |
|-------------------------|---------------|---|---------------|
| Boiling Point | 500°C(932°F) | Specific Gravity (H ₂ O = 1) | Not available |
| Vapor Pressure (mm Hg) | Not available | Melting Point | 398°C(748°F) |
| Vapor Density (AIR = 1) | Not available | Evaporation Rate (Butyl Acetate = 1) | Not available |

Solubility in Water

Soluble, 10.5% w/w @ 20°C

Appearance and Odor

Orange-red, odorless solid

Section IV Fire and Explosion Hazard Data

| | | | |
|---------------------------|------------------|----------------|----------------|
| Flash Point (Method Used) | Flammable Limits | LEL | UEL |
| Nonflammable | | Not applicable | Not applicable |

Extinguishing Media

Suitable to extinguish the supporting flame. Water spray, dry chemical, carbon dioxide, alcohol foam.

Special Fire Fighting Procedures

In the event of a fire, wear full protective clothing and NIOSH/MSHA-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Prevent contact with skin and eyes.

Unusual Fire and Explosion Hazards

May emit toxic fumes under fire conditions. Oxidizer. Reacts explosively with Hydrazine and anhydrous Hydroxylamine

Section V Reactivity Data

| | | | | |
|-----------|----------|---|---------------------|----------------|
| Stability | Unstable | | Conditions to Avoid | Incompatibles. |
| | Stable | X | | |

Incompatibility Materials to Avoid

Reducing agents, combustible materials, organic materials, acids, metals and alkalis.

Hazardous Decomposition or Byproducts

Potassium, potassium oxide.

Hazardous Polymerization**Conditions to Avoid**

| | | |
|----------------|---|------|
| May Occur | | None |
| Will Not Occur | X | |

Section VI Health Hazard Data

| Routes of Entry | Inhalation ? | Skin ? | Ingestion ? |
|-----------------|--------------|--------|-------------|
| | Yes | Yes | Yes |

Health Hazards (Acute and Chronic)

Skin: Corrosive, permeator, sensitizer. Eyes,: severe corrosive, may cause permanent corneal damage. Inhalation:

corrosive, prolonged inhalation may cause asthma. May result in impaired kidney and liver function. Ingestion:

Causes severe irritation, This material is a known carcinogen.

| Carcinogenicity | NTP | IARC Monographs | OSHA REGULATED? |
|-----------------|-------|-----------------|-----------------|
| | Known | Known Group 1 | Chromium |

Signs and Symptoms of Exposure.

Burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting, erythema, blisters,

tissue destruction, bloody diarrhea, edema, convulsions, bronchitis, pneumonia, cardiovascular collapse, shock and death.

Medical Conditions Generally Aggravated by Exposure

Asthma, emphysema, other respiratory diseases.

Emergency and First Aid Procedures

EYES/SKIN: Flush immediately with plenty of water for at least 15 minutes. Remove contaminated clothing. Remove contact lenses if possible. Call physician if irritation develops. Wash clothing before reuse. **INGESTION:** DO NOT induce vomiting. Give several cups of water to conscious victim. Call a physician. **INHALATION:** Move to fresh air. Give oxygen if breathing is difficult, artificial respiration if not breathing.

Section VII Precautions for Safe Handling and Use**Steps to be Taken in Case Material is Released or Spilled**

Evacuate unprotected personnel from area. Ventilate spill area. Wear self-contained breathing apparatus, rubber boots, heavy protective gloves and chemical safety goggles. Dampen spilled material to avoid creating dust. Sweep up and place in non combustible container. Flush spill area with water.

Waste Disposal Method Dispose in accordance with all applicable Federal, state and local regulations.

Precautions to be Taken in Handling and Storing

Keep container tightly closed. Store in corrosion-proof area. Do not get in eyes or on skin or clothing. Do not taste or swallow. Avoid breathing dust. Use only with adequate ventilation. Wash thoroughly after handling. Separate from combustible materials.

Other Precautions Do not get in eyes, on clothing. Do not breathe vapor. Use with adequate ventilation. Containers, even when empty, will retain residue. Always obey hazard warnings and handle empty containers as if they were full.

Section VII Control Measures**Respiratory Protection (Specify Type)**

NIOSH/MSHA approved dust/mist respirator.

| | | | | |
|-------------|----------------------|------------------------------|---------|--------------------------|
| Ventilation | Local Exhaust | Recommended to control dust. | Special | Eye-wash station nearby. |
| | Mechanical (General) | Recommended. | other | Safety shower nearby. |

Protective Gloves Rubber gloves.

