4. CHEMICAL SAFETY AND WHMIS

To The Teacher

The Chemical Safety and Workplace Hazardous Material Information System (WHMIS) Handbook is a good introduction to this field. The goal is to provide an informative introduction into chemical safety and WHMIS education.

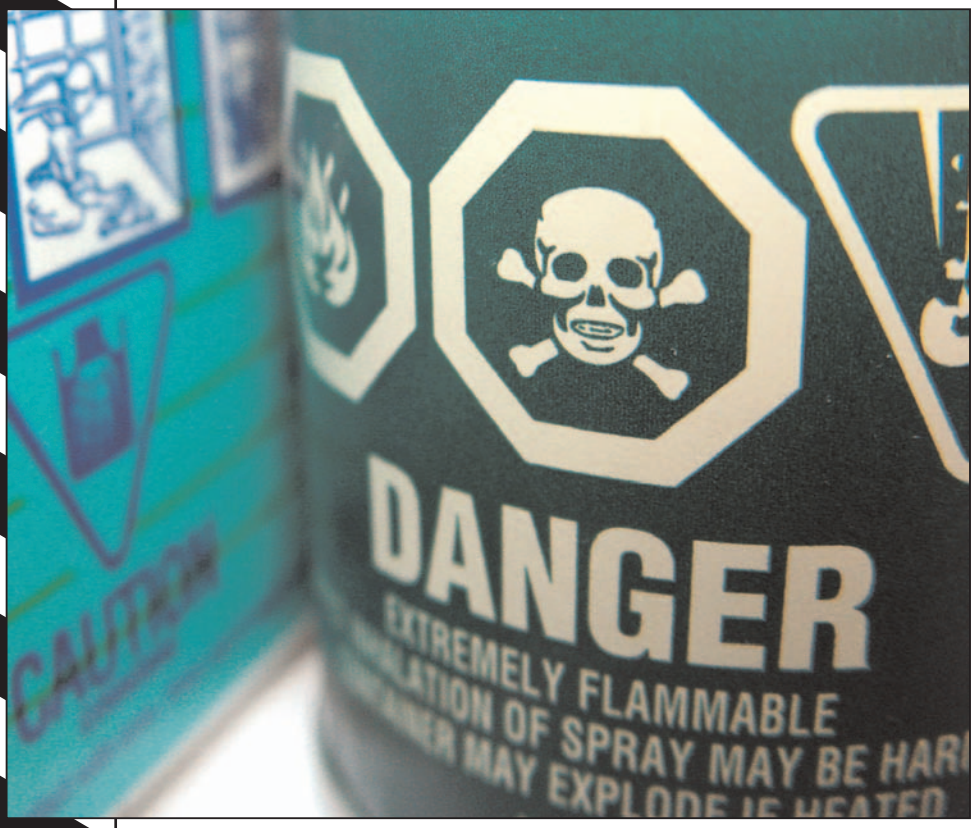
As students enter into the field of industrial arts, so shall they enter the age of part-time jobs. Students must realize the importance of safety in using and handling chemicals they may be exposed to. As legislation requires all workers to be informed, we are therefore obligated to make our students aware of controlled products, their use, and handling.

Incorporating an Introductory WHMIS Program into your class can take as little as four classes at only 15–20 minutes per class. Even with this short amount of time, students come out with a great understanding of WHMIS.

As new students may enter your facility after your lessons on WHMIS, this booklet and assignments may allow students to progress by themselves, if need be, with little intervention by the teacher.

Chemical Safety and WHMIS

Student Handbook



Introduction

This booklet has been made to help you understand the hazards associated with working with common products in the facility. All of those products contain chemicals.

There are many products used every day in the home, school, and workplace. You or your parents have probably used cleaners, glues, insect sprays, wood finishes, and many products that make life more comfortable.

These products help us in many ways. Cleaners make our kitchens, bathrooms, and living areas safe. Floor waxes and wood finishes protect, beautify, and preserve. Insect sprays allow us to enjoy the outdoors. Although these chemicals contribute to good living, we must be aware that there are dangers in using these products.

Chemicals in Everyday Living

Millions of products made from chemicals are used every day. The hazards associated with chemicals require careful examination, whether they are used at work, school, or home. We should always ask "Are there materials in my workplace that could harm me?"

Hazardous materials don't have to harm you if you learn:

- which ones are hazardous.
- what their hazards are.
- how they can be used safely.

CAUTION

The key word when using products that may contain hazardous chemicals is CAUTION. Respect the products for what they were designed to do. Knowledge of the product and proper handling of the product will help assure its safe use.

The "Workers Right to Know" Law

Your health and safety is important. The first line of defense in maintaining good health and safe conditions in the work area is to know about the chemicals you will be exposed to.

You Have A Right To Know:

- whether chemicals that you are being asked to use could harm you.
- how to find out about possible hazards associated with chemicals.
- how to use chemicals properly so that they are safe for you to use.
- what safety steps to take in case you spill or are accidentally exposed to hazardous materials.

To help protect you, the federal government created the Workplace Hazardous Material Information System (WHMIS). The WHMIS laws educate you about safety precautions.

One of these safety precautions includes making sure that you are aware of what hazardous materials you may be using.

The Law Says That You Have A "Right to Know:"

- what hazards you face at school or on the job.
- how you can protect yourself from these hazards.

The WHMIS law establishes a standard way for all people to learn (know) about what hazards they could face in the school (or on the job), as well as how to protect themselves against any possible danger. One purpose of this standard was so that everyone would know what information to provide and how to provide it. The reason for this is to keep you safe.

WHMIS legislation provides employees, employers, and suppliers nationwide with specific vital information about hazardous materials (called controlled products in the legislation).

We Use Hazardous Materials Every Day

There are many different materials that can be hazardous if they are not used properly. You will probably find many of these hazardous materials in your home. Most of these materials will only be dangerous if they are not handled carefully and treated with respect.

Here are just a few of the many hazardous chemicals that can be found in most homes:

- oven cleaner
- laundry bleach
- fingernail polish remover
- hair spray
- insect repellent
- turpentine

What are some hazardous chemicals in your industrial arts and technology labs/facilities?

