Understanding a Material Safety Data Sheet

Working in a photo lab brings you into contact with photographic chemicals. Most of these chemicals are very low hazard because they contain more than 90 percent water at their working strength. Even low hazard chemicals, however, deserve to be handled with care because all chemicals have some safety and health risk.

For the chemicals in your workplace, we recommend that you always follow these guidelines:

1. Learn about the safety and health risks of the chemicals.
2. Apply that knowledge on the job.
3. Take responsibility for your own safety and health.

One of the most complete sources of information about a chemical is the material safety data sheet (MSDS) — a document that contains detailed information about the health and safety properties of a material. The government requires all chemical manufacturers and suppliers to provide an MSDS for every hazardous chemical they sell into the workplace.

MSDSs are designed for many different people including you, employers, health care providers, transporters and firefighters. In the following pages of this PMAI bulletin, we describe the information found on an MSDS and identify those sections that are most important to you.

Since the Controlled Products Regulations only specify the information that must be on an MSDS — not the section where it must appear — not all MSDSs look alike. If the MSDSs supplied by your photo chemical manufacturer are different from the example we use in this bulletin, examine them closely to find the information that’s important to you.

This bulletin is intended for use only as a general guideline. It is not intended to replace or supercede any federal, provincial or local documents or publications.

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1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Colour paper developer working solution
Catalogue Number: XYZ1234
Product Use: Photographic colour paper developer solution
Manufacturer/Supplier: Photo Processing Solutions Inc.
5440 Main Street, Anywhere, ON X1X 0X0
(800) xxx-xxxx
24-Hour Emergency Number: (800) xxx-xxxx
Prepared By: Photo Processing Solutions Inc.
(800) xxx-xxxx
Preparation Date: September 20, 2000

2. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Registry Number</th>
<th>Weight Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>007732-18-5</td>
<td>90 - 95</td>
</tr>
<tr>
<td>Potassium carbonate</td>
<td>000584-08-7</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Potassium sulfite</td>
<td>10117-38-1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>p-Phenylenediamine derivative</td>
<td>25646-71-3</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

Routes of Entry: Skin contact, eye contact, inhalation, ingestion
Effects of Acute Exposure: May cause irritation of eyes, nose and throat.
Effects of Chronic Exposure: Repeated skin contact may cause an allergic skin reaction.

HMIS Hazard Ratings
Health: 2
Flammability: 0
Reactivity: 0
Personal Protection: C

NFPA Hazard Ratings
Health: 2
Flammability: 0
Reactivity (stability): 0
Personal Protection: C

Hazard Rating: 0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe
C = gloves, goggles and apron
SECTION 1 - Chemical Product and Company Identification

ESSENTIAL - for all photo lab employees

This section identifies the material by name and manufacturer. Perhaps the most important piece of information is the emergency telephone number, operational 24 hours/day. If your photo lab has a spill or an employee is overexposed to a chemical, call this number if you need information beyond the MSDS. Finally, since MSDSs are valid for only three years, always check the preparation date to ensure the MSDS hasn’t expired.

SECTION 2 - Composition/Information on Ingredients

USEFUL - for all photo lab employees

This section contains the following information:

- The names of the hazardous ingredients.
- The unique Chemical Abstract Service (CAS) registry number assigned to each ingredient. While ingredients may have more than one name, each has only one CAS number.
- How much each ingredient contributes to the total weight of the material (weight percent).

Manufacturers are required to list only hazardous ingredients in this section, but may choose to list nonhazardous, as well.

SECTION 3 - Hazards Identification

USEFUL - for all photo lab employees and emergency responders

This section identifies the known hazards of the material and its potential health effects. Routes of entry are the ways that a chemical would typically enter a person’s body in the workplace environment. Most MSDSs list all the routes: through skin and eye contact, through breathing (inhalation) and through the mouth (ingestion).

Information about both the short-term (acute) and long-term (chronic) health effects is also found here. In this example MSDS, we learn that the material may be a respiratory irritant in the short-term, while repeated contact may cause an allergic skin reaction. As a photo lab employee, this information should signal to you the need for personal protection — gloves, goggles, apron — whenever there’s a risk of coming into direct contact with the material.