Eye Protection Safety goggles

Other Protective Clothing or Equipment Lab coat or apron and rubber boots. Face-shield recommended.

Work /Hygienic Practices Wash exposed areas thoroughly after handling. Wash contaminated clothing before reuse.

Do NOT wear contact lenses. Wear appropriate personal protective equipment. Oxidizer! Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. **CARCINOGEN!!**

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GUM ARABIC 14°Bé

100% PURE GUM ARABIC SOLUTION

MSDS ID: J1075-02D

| | | |
|---------------------------------|---------------------|---|
| H R A T I N G | Health | 0 |
| | Fire | 0 |
| | Reactivity | 0 |
| | Personal Protection | - |

MANUFACTURED BY:

TEL (414)258-0911

(800)558-0747

FAX (414)258-7908

EMERGENCY (CHEMTREC)

RBP CHEMICAL CORPORATION

150 SOUTH 118th STREET

P.O. BOX 14069

MILWAUKEE, WI 53214-0069

(800)424-9300

HAZARDOUS INGREDIENTS

| NAME | CAS# | TLV | STEL | % |
|------|------|-----|------|---|
|------|------|-----|------|---|

Non-hazardous by OSHA standards

Constituents which may require SARA Title III Section 313 reporting.

None

PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: nd

Solubility in Water: Complete

pH: 4

Density: 9.2 lbs/gal, 1.11 gm/ml

VOC by EPA Method 24:

NONE

VOC Vapor Pressure: nd

Appearance and Odor:

Straw colored, slightly viscous solution with maky odor.

FIRE AND EXPLOSION HAZARD DATA

Flash Point: NONE (TCC)

Extinguishing Media:

N/A

Special Fire Fighting Procedures:

As in any fire involving chemicals, self-contained breathing apparatus and protective clothing should be worn.

Unusual Fire and Explosion Hazards:

None

REACTIVITY DATA

Stability: Stable

Incompatibility:

None

Hazardous Decomposition Byproducts:

None known

Hazardous Polymerization: Will not occur.

Conditions to Avoid:

None

HEALTH HAZARD DATA**Routes of Entry:**

| | | |
|------------|----------|-----------|
| Inhalation | Skin | Ingestion |
| Unlikely | Unlikely | Unlikely |

Health Hazards Acute and Chronic:

For industrial use only. No hazards are expected if used in the manner intended.

Carcinogenicity:

None of the ingredients in this product are listed by IARC, NTP or OSHA as carcinogenic.

Emergency and First Aid Procedures:

Eye Contact: Flush eyes with copious amounts of water. If irritation develops, consult a physician.

Skin Contact: Wash with soap and water.

Inhalation: Not a hazard under normal conditions of use.

Ingestion: If a large amount has been ingested, induce vomiting.

Signs and Symptoms of Overexposure:

N/A

Medical Condition Aggravated by Exposure:

N/A

PRECAUTIONS FOR USE AND DISPOSAL**Spills:**

Soak up spill with suitable absorbent or flush with plenty of water to sewer. Rinse area with water.

Waste Disposal:

Rinse to sewer.

Special Storage/ Handling Precautions:

None

CONTROL MEASURES**Respiratory Protection:**

Not required.

Ventilation:Local ☐ Mechanical ☒ Special ☐

Eye Protection: Not normally required.

Gloves: Not normally required.

Other:

None

The information contained herein is furnished without warranty of any kind. Users should consider this data a supplement to other information gathered by them and are responsible for completeness of information to assure proper use of these materials and the safety and health of their employees.

Date Printed: 12/19/95

This MSDS prepared under the direction of:

Wayne Koontz, Safety Director 10/19/87

Revised: 7/5/95 WJK

Rev. Code: 02D

10-1050

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 001

MSDS NO: BA201279

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 12/09/03

VERSION: 003

PRODUCT: POTASSIUM METABISULFITE

ORDER NO: 218481

PROD NO : 666873

PHOTOGRAPHERS FORMULARY

CALL IN ADVANCE TO MEET

7079 HWY 83 N.

BOX 89

CONDON , MT 59826

UNIVAR USA INC.