- circuit board etchant
- photographic chemicals
- screen printing ink
- solvents (paints)
- soldering paste
- wood finishes

What Makes a Material Hazardous?

A hazardous material can be defined as any material that can cause harm to you or to the environment. You must learn about these hazards for your protection.

The provincial government recommends that students complete a training program. Reading this booklet may be part of that training program.

Chemical Hazards

The word **toxic** means poison. Poison causes illness and sometimes death.

Toxicity refers to a chemical's ability to harm living things (you).

These harmful chemicals, called toxins, affect various parts of the body, such as the nervous system, the heart, the lungs, the eyes, and the skin. Chlorinated hydrocarbons, for example, are toxins known to cause damage to the liver. They are found in the solvents used for many paints and varnishes.

How Do Chemicals Get Into the Body?

There are three ways that chemicals can enter your body.

1. Inhaling (breathing): This is the main way that toxins get into the bloodstream. Many chemicals evaporate very quickly when exposed to air. An example is when you apply wood finish to your product. The liquid in the finish evaporates very rapidly. In this evaporation process, the liquid part of the wood finish turns to a vapour. These vapours are what you smell (although sometimes vapours are odourless). The vapours are also what you breathe into your lungs. Once in the lungs, the chemicals get into the bloodstream and then into all parts of the body.
2. Skin and eye contact: Toxins can enter the body through the skin or the eyes. An example of this is when toxic wood finish is wiped on. Most people do this by pouring a small amount of the wood finish onto a soft rag and wiping it on their project. If rubber gloves are not worn, a small amount of the chemical in the finish can enter the bloodstream directly through the skin.

Toxic chemicals can harm your eyes if you are not careful. Using paint thinner to clean your hands is not only dangerous to your skin if not washed thoroughly, but can also harm your eyes if you accidentally rub them. Another example would be if an aerosol can was accidentally pointed the wrong way (i.e., towards your face) and the chemical was sprayed. Always pay attention to which way the arrow points before spraying.

3. Swallowing: Contaminated substances can damage your internal organs. Forgetting to wash your hands before putting food items in your mouth can transfer tiny amounts of chemicals into your body.

Effects of Chemicals Entering the Body

1. Immediate or acute effects: These symptoms, which show up right away, can be illness, burning sensation, eye watering, et cetera.
2. Long range or chronic effects: These effects can be prolonged illness, such as cancer, or reproduction problems that take a long time to develop.

Types of Chemical Hazards

There are two types of chemical hazards that can cause serious injuries.

1. Physical hazards: The chemical is changed physically (e.g., the chemical burns or explodes). The fire or explosion can cause serious injury.
2. Health hazards: Illness or other health problems (e.g., dizziness, headache, a skin rash, and, in severe cases, nerve disorder or damage to body organs).

The products your teacher purchases for you in the school technology facility are usually no more dangerous than products used at home. The government regulates the types of products sold in stores for homeowners to use. The government feels that products, such as those sold in hardware stores and those used in the school lab/facility, are safe if the directions on the labels are followed. Sometimes people fail to read and follow directions. If you do not follow the directions on the label, these chemicals can be very dangerous.

Fumes

One important hazard is the fumes given off by some chemicals. Breathing fumes can cause severe headaches, nausea, and possibly brain damage. This is one reason it is very important to follow the directions on the label. The label will warn you of these dangers. Often, many chemicals are used in very large quantities in large factories. It is necessary for all workers to learn about chemical hazards so that they will be able to work with the chemicals safely.

Learn About the Dangers of Chemicals

Since hazardous chemicals are used in both home and in the classroom, it is important that you learn about the dangers of using chemicals. By knowing the hazards of the chemicals you work with and by practising safe work habits, you can greatly reduce the risk associated with chemicals. Two excellent sources of information are the labels on the containers and the Material Safety Data Sheet (MSDS).

How Do You Use the Chemical as Safely as Possible?

1. Read the container label (consumer and workplace).
2. Study the MSDS.

Labels usually include:

- Identity
- Hazards
- First aid following exposure
- Handling methods

Manufacturers use the product label to explain the safest way to use the product. For this reason, it is very important that you read the labels and follow the directions.

Wood Finish

Directions
Wood must be free of moisture, dirt, wax, old finishes, etc. Sand wood thoroughly, with # 120 to # 100 sandpaper, in direction of the grain. Apply with soft cloth or foam brush. Allow at least 4 hours between coats. Clean up with mineral spirits.

Caution: Keep away from heat, sparks, and open flame. Avoid prolonged contact with skin and breathing vapours. Do not take internally. Close container after use. Use only with adequate ventilation.

Keep out of the reach of children.

ACME PAINT COMPANY
99 Red Road
Wpg., MB ROE OLO
204-878-7878

These are labels found on everyday products. For example, if you went to a hardware store to pick up paint for a corner shelf, you would find such a label.

- The name of the product
- **Directions:** How it is to be used
- **Caution:** What you must do to prevent any physical health hazards
- **The manufacturer:** The name, address, and emergency phone number of the company that manufactured or imported the product

Who's Responsible?

Students' Responsibility:

1. **Labels:** Students are responsible for reading and understanding the labels used on any chemical product they use.
2. **Material Safety Data Sheet(s):** Students should know where MSDSs are located in the lab/facility and how to read them. All schools require that all chemical substances used in the classroom be listed on posters or in a binder. (More information on MSDS will follow.)
3. **Fire Extinguishers:** Students should know how to operate a fire extinguisher.
4. **Evacuation Route:** Students should know the best building evacuation route in case of a fire, explosion, or hazardous spill.
5. **Emergency Eyewash:** Students should know how to use eyewash stations prior to an emergency.

Controlled Product Symbols and their Meaning

Sometimes a special label is applied to show the kind of hazard that the chemical could cause if it was spilled or misused.

Corrosives

You often see these labels on the shipping box of an automobile battery. These batteries contain acid that can corrode surfaces, make holes in your clothing, or burn skin. Never rub your eyes if you get acid on your hands. Always wash your hands thoroughly after you have installed or serviced any battery.

Flammable

These chemicals could burn easily (i.e., gasoline).

