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USER GUIDE FOR PAINT STRIPPING IN FURNITURE REFINISHING FACILITIES



INSTRUCTOR'S MANUAL

Canada



This user guide is based on Environment Canada's *Code of Practice for the Reduction of Dichloromethane Emissions from the Use of Paint Strippers in Commercial Furniture Refinishing and Other Stripping Applications*, developed pursuant to Part 3 of the *Canadian Environmental Protection Act, 1999*.

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Picture cover

École nationale du meuble et de l'ébénisterie du Cégep de Victoriaville.

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INTRODUCTION

NOTES FOR THE INSTRUCTOR

☒ Training objective

To enhance student awareness of the importance and benefits of training:

- ☐ better knowledge of paint-stripping products and methods;
- ☐ development of skills for the safe, environmental use of dichloromethane-based (DCM) paint strippers.

☒ Training content

- ☐ presentations and awareness;
- ☐ course objectives and skills targeted;
- ☐ presentation of the course outline and agenda for the day;
- ☐ presentation of teaching material;
- ☐ knowledge assessment test.

PROPOSED INTRODUCTION

In general, although cabinetmakers and wood finishers use paint strippers to refinish pieces and surfaces, they are completely unaware of the risks that these products present to health and the environment.

Methylene chloride, or dichloromethane (DCM), is the primary ingredient in almost all paint strippers. It now appears that this solvent is “probably” carcinogenic to humans. In 1995, it was estimated that 1,300 tonnes of DCM emissions could be attributed each year to paint-stripping activities in Canada, with about 70% being released by furniture restoration workshops.

Because of this environmental issue, Environment Canada, in collaboration with industry representatives, chemical suppliers and representatives of non-governmental environmental organizations, developed a code on safe practices for handling, storing and using dichloromethane-based paint strippers. Entitled the *Code of Practice for the Reduction of Dichloromethane Emissions from the Use of Paint Strippers in Commercial Furniture Refinishing and Other Stripping Applications*, it will be called the Code of Practice throughout this document.

To promote the use of the practices recommended in the Code of Practice, Environment Canada partnered with the École nationale du meuble et de l'ébénisterie to develop a course focused specifically on this Code. It is important for those who use paint strippers containing DCM to be clearly aware of the potentially harmful consequences caused by these products, and of the methods suggested to minimize their use in the wood and furniture industry.

If everyone makes a special effort to continue to reduce DCM emissions during paint-stripping activities, overall, we will make a concrete contribution to maintaining a healthy, safe environment.

WHO WILL BENEFIT FROM THIS TRAINING?

Expert or beginning cabinetmakers, and experienced or amateur finishers will benefit from this training; in short, anyone who works frequently or occasionally with paint strippers used to restore wood surfaces.

COURSE OUTLINE

☒ Title

Wood stripping and the environment – improving control of dichloromethane emissions

☒ Length

One day

☒ General objective

To promote an environmental code of practice for the use of dichloromethane (DCM) by increasing the awareness of personnel at furniture and cabinetmaking businesses of the risks presented by this solvent and the methods to apply to avoid accidental poisoning and to protect the environment.

☒ Specific objectives

At the end of this training, students will be able to:

- ☐ identify and know the types of paint strippers available;
- ☐ know the physical and chemical properties of DCM;
- ☐ identify the risks associated with using paint strippers containing DCM;
- ☐ identify and use suitable protective equipment;
- ☐ apply work methods that take the risks of DCM into account in wood-stripping activities;
- ☐ apply effective recovery methods for paint strippers containing DCM; and
- ☐ apply waste storage and handling methods that conform to standards.

☒ Content

The training consists of five modules:

- ☐ types of paint strippers used for wood surfaces;
- ☐ dichloromethane: characteristics and associated risks;
- ☐ protective and safety equipment;
- ☐ safe work methods;
- ☐ storage, handling and record keeping.

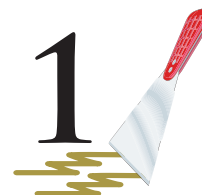
☒ **Methodology**

- ☐ Theoretical training (four hours) in the classroom, with the user guide.
- ☐ Practical training (four hours) in the workshop, consisting of demonstrations and simulation exercises using samples of items to be stripped.

☒ **Assessment**

- ☐ A theory test is given to students so they can assess their knowledge at the end of the training.
- ☐ A training evaluation form is also included in the student's manual.

MODULE 1



TYPES OF PAINT STRIPPERS USED FOR WOOD SURFACES

NOTES FOR THE INSTRUCTOR

☒ Objective

At the end of this module, students will be able to identify and list the different types of paint strippers and their physical and chemical properties, as well as their use in the wood and furniture industry from an environmental perspective.