(425)889-3400

6100 CARILLON POINT

, KIRKLAND

, WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC

(800)424-9300

PRODUCT IDENTIFICATION

PRODUCT NAME: POTASSIUM METABISULFITE

MSDS#: BA201279

DATE ISSUED: 08/07/03

SUPERSEDES: 01/29/00

ISSUED BY: 009130

MATERIAL SAFETY DATA SHEET

1. Substance/preparation and company identification

Potassium Metabisulfite

Use: Chemical

Company:

BASF Aktiengesellschaft Unternehmensbereich Anorganika E-CAA

67056 Ludwigshafen, Deutschland

Telephone: +49-621-60-76416

Telefax number: +49-621-60-76318

E-mail address: claudia.kraeh@basf-ag.de

PRODUCT: POTASSIUM METABISULFITE

ORDER NO: 218481

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Emergency information:

Fire brigade BASF Ludwigshafen

Telephone: +49-621-60-43333

Telefax number: +49-621-60-92664

2. Composition/information on ingredients

Chemical nature

dipotassium disulphite

CAS Number: 16731-55-8

EG-Number: 240-795-3

3. Hazard identification

Risk of serious damage to eyes.

Irritating to respiratory system.

Contact with acids liberates toxic gas.

4. First-aid measures

General advice:

Remove contaminated clothing.

If inhaled:

If difficulties occur after dust has been inhaled, remove to fresh air and seek medical attention.

Product: Potassium Metabisulfite food grade (E224)

On skin contact:

Wash thoroughly with soap and water.

On contact with eyes:

Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:

Rinse mouth and then drink plenty of water.

Note to physician:

Hazards: Risk of sulfur dioxide development by reaction with gastric acid after swallowing.

5. Fire-fighting measures

Suitable extinguishing media:

water

PRODUCT: POTASSIUM METABISULFITE

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Specific hazards:

Sulphur dioxide

The substances/groups of substances mentioned can be released if the product is involved in a fire,

Special protective equipment:

Wear a self-contained breathing apparatus.

Further information:

Contaminated extinguishing water must be disposed of in accordance with official regulations.

6. Accidental release measures

Personal precautions:

Avoid dust formation. Ensure adequate ventilation.

Environmental precautions:

Do not discharge into drains/surface waters/groundwater. Do not discharge into the subsoil/soil.

Methods for cleaning up or taking up:

For large amounts: Sweep/shovel up. Dispose of absorbed material in accordance with regulations.

For residues: Sweep/shovel up. Dispose of absorbed material in accordance with regulations.

7. Handling and storage

Handling

Avoid dust formation. Use only in well ventilated areas.

Protection against fire and explosion:

Storage

Segregate from acids and acid forming substances. Segregate from oxidants.

Do not store with: sodium nitrate, sodium nitrite, sodium sulfide

Further information on storage conditions:

Keep in a cool place. Keep container dry. Keep container in a well-ventilated place.

8. Exposure controls and personal protection

Components with workplace control parameters

7446-09-5: Sulphur dioxide

Personal protective equipment

PRODUCT: POTASSIUM METABISULFITE

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Respiratory protection:

Suitable respiratory protection for lower concentrations or short-term effect: Particle filter EN 143 Type P1, low efficiency, (solid particles of inert substances).

Hand protection:

Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374): E.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), polyvinylchloride (0.7 mm) and other

Supplementary note:

The specifications are based on own tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined in accordance to EN 374. Manufacturer's directions for use should be observed because of great diversity of types.

Eye protection:

Tightly fitting safety goggles (splash goggles) (EN 166)

General safety and hygiene measures:

Hands and/or face should be washed before breaks and at the end of the shift.

9. Physical and chemical properties

Form: powder
Color: white
Odor: pungent Odor

pH value: 3,5-4,5
(50 g/l, 20 °C)

Melting temperature: 190 °C
decomposition point: 150 °C

Product: Potassium Metabisulfite food grade (E224)
(30042359/S05 GEN_EU/EN)

Bulk density: 1.100 - 1.300 kg/m³

Solubility in water:
450 g/l
(20 °C)

Partitioning coefficient n-octanol/water (log P_{ow}): -4 (OECD Guideline 107)

PRODUCT: POTASSIUM METABISULFITE

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10. Stability and reactivity

Thermal decomposition: > 150 C

Substances to avoid:

acids, oxidizing agent, nitrites, nitrates

Hazardous reactions:

Reacts with nitrites. Reacts with nitrates. Reacts with oxidizing agents.