Poison

They have immediate effects. The chemicals must not be swallowed. Even breathing the fumes from these chemicals is very dangerous. Some household cleaners display this symbol. Other examples are chlorine and cyanide.

Compressed Gas

This area covers all compressed gasses, such as those found in the gas cylinders for oxyacetylene.

Oxidizing Material

Materials that provide oxygen or similar substances and that increase the risk of fire if they come in contact with flammable or combustible materials (i.e., oxygen, bleach).

Materials Causing Other Toxic Effects

Materials that can cause long-term effects in a person repeatedly exposed to small amounts (i.e., asbestos fibres, silica).

Biohazardous

This material may cause disease, and it also contains poisonous toxins (e.g., HIV, Hepatitis from blood, Anthrax from animal carcasses).

Dangerously Reactive

This material is unstable; it undergoes vigorous chemical reactions (i.e., acetylene, nitroglycerine).

Material Safety Data Sheets (MSDS)

In the section on learning about the dangers of chemicals, it was pointed out that to find the two best sources of chemical information you should:

- look at labels and
- refer to the appropriate MSDS

Labels are certainly important, but they are not large enough to contain all the relevant information. Therefore, manufacturers have created a special MSDS for every chemical product they sell. These sheets contain quite a lot of important information, but they do no good unless:

- they are available to read.
- you understand how to read them.
- you take the time to read them.

Why Read MSDSs?

The MSDS tells you:

- What the chemical is (i.e., name, manufacturer, properties).
- Why it is hazardous (i.e., physical risks and health risks, ways to be exposed, et cetera).
- How to deal with it safely using protective equipment, emergency and first-aid procedures.

What You Should Know About Hazardous Chemicals

- Know about your products.
- Read the labels.
- Be aware of all hazardous chemicals in your workplace.
- Review the MSDS. Remember – MSDSs exist for each and every chemical product.
- Follow recommendations made by the manufacturer of the chemical or related equipment.
- Pay attention to the instructor and all demonstrations.
- Keep containers closed tightly. Be sure lids of cans or other containers are not plugged with solids that prevent them from being sealed.
- Be sure that labels are not covered over by paint, stain, et cetera, or have not been torn or removed from container.
- Food should not be in a work area where it can become contaminated and accidentally swallowed.
- Wash hands before eating or drinking.
- Do a good job of cleaning the work area, tools, or equipment that may have been exposed to hazardous chemicals.
- Wear protective clothing and equipment when appropriate.
- Dispose of all contaminated materials properly.
- Keep flammable or explosive material away from heat sources.
- Make sure work area is well ventilated. Fresh air and sometimes an auxiliary fan help to remove vapours from work areas.

Analyzing the MSDSs

The MSDS is not a standard form found in all schools and businesses, but the information contained on the different forms is consistent. Once you understand what this information is and how it is to be used, you will be able to use any form of MSDS.

Note: Manitoba requires all MSDSs to be up to date with the latest information; therefore, MSDSs can’t be older than three years!

How to Read a MSDS

Section 1 **Identity:** This tells who makes the product, their address, and their emergency telephone number.

Section 2 **Hazardous Ingredients:** This section lists all the chemicals that are in the product that are considered hazardous.

Section 3 **Physical and Chemical Characteristics**

- Boiling Point
- Evaporation Rate
- Vapour Pressure
- Water Solubility
- Vapour Density
- Appearance and Odour
- Melting Point

Section 4 **Physical Hazards:** This explains how to handle possible hazards, such as flammability, fire, and explosions.

Section 5 **Health Hazards:** This section details the health hazards that could result from exposure to the substance. This section will also tell you if the chemical is believed to be a carcinogen (a substance that causes cancer).

Section 6 **Reactivity:** This section lists the substances this chemical should be kept away from to avoid potential reactions.

Section 7 **Precautions for Safe Handling and Use:** This explains what to do if the substance spills or leaks, how to clean up the spills or leaks, and how to dispose of the substance.

Section 8 **Control Measures:** This section lists what safety equipment you should wear to prevent harmful exposure.

Where Do We Get MSDSs?

At School: Manitoba requires teachers to have a MSDS for most chemical products used in the classroom. These sheets are usually in one notebook or binder for students to look at.

At Home: If you purchase a chemical product at a store, you may ask for a copy of the MSDS. However, many stores may not have them readily at hand but they can get them for you free of charge from their supplier or the manufacturer of the product.

On the Job: Some jobs require employees to use chemicals in much greater concentrations than the consumer chemicals you use at home or in the classroom. You can see that workers on the job have a special reason for knowing what chemicals they will be using. It is very important that you learn about hazardous chemical MSDSs in school. When you get on the job, you will know about your right to know what hazards you may be exposed to. The law requires that all manufacturers and non-manufacturing companies have MSDSs immediately available to employees.

Sample of Material Safety Data Sheet

Note: You can see two examples of MSDSs (including a full-size version of this one) at the end of this section.

MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT IDENTIFICATION AND USE

PRODUCT IDENTIFIER Sodium hydroxide, Caustic soda		**PRODUCT IDENTIFICATION NUMBER (PIN)** S-318	
PRODUCT USE			
MANUFACTURER'S NAME La Bell Industries		**SUPPLIER'S NAME** Omega Chemicals	
STREET ADDRESS 18 Rue LeJour		**STREET ADDRESS** P.O. Box 1989	
CITY Montreal	**PROVINCE** Quebec	**CITY** Sumware	**PROVINCE** Ont.
POSTAL CODE M0N 0C0	**EMERGENCY TELEPHONE NO.** (522) 555-4433	**POSTAL CODE** C1H 2O1	**EMERGENCY TELEPHONE NO.** (416) 555-4321

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS	%	CAS NUMBER	LD_{50} OF INGREDIENT (Specify species & route)	LD_{50} OF INGREDIENT (Specify species)
Sodium Hydroxide	96	1310-73-2		
Sodium Carbonate (Na_2C0_3)	0.5-2.5			
Sodium Chloride (NaCl)	0.0-2.1			
Sodium Sulphate (Na_2CO_3)	0.02-0.1			
Potassium, Calcium, and Magnesium	0.1			
Sodium Dioxide (SiO_2)	0.03			
Other Metals (total)	0.01			