This section may also contain information for commonly used hazard rating systems. For example, under the Hazardous Materials Information System (HMIS), the material is rated as a minimal flammability and reactivity hazard. But it does have a moderate health risk rating (2) because it may cause an allergic skin reaction. The other commonly used hazard rating system shown on the MSDS is the National Fire Protection Association (NFPA).
### 4. FIRST-AID MEASURES

- **Inhalation**
  If inhaled, move to fresh air. Get medical attention if symptoms persist.

- **Eyes**
  Any material that contacts the eye should be washed out immediately with water. Get medical attention if symptoms occur.

- **Skin**
  In case of contact, immediately flush area with plenty of water and wash with a nonalkaline skin cleaner. If skin irritation or an allergic skin reaction develops, get medical attention.

- **Ingestion**
  Drink 1 to 2 glasses of water. Get medical advice. Never give anything by mouth to an unconscious person.

### 5. FIREFIGHTING MEASURES

- **Flammability**
  Not flammable

- **Flashpoint and Method**
  Not applicable

- **Upper Flammable Limit**
  Not applicable

- **Lower Flammable Limit**
  Not applicable

- **Autoignition Temperature**
  Not applicable

- **Explosion Data**
  - Sensitivity to Impact: None
  - Sensitivity to Static Discharge: None

- **Means of Extinction**
  Use extinguishing media that is appropriate for the fire. Wear self-contained breathing apparatus and protective clothing.

- **Hazardous Combustion Products**
  Carbon monoxide, carbon dioxide, nitrogen oxides and sulfur oxides

### 6. ACCIDENTAL RELEASE MEASURES

Leak and spill procedure: Flush small amounts to the sewer with large amounts of water, where allowed. For large spills, absorb spill with inert material, then place in a container for chemical waste. Prevent runoff from entering drains, sewers or streams.

### 7. HANDLING AND STORAGE

- **Handling**
  Avoid breathing mist or vapour. Use with adequate ventilation. Use appropriate PPE. After handling, wash thoroughly with a nonalkaline type of hand cleaner.

- **Storage**
  Keep container closed.
SECTION 4 - First-Aid Measures

ESSENTIAL - for all photo lab employees

First-aid is treatment that you offer to a person immediately after he/she has been overexposed to a hazardous material. The recommendations on this example MSDS are standard for photographic chemicals except ingestion, which varies depending upon whether the material is corrosive. In all cases, if first-aid doesn’t eliminate the effects of overexposure, the person should get medical attention.

SECTION 5 - Firefighting Measures

ESSENTIAL - for trained emergency responders and firefighters

This section of the MSDS describes the flammability properties of a chemical. In this example, since the material is 90 to 95 percent water, it won’t burn. Therefore, the means of extinction should be whatever is appropriate for those flammable items in the area, such as packaging. In fact, most of the hazardous combustion products listed on our example MSDS come from burning cardboard boxes and plastic containers. Information about a material’s ability to explode can also be found in this section.

Do not allow any of your employees to operate a portable fire extinguisher unless they have been trained.

SECTION 6 - Accidental Release Measures

ESSENTIAL - for photo lab employees trained in spill response

Handling spills and leaks is a combination of company policy and government regulations. Where it’s allowed, photo labs may discharge small spills of nonsilver-rich solutions to the sanitary sewer drain. Large spills and spills of silver-rich solutions should be absorbed and managed off-site.

SECTION 7 - Handling and Storage

USEFUL - for all photo lab employees

This section of the MSDS lists the precautions necessary to reduce risks associated with handling and storing hazardous materials. In our example MSDS, we’re advised to do the following:

• Avoid breathing it and make sure the area is properly ventilated.
• Use gloves, splash-proof goggles and an apron to reduce the risk of direct contact.
• After handling this chemical, wash your hands thoroughly with a nonalkaline cleaner to reduce the risk of developing an allergic skin reaction.

For safe storage this MSDS recommends keeping the container closed. This practice reduces the amount of the material that will evaporate into the air.
### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits - Sulfur dioxide gas may be liberated.