Hazardous decomposition products:

Sulphur dioxide

11. Toxicological information

LD50/oral/rat: 2,300 mg/kg (BASF-Test)

by inhalation/rat: / 8 h(BASF-Test)

Inhalation-risk test (IRT):

No mortality within 8 hours as shown in animal studies. The inhalation of a highly saturated vapor-air mixture represents no acute hazard.

Primary skin irritation/rabbit:

non-irritant (BASF-Test)

Primary irritations of the mucous membrane/rabbit:

Risk of serious damage to eyes. (OECD Guideline 405)

Irritating to respiratory system.

A sensitizing effect on particularly sensitive individuals cannot be excluded.

Further information:

In the majority of studies performed with microorganisms and in mammalian cell culture, a mutagenic effect was not found. A mutagenic effect was also not observed in in vivo tests.

The results of animal studies gave no indication of a fertility impairing effect.

No indications of a developmental toxic / teratogenic effect were seen in animal studies.

12. Ecological information

PRODUCT: POTASSIUM METABISULFITE

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Ecotoxicity

Toxicity to fish:

OECD 203; ISO 7346; 84/449/EEC, C.1

Brachydanio rerio/LC50 (96 h): 460 - 1.000 mg/l

Microorganisms/Effect on activated sludge:

DIN 38412 Part 8

Pseudomonas putida/EC50 (17 h): 65 mg/l

Persistence and degradability

Assessment: Inorganic product which cannot be eliminated from water by biological purification processes.

Chemical oxygen demand (COD): (calculated) approx. 140 mg/g

Bioaccumulation potential

Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

Additional information

Other ecotoxicological advice:

Higher concentrations of the substance may cause a strong chemical oxygen consumption in biological sewage-treatment plants and/or waterways. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

13. Disposal considerations

Contact manufacturer regarding recycling.

Contact waste centre regarding recycling.

Must be dumped or incinerated in accordance with local regulations.

Contaminated packaging:

Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport information

Not classified as hazardous under transport regulations (ADR RID ADN

IMDG/CGVSee ICAO/IATA)

15. Regulatory information

Regulations of the European union (Labelling) / National legislation/

Regulations EG-Number: 240-795-3

Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws,

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regulations and administrative provisions relating to the classification,
packaging and labelling of dangerous substances:

Hazard symbol(s)

Xi Irritant.

R-phrase(s)

R37 Irritating to respiratory system.

R41 Risk of serious damage to eyes.

R31 Contact with acids liberates toxic gas.

S-phrase(s)

S39 Wear eye/face protection.

S26 In case of contact with eyes, rinse immediately with plenty of water and
seek medical advice.

Other regulations

16. Other information

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----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR

UNIVAR USA INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

12/19/03 16:23

PRODUCT: 666873

CUST NO: 113365

ORDER NO: 218481

----- NOTICE -----

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THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
PROCESS.

*** END OF MSDS ***



Material Safety Data Sheet

| NEPA | HMIS | Personal Protective Equipment |
|------|------|-------------------------------|
| | | |
| | | See Section 15. |

| Section 1. Chemical Product and Company Identification | | | Page Number: 1 |
|--|--|--|--|
| Common Name/ Trade Name | Glyoxal, 40% | Code | G3394 |
| | | CAS# | Mixture. |
| Manufacturer | SPECTRUM CHEMICAL MFG. CORP. 14422 S. SAN PEDRO STREET GARDENA, CA 90248 | RTECS | MD2700000 |
| | | TSCA | TSCA 8(b) inventory: Glyoxal; Water |
| Commercial Name(s) | Not available. | CI# | Not available. |
| Synonym | Not available. | IN CASE OF EMERGENCY CHEMTREC (24hr) 800-424-9300 CALL (310) 516-8000 | |
| Chemical Name | Not applicable. | | |
| Chemical Family | Not available. | | |
| Chemical Formula | Not applicable. | | |
| Supplier | SPECTRUM CHEMICAL MFG. CORP. 14422 S. SAN PEDRO STREET GARDENA, CA 90248 | | |