SECTION 3 - PHYSICAL DATA

PHYSICAL STATE Other	**ODOUR AND APPEARANCE** White/off-white odourless, hygroscopic		
VAPOUR PRESSURE (mm Hg) Not appl.	**VAPOUR DENSITY (AIR = 1)** Not appl.	**EVAPORATION RATE** Non-volatile @ room temp	**BOILING POINT (** 1388EC
pH Not appl.	**SPECIFIC GRAVITY** 2.13	**COEFF. WATER/OIL DIST** Not appl	

SECTION 4 - FIRE AND EXPLOSION DATA

FLAMMABILITY YES ☐ NO ☒ **IF YES, UNDER WHICH CONDITIONS?**

MEANS OF EXTINCTION Although it is non-combustible, it can be hazardous in a should be known for fire fighting: 1) it can melt and f

Hot or molten material can react violently with water (splattering). 3) Can react wi aluminum to generate flammable hydrogen gas.

FLASHPOINT (FC) AND METHOD Not flammable	**UPPER FLAMMABLE LIMIT (% BY VOLUME)** Not flammable	**LOWER F LIMIT (%**
AUTOIGNITION TEMPERATURE (°C) Not flammable	**HAZARDOUS COMBUSTION PRODUCTS** Not fl	
EXPLOSION DATA ⇨ SENSITIVITY TO IMPACT Not appl.	**SENSITIVITY TO STATIC DISCH**	

SECTION 5 - REACTIVITY DATA

CHEMICAL STABILITY
YES ☒ NO ☐ **IF NO, UNDER WHICH CONDITIONS?**

INCOMPATIBILITY WITH OTHER SUBSTANCES Strong acids, many organic leather, wool, aluminum, z
YES ☒ NO ☐ **IF SO, WHICH ONES ⇨**

REACTIVITY, AND UNDER WHAT CONDITIONS Slowly picks up moisture and CO_2 f Sodium carbonate

HAZARDOUS DECOMPOSITION PRODUCTS None

PRODUCT IDENTIFIER

SECTION 6 - TOXOLOGICAL PROPERTIES

ROUTE OF ENTRY SKIN CONTACT ☒ SKIN ABSORPTION ☒ EYE CONTACT ☒ INHALATION ☐ INGESTION ☒

EFFECTS OF ACUTE EXPOSURE TO PRODUCT Damage to any human tissue particularly skin, eyes, and respiratory tract.

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT Dust and mist can cause damage particularly to the respiratory tract.

EXPOSURE LIMITS	IRRITANCY OF PRODUCT	SENSITIZATION TO PRODUCT	CARCENOGENICITY
2 mg/m^3 Ceiling limit.	Causes burning sensation	Not known	Not listed
TERATOGENICITY	**REPRODUCTIVE TOXICITY**	**MUTAGENICITY**	**SYNERGISTIC PRODUCTS**
Not known	Not known	Not listed	Reacts violently when molten

SECTION 7 - PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

GLOVES (SPECIFY) rubber, polyethylene	**RESPIRATOR (SPECIFY)** filter type	**EYE (SPECIFY)** goggles, face shield
FOOTWEAR (SPECIFY) rubber boots where needed to prevent contact	**CLOTHING (SPECIFY)** rubber apron where needed to prevent contact	**OTHER (SPECIFY)** Lab coat, overalls

ENGINEERING CONTROL (SPECIFY E.G., VENTILATION, ENCLOSED PROCESS) local exhaust

LEAK AND SPILL PROCEDURE When spilled in a dry condition, it can be promptly shovelled up for recovery or disposal. Flush surfaces with water, neutralize with diluted acid (vinegar).

WASTE DISPOSAL Disposal must meet with local requirements. Waste must never be discharged directly into sewers or surface waters. (Neutralize and dilute with much water)

HANDLING PROCEDURES AND EQUIPMENT

STORAGE REQUIREMENTS Store in well-sealed containers, have abundant water (running preferred) at hand.

SPECIAL SHIPPING INFORMATION This material is classified as **Corrosive**

SECTION 8 - FIRST AID MEASURES

SPECIFIC MEASURES

Eye Contact: Wash eyes immediately with plenty of running water for no less than 15 min. (including under the eyelids). Speed is important to avoid permanent injury. If one eye is injured, keep the injured eye at a lower level to avoid contaminating the uninjured eye.

Skin Contact: Wash contact area promptly with much water. (Dilute acetic acid, vinegar, can be used to neutralize). Remove contaminated clothing under the shower. Prolong washing until medical help arrives.

Inhalation: Remove from exposure to mist or dust and get prompt medical help.

Ingestion: Immediately phone 911 and ask for poison treatment. Describe the chemical that has been swallowed, and follow the advise of emergency personnel.

SECTION 9 - PREPARATION DATE OF MSDS

PREPARED BY (GROUP, DEPARTMENT, ETC.)	PHONE NUMBER	DATE

What If a Spill Occurs?

There are several rules to follow in case of a spill in a classroom. Use the following common-sense guidelines.

- Don't panic. Evacuate the spill area if there is a danger of fire or explosion.
- Alert your teacher immediately.
- Check for possible physical injuries. Did the chemical get into anyone's eyes? (If this happens, it is especially important to act swiftly.) Do the following:
  - — Read the label – Does it say to flush eyes with water? If so, help the person to the sink or eyewash station and flush eyes until medical help arrives.
  - — Your instructor will usually decide whether to call for medical help.
- Alert other students of the spill. Stay away from spilled chemicals.
- The instructor will take care of the proper method of cleaning up the chemical according to the MSDS.

Safety Equipment

All students should wear safety protection when working with solvents. What is required? It may be different for each chemical you are working with.

Safety Goggles: Safety goggles should always be used. This is to prevent eye injury in case of accidental splash or other eye contact.

Skin Protection: Sometimes gloves should be worn. With some wood finishes, it may not be necessary to wear skin protection. How do you know? It will tell you on the MSDS.