☒ Content

- ☐ types of paint strippers;
- ☐ paint stripper reaction, effectiveness, and selection;
- ☐ potential and limitations of non-dichloromethane paint strippers;
- ☐ alternatives being developed.

☒ Exercise

Students will be asked to describe the paint strippers available on the market and their specific characteristics.

☒ Methodology

- ☐ product presentation using samples;
- ☐ description of the characteristics of each;
- ☐ paint stripper reaction, effectiveness and selection;
- ☐ suggestions for reducing the use of dichloromethane.

☒ Proposed length

45 minutes

1.1 Types of paint strippers

There are two main types of paint strippers on the market: commercial paint strippers that are available to the general public, and industrial paint strippers available from specialized suppliers. These paint strippers are sold in two formats: liquid-based and gel-based.

Liquid-based paint strippers are generally used for flat, horizontal surfaces. Since they penetrate deeply into the wood, they are intended primarily for immersion stripping using a flow-over system. These types of paint strippers do not contain evaporation retardants or thickeners.

Gel-based paint strippers are more widely used. They are spread on the surface to be stripped. They are particularly suitable for vertical surfaces and can also be used to strip metal surfaces.

Paint strippers for catalyzed finishes are available in gel- and liquid-based formats. They are generally powerful organic acids that slowly penetrate the film. Their use is limited to industrial applications because they are very hazardous.



Photo: École nationale du meuble et de l'ébénisterie

It is important to read the material safety data sheet carefully for information on paint stripper usage, storage, etc.

The typical formulation for an all-purpose paint stripper is relatively simple. The ingredients are:

- ☐ active solvents;
- ☐ solvent enhancers (such as methanol and ethanol);
- ☐ activators in the form of acids that help the solvent penetrate the coat of paint;
- ☐ evaporation retardants and thickeners (waxes and paraffins).
- ☐ Note that it is preferable to use paint strippers containing a wax additive that will harden on the surface of the product, thus reducing contact between the dichloromethane and the surrounding air.
- ☐ various additives (dispersing agents, surface active agents).

The most harmful ingredient is dichloromethane, or methylene chloride, which is discussed in the next module.

1.2 Paint stripper reaction, effectiveness and selection

A paint stripper's reaction and effectiveness depend on the drying process of the finishing product that has been applied. For products that dry by evaporation, the dry films do not have a very high resistance to physical or chemical methods. The resins can be redissolved easily using a solvent or paint stripper that has a higher solvating power. For catalyzed products, condensation and polymerization reactions occur that increase the molecular weight of the resins.

These products therefore provide very good physical and chemical resistance, and a standard paint stripper cannot dissolve the film by breaking down the chemical bonds.

Note: Furniture made prior to 1960 may be coated in lead-based paint. These furniture items require special precautions since exposure to lead, even in small quantities, is hazardous to health.

A private laboratory can help determine if the paint on old furniture contains lead.

It is therefore important to be able to select a paint stripper that is suitable for the type of finish and surface to be stripped. In general, since most films are created through the evaporation of solvents, liquid- or gel-based paint strippers are suitable. Methods that do not use paint strippers can also be considered. In fact, some furniture items can simply be sanded or washed to remove grease.

To determine the resistance of a film, do a patch test in a small, inconspicuous area:

- ☐ if the coating dissolves easily, it is a nitrocellulose product;
- ☐ if the coating does not dissolve but the sheen changes, it is a pre-catalyzed product;
- ☐ if the coating does not dissolve and the sheen does not change, it is a catalyzed product.

1.3 Potential and limitations of non-dichloromethane paint strippers

Traditional paint strippers contain methylene chloride, or dichloromethane (DCM), which is a toxic substance that is a risk to health and the environment. For more environmentally responsible paint strippers, non-DCM products can also be used.

Non-DCM paint strippers are less stressing to users because they release fewer toxic vapours. However, they require adequate ventilation and are slower acting.

A recent study of paint strippers tested 21 types, including 5 without DCM. The results showed that the latter gave good results, especially with air-dried finishes.

For epoxy- or urethane-based finishes, the use of “biodegradable paint strippers” provides medium results. The advantage of these paint strippers is that they do not darken the wood or damage the fibres.

1.4 Alternatives being developed

Many chemical manufacturers are working on developing alternative products to replace DCM. After considerable testing, particularly in Quebec in the aerospace industry, it seems that dibasic ester (DBE) products are the most promising for replacing traditional solvents.