| Section 2. Composition and Information on Ingredients | | | | | |
|---|--|--------------------------|---------------------------|---------------------------|-------------|
| | | Exposure Limits | | | |
| Name | CAS # | TWA (mg/m ³) | STEL (mg/m ³) | CEIL (mg/m ³) | % by Weight |
| 1) Glyoxal | 107-22-2 | | | | 40 |
| 2) Water | 7732-18-5 | | | | 60 |
| Toxicological Data on Ingredients | Glyoxal: ORAL (LD50): Acute: 1100 mg/kg [Rat]. DERMAL (LD50): Acute: 6600 mg/kg [Guinea pig]. | | | | |

| Section 3. Hazards Identification | |
|-----------------------------------|---|
| Potential Acute Health Effects | Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Non-corrosive for skin. Non-sensitizer for skin. Non-permeator by skin. |
| Potential Chronic Health Effects | Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Non-corrosive for skin. Non-sensitizer for skin. Non-permeator by skin. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system. Repeated or prolonged exposure to the substance can produce target organs damage. |

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 | After contact with skin, wash immediately with plenty of water. 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. |
| Serious 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. |
| Serious Inhalation | Not available. |
| Ingestion | Do not induce vomiting. 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. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention. |
| Serious Ingestion | Not available. |

Section 5. Fire and Explosion Data

| | |
|---|---|
| Flammability of the Product | May be combustible at high temperature. |
| Auto-Ignition Temperature | Not available. |
| Flash Points | Not available. |
| Flammable Limits | Not available. |
| Products of Combustion | These products are carbon oxides (CO, CO ₂). |
| Fire Hazards in Presence of Various Substances | Extremely flammable in presence of open flames and sparks, of heat. |
| Explosion Hazards in Presence of Various Substances | Risks of explosion of the product in presence of mechanical impact: Not available. Extremely explosive in presence of open flames and sparks, of heat. |
| Fire Fighting Media and Instructions | SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet. |
| Special Remarks on Fire Hazards | Not available. |
| Special Remarks on Explosion Hazards | Not available. |

Section 6. Accidental Release Measures

| | |
|-------------|--|
| Small Spill | Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements. |
| Large Spill | Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. |

Section 7. Handling and Storage

| | |
|-------------|--|
| Precautions | 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 gas/fumes/ vapour/spray. Wear suitable protective clothing. 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. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents. |

Continued on Next Page

Section 8. Exposure Controls/Personal Protection

| | |
|--|---|
| Engineering Controls | Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location. |
| Personal Protection | Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. |
| Personal Protection in Case of a Large Spill | Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. |
| Exposure Limits | Not available. |

Section 9. Physical and Chemical Properties

| | | | |
|-------------------------------|--|-------|----------------|
| Physical state and appearance | Liquid. | Odor | Not available. |
| Molecular Weight | Not applicable. | Taste | Not available. |
| pH (1% soln/water) | Neutral. | Color | Not available. |
| Boiling Point | The lowest known value is 51°C (123.8°F) (Glyoxal). Weighted average: 80.4°C (176.7°F) | | |
| Melting Point | May start to solidify at 15°C (59°F) based on data for: Glyoxal. | | |
| Critical Temperature | Not available. | | |
| Specific Gravity | Weighted average: 1.05 (Water = 1) | | |
| Vapor Pressure | The highest known value is 17.535 mm of Hg (@ 20°C) (Water). | | |
| Vapor Density | The highest known value is 0.62 (Air = 1) (Water). | | |
| Volatility | Not available. | | |
| Odor Threshold | Not available. | | |
| Water/Oil Dist. Coeff. | Not available. | | |
| Ionicity (in Water) | Not available. | | |
| Dispersion Properties | See solubility in water. | | |
| Solubility | Easily soluble in cold water. | | |

Section 10. Stability and Reactivity Data

| | |
|---|-------------------------------------|
| Stability | The product is stable. |
| Instability Temperature | Not available. |
| Conditions of Instability | Not available. |
| Incompatibility with various substances | Not available. |
| Corrosivity | Non-corrosive in presence of glass. |
| Special Remarks on Reactivity | Not available. |
| Special Remarks on Corrosivity | Not available. |
| Polymerization | No. |