Oily Waste Containers: The rags used to apply wood finishes should be placed in an oily waste container. Rags filled with solvents, oil, and other chemicals will also be placed in these safety containers. These containers should be used for disposal of material with solvents or oils only. Never use them for papers, gum wrappers or other trash which they were not meant for.

Respirators: Used to reduce the inhalation of vapours. Often worn when spray painting larger surfaces (e.g., painting automobiles).

What Dangers Must We Avoid?

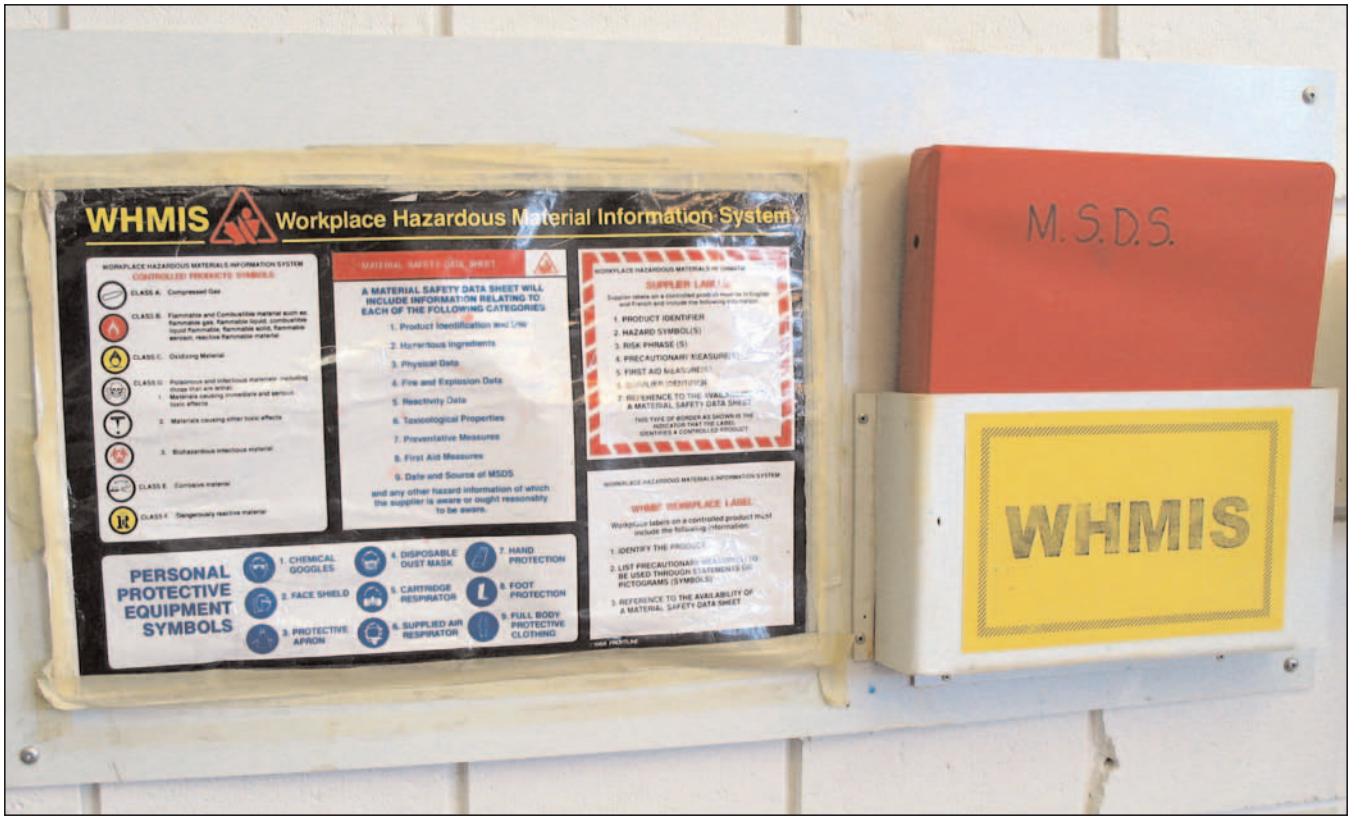
Fumes: Fumes are usually invisible. As solvents and other chemicals evaporate, vapours or fumes are given off. Evaporation means going from a liquid (or solid) to a gas. In many cases, mild fumes from household cleaners may not bother you. If you are applying wood finish to a project, fumes will be given off as that finish evaporates. If you are using a non-toxic finish, the fumes cause no health hazard. However, if you are using finishes that use a mineral spirit as lacquer base, the fumes will be toxic. In a classroom where many people might be using chemical products at the same time, it is very important that there is enough ventilation. Ventilation means: to cause fresh air to circulate through a room so as to replace the foul air.

Chemical Spills: As more containers of chemicals are being used, and more people are using them, the greater the danger of a spill. Spilled chemicals can not only spoil your clothes, they can splash in your eyes and cause blindness or burn you. What should you do if a hazardous chemical substance spills? It depends on the substance. In factories where very large quantities of chemicals are used, a spill might involve hundreds or even thousands of gallons of hazardous chemicals. If a spill like this occurs, it is very important that all

the workers know what to do. Sometimes workers are trained to know how to clean up the spill themselves and sometimes they must quickly leave the building. Since most of the chemical products used in schools are the same as those used in homes, cleanup of a spilled product can often be done by students. **Read the MSDS to find out how to clean up spills!**

Remember:

- Read labels on containers.
- Know how to read the MSDS.
- Maintain a clean work area.
- Seal containers tightly.
- Follow safety rules.
- Use protective clothing and equipment.
- Prepare for a spill. Have clean-up materials handy.
- Keep first-aid equipment up-to-date and readily available.
- Ventilate your work area.
- Keep all flammables away from heat.
- Use approved and labelled containers for storing.
- Take personal protection seriously.
- Clean up spills according to recommended procedures.
- Store chemical products in designated areas.



Product Label Awareness Assignment

Name: _____

In your own home, with the aid of an adult, find a product that is used to help clean your home. Read the label and its instructions for use and fill out the following questions.