<table>
<thead>
<tr>
<th>Engineering Controls</th>
<th>Good general ventilation should be used. Ventilation rates should be matched to conditions.</th>
</tr>
</thead>
</table>

**Personal Protection**

- **Respiratory Protection**: None should be needed.
- **Eye Protection**: Wear splash-proof goggles.
- **Skin Protection**: Wear impervious gloves and protective clothing.
- **Recommended Facilities**: Emergency eyewash

### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State and Appearance</th>
<th>Light yellow, liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odour</td>
<td>Odourless</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>No data</td>
</tr>
<tr>
<td>Vapour Density (Air = 1)</td>
<td>0.6</td>
</tr>
<tr>
<td>Vapour Pressure at 20°C (60°F)</td>
<td>24 mbar (18mm Hg)</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>1 (water = 1)</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>&gt;100°C (&gt;212°F)</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>No data</td>
</tr>
<tr>
<td>pH</td>
<td>10.0</td>
</tr>
<tr>
<td>Specific Gravity (water = 1)</td>
<td>1.037</td>
</tr>
<tr>
<td>Coefficient of Water/Oil Distribution</td>
<td>No data</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

| Stability (if no, under what conditions) | Yes |
| Incompatibility (if yes, which ones)    | Yes, strong acids and oxidizers |
| Hazardous Decomposition Products        | Sulfur dioxide gas |
| Reactivity and Conditions               | Not normally reactive |
SECTION 8 - Exposure Controls/Personal Protection

ESSENTIAL - for photo lab employers

This section provides information about safe levels of airborne chemicals. The Occupational Safety and Health Administration (OSHA), along with the American Conference of Governmental Industrial Hygienists (ACGIH), sets exposure limits for some substances — the maximum amount of an air contaminant most people can be exposed to without suffering any harmful effects. There are typically three different types of exposure limits:

- Time-weighted average (TWA) is the average concentration for a normal 8-hour workday to which nearly all workers can be repeatedly exposed with no harmful effect.
- Short-term exposure limit (STEL) is the maximum concentration to which workers can be periodically exposed for a period up to 15 minutes with no harmful effect.
- Ceiling limit is the concentration of an airborne substance that must not be exceeded at any time.

The material in this example may give off sulfur dioxide gas if it is heated to a very high temperature (e.g., developer drips onto a heat exchanger). Airborne exposures can be controlled in the workplace with good general ventilation. For tasks that could result in a splash (e.g., mixing chemicals), your employer will require you to use splash-proof goggles and chemical-resistant gloves. The photo lab must also have an emergency eyewash in case an employee receives a splash to the eyes.

SECTION 9 - Physical and Chemical Properties

USEFUL - for all photo lab employees and emergency response personnel

This section describes how a material looks, smells and acts. Our example material is liquid, light yellow in colour and odourless. The other item that’s important to you is the pH — a measure of the material’s acidity or alkalinity. Materials having a pH of less than 2.5 or greater than 12.5 are very corrosive and can easily burn your eyes and skin. Therefore, always wear PPE when handling corrosive materials.

SECTION 10 - Stability and Reactivity

USEFUL - for photo lab employees and emergency response

This section reveals information about a material’s stability — how the material will act under physical conditions of shock, vibration or temperature — and its reactivity — how the material will act when it’s heated, burned or comes into contact with other materials.

- Incompatibility describes substances with which this product will react dangerously. (Two incompatible products are household bleach and photographic fixer. Never mix them!)
- Hazardous decomposition products describes dangerous substances resulting from the breakdown of a material due to heat or chemical reaction.
### 11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Product</th>
<th>Acute Oral Toxicity (LD&lt;sub&gt;50&lt;/sub&gt;)</th>
<th>Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium carbonate</td>
<td>&gt;2,000 mg/kg (oral rat)</td>
<td></td>
</tr>
<tr>
<td>Acute oral toxicity</td>
<td>LD&lt;sub&gt;50 &lt;/sub&gt;~ 1,870 mg/kg (rat)</td>
<td></td>
</tr>
<tr>
<td>Eye irritation</td>
<td>Corrosive (rabbit)</td>
<td></td>
</tr>
<tr>
<td>Skin irritation</td>
<td>Mild (rabbit)</td>
<td></td>
</tr>
<tr>
<td>p-Phenylenediamine derivative</td>
<td>LD&lt;sub&gt;50 &lt;/sub&gt;~ 394 mg/kg (rat)</td>
<td></td>
</tr>
<tr>
<td>Acute oral toxicity</td>
<td>Corrosive (rabbit)</td>
<td></td>
</tr>
<tr>
<td>Eye irritation</td>
<td>None (rabbit)</td>
<td></td>
</tr>
<tr>
<td>Skin irritation</td>
<td>Extreme (guinea pig)</td>
<td></td>
</tr>
<tr>
<td>Skin sensitization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irritancy of Product</td>
<td>May cause irritation of eyes, nose and throat.</td>
<td></td>
</tr>
<tr>
<td>Sensitization to Product</td>
<td>Repeated skin contact may cause an allergic skin reaction.</td>
<td></td>
</tr>
<tr>
<td>Teratogenicity</td>
<td>Not known to be teratogenic.</td>
<td></td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not known to be carcinogenic.</td>
<td></td>
</tr>
<tr>
<td>Reproductive Toxicity</td>
<td>Not known to be a reproductive toxin.</td>
<td></td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Not known to be mutagenic.</td>
<td></td>
</tr>
<tr>
<td>Synergistic Materials</td>
<td>None known.</td>
<td></td>
</tr>
</tbody>
</table>