Section 11. Toxicological Information

| | |
|--|---|
| Routes of Entry | Eye contact. Inhalation. Ingestion. |
| Toxicity to Animals | Acute oral toxicity (LD50): 1100 mg/kg [Rat]. Acute dermal toxicity (LD50): 6600 mg/kg [Guinea pig]. |
| Chronic Effects on Humans | The substance is toxic to lungs, the nervous system. |
| Other Toxic Effects on Humans | Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Non-corrosive for skin. Non-sensitizer for skin. Non-permeator by skin. |
| Special Remarks on Toxicity to Animals | Not available. |
| Special Remarks on Chronic Effects on Humans | Not available. |
| Special Remarks on other Toxic Effects on Humans | Not available. |

Section 12. Ecological Information

| | |
|---|---|
| Ecotoxicity | Not available. |
| BOD5 and COD | Not available. |
| Products of Biodegradation | Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise. |
| Toxicity of the Products of Biodegradation | The products of degradation are more toxic. |
| Special Remarks on the Products of Biodegradation | Not available. |

Section 13. Disposal Considerations

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

Section 14. Transport Information

| | |
|----------------------------------|--|
| DOT Classification | Not a DOT controlled material (United States). |
| Identification | Not applicable. |
| Special Provisions for Transport | Not applicable. |
| DOT (Pictograms) | |

**Section 15. Other Regulatory Information and Pictograms**

| | |
|------------------------------------|---|
| Federal and State Regulations | TSCA 8(b) inventory: Glyoxal; Water |
| California Proposition 65 Warnings | California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: No products were found. California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: No products were found. |
| Other Regulations | OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). |
| Other Classifications | WHMIS (Canada) CLASS D-2A: Material causing other toxic effects (VERY TOXIC). |

Continued on Next Page

DSCL (EEC)

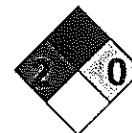
R22- Harmful if swallowed.
R36/38- Irritating to eyes and skin.

HMIS (U.S.A.)

| | |
|---------------------|---|
| Health Hazard | 2 |
| Fire Hazard | 1 |
| Reactivity | 0 |
| Personal Protection | h |

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

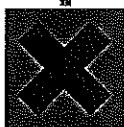
Health



Flammability

Reactivity

Specific hazard

WHMIS (Canada)
(Pictograms)DSCL (Europe)
(Pictograms)TDG (Canada)
(Pictograms)ADR (Europe)
(Pictograms)

Protective Equipment



Gloves.



Lab coat.

Vapor respirator. Be sure to use an
approved/certified respirator or
equivalent. Wear appropriate
respirator when ventilation is
inadequate.

Splash goggles.

Section 16. Other Information

Catalog Number(s) G1022

References Not available.

Other Special
Considerations Not available.

Validated by G. A. Binas on 6/23/99.

Verified by G. A. Binas.

Printed 8/19/99.

Continued on Next Page

DSCL (EEC)

R22- Harmful if swallowed.
R36/38- Irritating to eyes and skin.

HMIS (U.S.A.)

| | |
|---------------------|---|
| Hazard Rating | 2 |
| Fire Hazard | 1 |
| Reactivity | 0 |
| Personal Protection | h |

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

Health



Flammability

Reactivity

Specific hazard

WHMIS (Canada)
(Pictograms)DSCL (Europe)
(Pictograms)TDG (Canada)
(Pictograms)ADR (Europe)
(Pictograms)

Protective Equipment



Gloves.



Lab coat.

Vapor respirator. Be sure to use an
approved/certified respirator or
equivalent. Wear appropriate
respirator when ventilation is
inadequate.

Splash goggles.

Section 16. Other Information

Catalog Number(s) G1022

References Not available.

Other Special
Considerations Not available.

Validated by G. A. Binas on 6/23/99.

Verified by G. A. Binas.

Printed 8/19/99.

Continued on Next Page

MATERIAL SAFETY DATA SHEET

GREAT LAKES GELATIN CO.

P.O. BOX 917

Grayslake, IL 60030

ph: 847-223-8141

MSDS # 9000-70-8

May be used to comply with OSHA's Hazard Communication Standard 29 CFR 1910.1200 Standard must be consulted for specific requirements.

IDENTITY as used on label and list.

GELATIN

Coarse to 100 mesh

HAZARDOUS INGREDIENTS/ IDENTITY INFORMATION

Components: Gelatin is not considered hazardous under Federal Hazard Communications Standard(29CFR 1910-1200) Gelatin is a food; (GRAS).