1. The product name: _____
2. The manufacturer's name _____
3. Use of the product: _____
4. Direction for use: _____

   _____

5. Safety precautions for use: _____

   _____

   _____

6. Clean-up and spill procedures: _____

   _____

   _____

   _____

7. Are there any symbols on the product (i.e., flammable, corrosive)?

   List which symbols are found on the container.

   _____

   _____

   _____

   _____

MSDS Awareness Assignment

Name: _____

Using the MSDS found in the booklet, find and write down the following:

1. The product name: _____
2. The manufacturer's name _____
3. List the ingredients found in this substance: _____

   _____

   _____

4. Does the product have any health hazard risks by the following?
   a. Inhalation health risks and symptoms of exposure: _____

      _____

   b. Skin and eye contact health risks and symptoms of exposure: _____

      _____

   c. Ingestion health risks and symptoms of exposure: _____

      _____

5. State the emergency first-aid procedures for skin contact. _____

   _____

   _____

6. State the precautions required to be taken in storing this product. _____

   _____

   _____

7. List and state the exposure control for skin protection. _____

   _____

Chemical Safety and WHMIS Test

Name: _____

1. What is meant by the law …"Right To Know"? _____

   _____

   _____

   _____

2. List three products found in your home that can contain hazardous chemicals.

   _____

3. List three products in your industrial arts and technology facility that contain hazardous chemicals.

   _____

4. List three ways chemicals can enter your body.

   _____

5. What is the full name of the abbreviation MSDS?

   _____

6. What is the full name of the abbreviation WHMIS? _____

   _____

7. State at least three responsibilities a student must know in regards to safety and WHMIS. _____

   _____

   _____

   _____

   _____

8. Determine the correct meaning of the hazard sign and place the corresponding letter after the sign.

A. Materials causing other toxic effects

B. Biohazardous

C. Corrosive

D. Flammable and combustible

E. Poisonous

F. Compressed gas

G. Oxidizing

H. Dangerously reactive

9. What are the three important things that a MSDS tells us?

   1. _____

   2. _____

   3. _____

10. What would you do if there was a chemical spill in the facility?

_____

_____

_____

_____

_____

11. List at least three pieces of safety equipment that may be required when handling chemicals.

_____

_____

_____

_____

12. Do you believe the workers “right to know” law is a good law? Why or why not? Please explain your answer.

_____

_____

_____

_____

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_____

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CITY Montreal	**PROVINCE** Quebec	**CITY** Sumware	**PROVINCE** Ont.
POSTAL CODE M0N 0C0	**EMERGENCY TELEPHONE NO.** (522) 555-4433	**POSTAL CODE** C1H 2O1	**EMERGENCY TELEPHONE NO.** (416) 555-4321

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Sodium Carbonate (Na_2C0_3)	0.5-2.5			
Sodium Chloride (NaCl)	0.0-2.1			
Sodium Sulphate (Na_2CO_3)	0.02-0.1			
Potassium, Calcium, and Magnesium	0.1			
Sodium Dioxide (SiO_2)	0.03			
Other Metals (total)	0.01			

SECTION 3 - PHYSICAL DATA

PHYSICAL STATE Other	**ODOUR AND APPEARANCE** White/off-white odourless, hygroscopic			**ODOUR THRESHOLD (ppm)** odourless
VAPOUR PRESSURE (mm Hg) Not appl.	**VAPOUR DENSITY (AIR = 1)** Not appl.	**EVAPORATION RATE** Non-volatile @ room temp	**BOILING POINT (°C)** 1388ÞC	**MELTING POINT (°C)** 318ÞC
pH Not appl.	**SPECIFIC GRAVITY** 2.13	**COEFF. WATER/OIL DIST.** Not appl.		

SECTION 4 - FIRE AND EXPLOSION DATA

FLAMMABILITY
YES ☐ **NO** ☒ **IF YES, UNDER WHICH CONDITIONS?**

MEANS OF EXTINCTION Although it is non-combustible, it can be hazardous in a fire area. The following should be known for fire fighting: 1) it can melt and flow when heated (mp 318Þ) 2) Hot or molten material can react violently with water (splattering). 3) Can react with certain metals, such as aluminum to generate flammable hydrogen gas.

FLASHPOINT (ÞC) AND METHOD Not flammable	**UPPER FLAMMABLE LIMIT (% BY VOLUME)** Not flammable	**LOWER FLAMMABLE LIMIT (% BY VOLUME)** Not flammable
AUTOIGNITION TEMPERATURE (°C) Not flammable	**HAZARDOUS COMBUSTION PRODUCTS** Not flammable	
EXPLOSION DATA ⇨ SENSITIVITY TO IMPACT Not appl.	**SENSITIVITY TO STATIC DISCHARGE** Not appl.	

SECTION 5 - REACTIVITY DATA

CHEMICAL STABILITY
YES ☒ **NO** ☐ **IF NO, UNDER WHICH CONDITIONS?**

INCOMPATIBILITY WITH OTHER SUBSTANCES
YES ☒ **NO** ☐ **IF SO, WHICH ONES ⇨** Strong acids, many organic compounds, leather, wool, aluminum, zinc, and tin.

REACTIVITY, AND UNDER WHAT CONDITIONS Slowly picks up moisture and CO_2 from the air to form Sodium carbonate

HAZARDOUS DECOMPOSITION PRODUCTS None

PRODUCT IDENTIFIER

SECTION 6 - TOXOLOGICAL PROPERTIES

ROUTE OF ENTRY SKIN CONTACT ☒ SKIN ABSORPTION ☒ EYE CONTACT ☒ INHALATION ☒ INGESTION ☒

EFFECTS OF ACUTE EXPOSURE TO PRODUCT Damage to any human tissue particularly skin, eyes, and respiratory tract.

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT Dust and mist can cause damage particularly to the respiratory tract.