### 12. ECOLOGICAL INFORMATION

This material has not been tested for environmental effects.

### 13. DISPOSAL CONSIDERATIONS

Consult federal, provincial and local laws for the proper disposal method.
SECTION 11 - Toxicological Information

ESSENTIAL - for health care providers and photo lab employees

This section provides information about how the material may affect the body, based on test information. Acute oral toxicity (LD$_{50}$) is a term used to indicate how hazardous a material is when it’s ingested (eaten). In our example, a person would have to eat more than 2,000 milligrams (mg) of this product for every kilogram of his/her body weight to have a 50 percent chance of dying. In other words, the lethal dose 50 percent (LD$_{50}$) is >2,000 mg/kg. For someone weighing 65 kg (143 pounds), the LD$_{50}$ of this product would be more than 130 kg (287 pounds).

The lower the LD$_{50}$, the more toxic the chemical. A substance having an LD$_{50}$ of less than 500 mg/kg is considered poisonous. One of the ingredients in our example MSDS, p-Phenylenediamine derivative, the colour developing agent, is poisonous because the LD$_{50}$ is 394 mg/kg. We can also see that based on animal testing, some of the ingredients in this example MSDS are corrosive to eyes, irritating to skin, and can cause skin sensitization.

The last seven items in this section describe some very specific, potential effects on a human:

• Is the material an irritant or a skin sensitizer?
• Can exposure affect the fetus of an exposed woman (teratogen)?
• Can exposure cause cancer (carcinogen)?
• Can exposure affect the reproductive health of a person or his/her offspring?
• Can exposure alter the genetic structure of a person (mutagen)?

SECTION 12 - Ecological Information

USEFUL - for environmental professionals

If a release of this material can affect the environment — land, water or air — the information will be detailed here. Most MSDSs contain very little information in this section because only individual ingredients, not mixtures, are typically tested.

SECTION 13 - Disposal Considerations

USEFUL - for photo lab owners and environmental professionals

This section provides information for determining proper disposal methods. Because government usually regulates disposal, this section generally refers the reader to local, provincial and federal regulations.
14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>Not regulated for transportation</td>
</tr>
<tr>
<td>Shipping Class</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Product Identification Number</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Packing Group</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Other Instructions</td>
<td>Check the transportation labels</td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

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

16. OTHER INFORMATION

This MSDS has been prepared to meet the requirements of the Workplace Hazardous Materials Information System (WHMIS) and is believed to be correct. The information should be used to make an independent determination of the methods to safeguard workers and the environment.
SECTION 14 - Transport Information

USEFUL - for shipping personnel

This section contains information to be used on shipping labels and manifests. All materials must be shipped according to Transportation of Dangerous Goods (TDG) regulations. In this example, the material is not regulated for transportation — not surprising because it’s almost all water.

SECTION 15 - Regulatory Information

USEFUL - for photo lab employers

This section contains information about laws that affect this material. Many MSDSs simply state that the document contains all of the required information under the Controlled Products Regulations.

SECTION 16 - Other Information

USEFUL - for all photo lab employees

This is the place where manufacturers put information that doesn’t really fit in any other section.