Hazard Information Label Data:

HAZARD CODE:

| | | | | |
|---|---|---------------|--------------|---|
| 4 | = | Extreme | Flammability | 0 |
| 3 | = | High | Reactivity | 0 |
| 2 | = | Moderate | Health | 0 |
| 1 | = | Slight | Special | 0 |
| 0 | = | Insignificant | | |

PHYSICAL/ CHEMICAL CHARACTERISTICS

| | |
|---------------------|----------------------------------|
| Specific Gravity | 1.2 |
| Melting Point | Decomposes above 100°C |
| | Complete combustion at 1069° f |
| Solubility in Water | Swells in cold; complete @ 40° C |
| Appearance and Odor | Ivory to Amber colored powder |
| Shelf Life | Indefinite |

FIRE AND EXPLOSION HAZARD DATA

| | |
|----------------------------------|-----------------------------------|
| Flash point | Non Flammable |
| Extinguishing Media rated | Water, foam, CO2, & ABC |
| | extinguisher |
| Special Fire Fighting Procedures | Treat as typical combustible fire |

REACTIVITY DATA

| | |
|--------------------------|----------------|
| Stability | Stable |
| Hazardous Polymerization | Will not occur |

pg.2

HEALTH HAZARD DATA**ROUTES OF ENTRY:**

| | | | |
|------------------------------------|-----------|---------------------------------|------------|
| Inhalation | Dust | | N/A |
| Ingestion | Non-toxic | Health hazard (acute & chronic) | None Known |
| Carcinogenicity | None | | |
| Emergency and first aid procedures | | Wash off dust with warm water | |

PRECAUTIONS FOR SAFE HANDLING AND USE.**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED.**

This material is **not** a hazardous waste as specified in 40 DFR 261. Handle as biodegradable powder.

WASTE DISPOSAL METHOD

Dispose in an approved landfill in compliance with all regulations or burn in an approved combustion disposal.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Handle according to good manufacturing and warehousing practices.

CONTROL MEASURES

| | |
|---------------------------------------|---------------------------------|
| Respiratory Protection (Specify type) | Dust protector |
| Ventilation - local exhaust | As needed |
| Ventilation - Mechanical (general) | As needed |
| Protective Gloves | Not required |
| Eye Protection | Safety Glasses |
| Other Protective clothing | Use good manufacturing practice |
| Work/ Hygienic Practices | Use good manufacturing practice |

Storage & Labelling

| | |
|----------|-----|
| Indoors | Yes |
| Outdoors | No |

To preserve integrity of product, do not store in excessive heat or in contact with water. Prolong storage recommendations are to re-evaluate physical and chemical characteristics every three years.

GREAT LAKES GELATIN

10-15-1993 10:59AM FROM SAVOIR-FAIRE 415 332 3113

00326- all codes
except
-10198279-xx
8280-xx
8283-08U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

| | | |
|--|--|---|
| Sennelier W/C | | SECTION I |
| MANUFACTURER'S NAME SENNELIER Distributed by SAVOIR FAIRE | | EMERGENCY TELEPHONE NO. 415.332.4660 |
| ADDRESS (Number, Street, City, State, and ZIP Code) PO BOX 2021 SAUSALITO CA 9454 | | |
| CHEMICAL NAME AND SYNONYMS | | TRADE NAME AND SYNONYMS EXTRA FINE WATERCOLORS |
| CHEMICAL FAMILY | | FORMULA Water, Gum Arabic, Glycerine, Honey |

| | | | | | |
|---|---|-------------|---|---|-------------|
| SECTION II - HAZARDOUS INGREDIENTS None | | | | | |
| PAINTS, PRESERVATIVES, & SOLVENTS | X | TLV (Units) | ALLOYS AND METALLIC COATINGS | X | TLV (Units) |
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | X | TLV (Units) |

| | | | |
|--|------|---------------------------------------|-----------|
| SECTION III - PHYSICAL DATA | | | |
| BOILING POINT (°F.) | n.s. | SPECIFIC GRAVITY (H ₂ O-1) | 1.110-1.7 |
| VAPOR PRESSURE (mm Hg.) | n.s. | PERCENT VOLATILE BY VOLUME (%) | |
| VAPOR DENSITY (AIR=1) | n.s. | EVAPORATION RATE (1=1) | |
| SOLUBILITY IN WATER | Yes | | |
| APPEARANCE AND ODOR Odourless colored Stiff Pasted | | | |

| | | | |
|---|------------------|--|-----|
| SECTION IV - FIRE AND EXPLOSION HAZARD DATA | | | |
| FLASH POINT (Method used) | FLAMMABLE LIMITS | | N/A |
| EXTINGUISHING MEDIA | | | |
| SPECIAL FIRE FIGHTING PROCEDURES | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | |

PAGE (1)

(Continued on reverse side)

Form OSHA-20
Rev. 11-72

Notes: This is all we have - there are not sheets.