EXPOSURE LIMITS	IRRITANCY OF PRODUCT	SENSITIZATION TO PRODUCT	CARCENOGENICITY
2 mg/m^3 Ceiling limit.	Causes burning sensation	Not known	Not listed
TERATOGENICITY	**REPRODUCTIVE TOXICITY**	**MUTAGENICITY**	**SYNERGISTIC PRODUCTS**
Not known	Not known	Not listed	Reacts violently when molten

SECTION 7 - PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

GLOVES (SPECIFY)	RESPIRATOR (SPECIFY)	EYE (SPECIFY)
rubber, polyethylene	filter type	goggles, face shield
FOOTWEAR (SPECIFY)	**CLOTHING (SPECIFY)**	**OTHER (SPECIFY)**
rubber boots where needed to prevent contact	rubber apron where needed to prevent contact	Lab coat, overalls

ENGINEERING CONTROL (SPECIFY E.G., VENTILATION, ENCLOSED PROCESS) local exhaust

LEAK AND SPILL PROCEDURE When spilled in a dry condition, it can be promptly shovelled up for recovery or disposal. Flush surfaces with water, neutralize with diluted acid (vinegar).

WASTE DISPOSAL Disposal must meet with local requirements. Waste must never be discharged directly into sewers or surface waters. (Neutralize and dilute with much water)

HANDLING PROCEDURES AND EQUIPMENT

STORAGE REQUIREMENTS Store in well-sealed containers, have abundant water (running preferred) at hand.

SPECIAL SHIPPING INFORMATION This material is classified as **Corrosive**

SECTION 8 - FIRST AID MEASURES

SPECIFIC MEASURES

Eye Contact: Wash eyes immediately with plenty of running water for no less than 15 min. (including under the eyelids). Speed is important to avoid permanent injury. If one eye is injured, keep the injured eye at a lower level to avoid contaminating the uninjured eye.

Skin Contact: Wash contact area promptly with much water. (Dilute acetic acid, vinegar, can be used to neutralize). Remove contaminated clothing under the shower. Prolong washing until medical help arrives.

Inhalation: Remove from exposure to mist or dust and get prompt medical help.

Ingestion: Immediately phone 911 and ask for poison treatment. Describe the chemical that has been swallowed, and follow the advise of emergency personnel.

SECTION 9 - PREPARATION DATE OF MSDS

PREPARED BY (GROUP, DEPARTMENT, ETC.)	PHONE NUMBER	DATE

M A T E R I A L S A F E T Y D A T A S H E E T Rev. 06B

For Coating, Resins, and Related Materials NPCA 1-84

Manufacturer's Name
BENJAMIN MOORE & CO.
51 CHESTNUT RIDGE RD
MONTVALE, NJ 07645

Emergency Telephone No.
800-424-9300 (CHEMTREC)

Date Prepared	Last Rev Date	Information Telephone No.
01-19-01	09-05-00	201-573-9600

For the most up-to-date MSDS information
please visit our website www.benjaminmoore.com/msds/go.html

SECTION I - PRODUCT ID

PRODUCT*: M07, nM07
CLASS: SOLVENT THINNED PAINT
NAME: UNIVERSAL METAL PRIMER
COLOR: ALL

** HMIS CODE **
HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 0
PERSONAL PROT:

** SARA TITLE 312 **
ACUTE: Y CHRONIC: Y FIRE: Y PRESSURE: N REACTIVITY: N

For a complete description of HMIS and an explanation of the PERSONAL PROT: code, see Section XX.

*NOTE: In the PRODUCT code a little n can be any capital letter of the alphabet except P or Q.

SECTION II HAZARDOUS INGREDIENTS

INGREDIENT	HAZ	SARA	MAX %	CAS #	TLV	PEL	STEL	CEIL	MM Hg
n-Butyl Acetate	Y	N	5.5	000123-86-4	150 ppm	150 ppm	200 ppm	N/E	9 @ 20C
Naphthalene	Y	Y	2.2	000091-20-3	10 ppm	10 ppm	15 ppm	N/E	N/A
Ethyl Benzene	Y	Y	3.7	000100-41-4	100 ppm	100 ppm	125 ppm	N/E	10 @ 20C
Xylene	Y	Y	20.1	001330-20-7	100 ppm	100 ppm	150 ppm	N/E	21 @ 38C
Stoddard Solvent	Y	N	1.8	008052-41-3	100 ppm	100 ppm	N/E	N/E	2.0 @ 20
Silica, Crystalline	Y	N	5.8	014808-60-7	.1 mg/M3	.1 mg/M3	N/E	N/E	N/A
Iron Oxide	Y	N	6.4	001332-37-2	5 mg/M3	10 mg/M3	N/E	N/E	N/A
Zinc Phosphate	Y	Y	4.1	007779-90-0	10 mg/M3	15 mg/M3	N/E	N/E	N/A
Aluminum Phosphate	Y	N	1.9	007784-30-7	10 mg/M3	N/E	N/E	N/E	N/A

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Talc
 Y   N     36.4  014807-96-6    2 mg/M3  2 mg/M3  N/E      N/E      N/A
-------------------------------------------------------------------------------
Methyl Ethyl Ketoxime
 Y   N       .2  000096-29-7    0.1 ppm  N/E      N/E      N/E      2.0 @ 68
-------------------------------------------------------------------------------
Methyl N-Propyl Ketone
 Y   N      7.8  000107-87-9    200 ppm  200 ppm  250 ppm  N/E      27.8 @ 6
-------------------------------------------------------------------------------
Titanium Dioxide
 Y   N     12.3  013463-67-7    10 mg/M3 10 mg/M3 N/E      N/E      N/A
-------------------------------------------------------------------------------
Petroleum Distillates, n.o.s.
 Y   N      4.7  008002-05-9    300 ppm  300 ppm  400 ppm  N/E      26 @ 100
-------------------------------------------------------------------------------
Calcium Carbonate
 Y   N     25.0  000471-34-1    10 mg/M3 5 mg/M3  N/E      N/E      N/A
-------------------------------------------------------------------------------
*******************************************************************************
     This product contains one or more reported carcinogens or suspected
carcinogens which are noted NTP, IARC, or OSHA-Z in the other limits
recommended column.
*******************************************************************************
Note:  This product contains pigments which may become a dust nuisance when
removed by abrasive blasting, sanding, or grinding.
This product may contain small amounts of materials known to the State of
California to cause cancer and reproductive harm.
-------------------------------------------------------------------------------
                          SECTION III  PHYSICAL DATA
-------------------------------------------------------------------------------
BOIL RANGE: 255.0 to 385.0 WT/GL: 11.3 to 12.7  %VOL/VOL: 39.7  to 49.4
EVAPORATION RATE: SLOWER THAN ETHER        VAPOR DENSITY: HEAVIER THAN AIR
-------------------------------------------------------------------------------
                  SECTION IV  FIRE AND EXPLOSION HAZARD DATA
-------------------------------------------------------------------------------
D.O.T. FLAMMABILITY CLASS.:  FLAMMABLE       FLASH POINT: 72  F   PMCC
LEL %:  1.0
EXTINGUISHING MEDIA:  FOAM   CO2  DRY CHEMICAL  WATER FOG
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Toxic gases may form when product burns.
Closed containers may burst if exposed to extreme heat or fire.
SPECIAL FIRE FIGHTING PROCEDURES:
Cool exposed containers with water. Use self-contained breathing apparatus.
Do not use water stream on burning liquid. Use self-contained breathing
apparatus.
-------------------------------------------------------------------------------
                    SECTION V  HEALTH HAZARD DATA
-------------------------------------------------------------------------------
EFFECTS OF OVEREXPOSURE - ACUTE:
Inhalation - Harmful if inhaled.  May affect the brain or nervous system
causing dizziness, headache or nausea.
Contact - Causes eye irritation.
Contact - Causes skin irritation.
Skin Absorption - Hazardous ingredients contained in this product have the
capacity to be absorbed through the skin in sufficient quantities to cause
systemic toxicity.  See Safe Handling and Use Information (Section VIII).
Ingestion - Irritation of the digestive tract and nervous system depression
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(drowsiness, dizziness, loss of coordination and fatigue). Aspiration Hazard - This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.
EFFECTS OF OVEREXPOSURE - CHRONIC:
Contains: Crystalline Silica which has been determined to be carcinogenic to humans (1) by IARC when in respirable form. Risk of cancer depends on duration and level of inhalation exposure to dust from sanding the dried paint or spray mist.
NOTICE: Reports have associated permanent brain and nervous system damage with repeated, prolonged overexposure to solvents among persons engaged in the painting trade. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.
IARC has classified Ethyl Benzene as possibly carcinogenic for humans (2B).
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE:
None expected when used in accordance with Safe Handling and Use Information (Section VIII).
Inhalation statement: Sanding dust inhalation may cause lung damage.
Contains Methyl Ethyl Ketoxime (MEKO) which has been identified as a potential animal liver carcinogen. Currently, MEKO is not listed as a potential carcinogen by IARC, NTP or OSHA.
PRIMARY ROUTE(S) OF ENTRY: DERMAL INHALATION INGESTION
EMERGENCY AND FIRST AID PROCEDURES :
Inhalation - Remove from hazard area, maintain breathing, call physician.
Skin Contact - Remove with soap and water.
Eye Contact - Flush immediately with large amounts of water. Call physician
Ingestion - Drink 1 or 2 glasses of water to dilute.
DO NOT induce vomiting. Call physician.

SECTION VI REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION WILL NOT OCCUR
HAZARDOUS DECOMPOSITION PRODUCTS:
Burning may produce carbon dioxide and carbon monoxide.
CONDITIONS TO AVOID: Elevated temperatures and build up of vapors
INCOMPATABILITY (MATERIALS TO AVOID): None reasonably foreseeable.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Remove all sources of ignition. Avoid breathing vapors. Use non-sparking tools to return materials to container. Absorb residue with Fullers earth.
WASTE DISPOSAL METHOD:
Conventional procedures in compliance with local, state and federal regulations. Do not incinerate sealed containers.

SECTION VIII SAFE HANDLING AND USE INFORMATION

RESPIRATORY PROTECTION:
Wear a properly fitted vapor/particulate respirator approved by NIOSH for use with paints during application or sanding and until all vapors and spray mist are exhausted. In confined spaces or in situations where continuous spray operations are typical, or if proper respirator fit is not possible, wear a positive-pressure, supplied air respirator approved by NIOSH.
VENTILATION:
Adequate to maintain working atmosphere below T.L.V. and L.E.L. (See Sect. II for ingredient data and concentrations). Mechanical exhaust

may be required in confined areas.
Discharge exhaust only in area away from ignition sources.
PROTECTIVE GLOVES: Solvent impermeable gloves are required.
EYE PROTECTION : Splash goggles or safety glasses with side shields.
OTHER PROTECTIVE EQUIPMENT: Clothing adequate to protect skin.
HYGIENIC PRACTICES:
Remove and wash clothing before reuse. Wash hands before eating, smoking or using the washroom.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Flammable - Keep away from heat, sparks and flames.
OTHER PRECAUTIONS :
Use only with adequate ventilation. Avoid prolonged contact with skin and breathing of vapor spray mist or sanding dust.
Close container after each use. Keep out of reach of children. Do not take internally.

SECTION XX

HMIS (Hazardous Materials Identification System)(R) NPCA
HMIS is a recognized workplace Hazard Communications System as required by OSHA (29 CFR 1910.1200). Information on establishing a compliant hazardous communication program using HMIS is available from:
American Labelmark Co., Inc., Labelmaster Division
5724 N. Pulaski Rd., Chicago, IL 60646
1-800-621-5808
The ratings assigned by Benjamin Moore & Co. are only suggested ratings; the contractor/employer has ultimate responsibility for HMIS rating where this system is used.
PERSONAL PROTECTION: This code is left blank on Benjamin Moore & Co. MSDS's as it depends on application technique and the workplace ventilation. Please read Sections II through IX of this MSDS before deciding on appropriate protective equipment and beginning work. There are codes available for this section which can be obtained from Labelmaster.
This product contains at least one toxic chemical listed in Section II that is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR 372.

DISCLAIMER

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.
NOTICE: Removal of old paint by sanding, scraping or other means may generate dust or fumes which contain lead. Exposure to lead dust or fumes may cause adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For additional information, contact the USEPA/Lead Information Hotline at 1-800-LEAD-FYI.

Notes