Item Numbers: 00326-0014, 00326-0016, 00326-0019, 00326-0024, 00326-0029, 00326-0039, 00326-0089, 00326-1009, 00326-1051, 00326-1052, 00326-1053, 00326-1069, 00326-1109, 00326-2009, 00326-2021, 00326-2022, 00326-2023, 00326-2221, 00326-2223, 00326-2251, 00326-2252, 00326-2253, 00326-2551, 00326-2552, 00326-2561, 00326-2562, 00326-2563, 00326-2603, 00326-3003, 00326-3061, 00326-3062, 00326-3063, 00326-3071, 00326-3072, 00326-3073, 00326-3091, 00326-3092, 00326-3093, 00326-3131, 00326-3132, 00326-3133, 00326-3151, 00326-3153, 00326-3373, 00326-3381, 00326-3382, 00326-3383, 00326-3491, 00326-3492, 00326-3493, 00326-3711, 00326-3712, 00326-3713, 00326-3721, 00326-3722, 00326-3723, 00326-3731, 00326-3732, 00326-3733, 00326-3741, 00326-3742, 00326-3743, 00326-3751, 00326-3752, 00326-3753, 00326-3761, 00326-3771, 00326-3773, 00326-3781, 00326-3783, 00326-3791, 00326-3801, 00326-3803, 00326-4013, 00326-4041, 00326-4042, 00326-4043, 00326-4081, 00326-4082, 00326-4083, 00326-4071, 00326-4072, 00326-4073, 00326-4121, 00326-4122, 00326-4123, 00326-4141, 00326-4142, 00326-4143, 00326-4181, 00326-4183, 00326-4271, 00326-4272, 00326-4273, 00326-4323, 00326-4381, 00326-4383, 00326-4641, 00326-4642, 00326-4643, 00326-4651, 00326-4652, 00326-4653, 00326-4721, 00326-4722, 00326-4723, 00326-4791, 00326-4792, 00326-4793, 00326-4881, 00326-4882, 00326-4911, 00326-4913, 00326-4921, 00326-4923, 00326-4931, 00326-4933, 00326-4941, 00326-5141, 00326-5142, 00326-5143, 00326-5161, 00326-5162, 00326-5163, 00326-5181, 00326-5182, 00326-5183, 00326-5201, 00326-5202, 00326-5203, 00326-5221, 00326-5222, 00326-5223, 00326-5251, 00326-5252, 00326-5253, 00326-5301, 00326-5302, 00326-5303, 00326-5391, 00326-5393, 00326-5911, 00326-5913, 00326-6181, 00326-6182, 00326-6183, 00326-6621, 00326-6623, 00326-6661, 00326-6662, 00326-6663, 00326-6671, 00326-6672, 00326-6673, 00326-6721, 00326-6723, 00326-6911, 00326-6913, 00326-6921, 00326-6923, 00326-7051, 00326-7053, 00326-7071, 00326-7073, 00326-7081, 00326-7083, 00326-7091, 00326-7092, 00326-7093, 00326-7101, 00326-7102, 00326-7103, 00326-7111, 00326-7113, 00326-7121, 00326-7122, 00326-7123, 00326-7131, 00326-7133, 00326-7161, 00326-7163, 00326-7211, 00326-7212, 00326-7213, 00326-7821, 00326-7822, 00326-7823, 00326-7911, 00326-7913, 00326-8041, 00326-8042, 00326-8043, 00326-8051, 00326-8052, 00326-8053, 00326-8061, 00326-8062, 00326-8063, 00326-8071, 00326-8072, 00326-8073, 00326-8211, 00326-8213, 00326-8221, 00326-8223, 00326-8311, 00326-8312, 00326-8313, 00326-8481, 00326-8483, 00326-8541, 00326-8542, 00326-8543, 00326-8901, 00326-8911, 00326-8912, 00326-8913, 00326-9031, 00326-9033, 00326-0129