DBE is a transparent, colourless liquid produced from dibasic acids. It is classed as “not hazardous” according to European criteria since it is a mixture of naturally occurring products. Its high solubility often enables it to enhance the properties of products and limit the amount of solvent required. It can therefore be combined with other non-toxic solvents in order to reduce the risks while simplifying handling.

For wood stripping, many tests still need to be done to determine the effectiveness of DBE on cellulose lacquers, polyurethanes, paints, etc. Nevertheless, this solvent will continue to grow in popularity as a substitute for DCM.

MODULE 2



DICHLOROMETHANE – CHARACTERISTICS AND ASSOCIATED RISKS

NOTES FOR THE INSTRUCTOR

☒ Objective

At the end of this module, students will have better knowledge of this solvent used in the manufacture of paint strippers, its physical and chemical properties, and the risks it presents to health and the environment.

☒ Content

- ☐ definition of dichloromethane (DCM);
- ☐ risks associated with its use;
- ☐ material safety data sheet for a paint stripper containing DCM.

☒ Exercise

Students will be asked to describe the characteristics and risks of DCM to users and the environment.

☒ Methodology

- ☐ presentation of DCM;
- ☐ description of the risks and toxicity level of DCM;
- ☐ demonstration of containers with a description of the contents and identification of DCM.

☒ Proposed length

30 minutes

2.1 What is dichloromethane (DCM)?

Dichloromethane (CH_2Cl_2) belongs to the halogenated aliphatic hydrocarbon family.

It is a colourless, very volatile liquid, with an ether-like odour generally detectable at between 200 and 300 ppm. It has low solubility in water but is miscible with most organic solvents. It is used to dissolve a large number of substances, such as greases, oils and resins, hence its use as a solvent in lacquer and paint strippers.

2.2 Uses of DCM

- ☐ aerosol formulations;
- ☐ removal agent in the food and pharmaceutical industries;
- ☐ removal of greases and paraffins;
- ☐ manufacture of cellulose coatings and fibres;
- ☐ cold adhesive formulations;
- ☐ lacquer and paint stripper formulations.

2.3 Characteristics and properties of DCM

Physical properties

- ☐ appearance: colourless liquid
- ☐ melting point: -97°C
- ☐ boiling point: 40°C
- ☐ vapour density: 2.9
- ☐ self-ignition temperature: 605°C

Chemical properties

- ☐ When properly stabilized for trade use by the addition of different products, DCM oxidizes very slowly when cold. However, the presence of water or light accelerates the degradation process.
- ☐ At temperatures above 120°C , DCM decomposes to form hydrogen chloride, carbon monoxide and dioxide, and carbonyl dichloride.
- ☐ The solvent vapours can also oxidize and release toxic gases through the action of intense ultraviolet radiation.
- ☐ In its dry state, the solvent does not affect common metals. However, if it is not stabilized, it can sometimes react very strongly with aluminum, magnesium, alkali metals, some forms of plastic, and titanium.

Toxicity

- ☐ possibility of irreversible effects if swallowed or inhaled;
- ☐ avoid breathing the vapours;
- ☐ avoid contact with skin and eyes.

Inflammation of the eyes is characterized by redness, tearing and itching.

Inflammation of the skin is characterized by itching, rough skin, redness and sometimes blisters.

Chronic effects on humans

- ☐ suspected carcinogenic effects;
- ☐ toxic to male and female reproductive systems;
- ☐ mutagenic and teratogenic effects under study.

Risk of fire and explosion

- ☐ Paint strippers containing DCM are flammable when exposed to open flame, sparks and static electricity discharges.
- ☐ Extinction methods:
 - for a small fire, dry chemical can be used;
 - for a large fire, use a water spray or fog. NEVER AIM THE STREAM OF WATER DIRECTLY INTO THE CONTAINER. THIS IS TO PREVENT SPLASHING THE PRODUCT, WHICH COULD CAUSE THE FLAMES TO SPREAD.
- ☐ Cool containers with a stream of water to avoid overpressure, self-ignition or explosion.
- ☐ It is important to check the flashpoint on the material safety data sheet.

The use of dichloromethane-based paint strippers presents significant risks and requires preventive measures, which are discussed in Module 3.

MODULE 3



PROTECTIVE AND SAFETY EQUIPMENT

NOTES FOR THE INSTRUCTOR

☒ Objective

At the end of this module, students will be able to correctly identify and use the protective equipment required when working with paint strippers containing dichloromethane.

☒ Content

This module describes the features and criteria to consider when selecting and using the following items:

- ☐ safety footwear;
- ☐ gloves;
- ☐ safety goggles;
- ☐ clothing;
- ☐ masks.

☒ Exercise

Students will be asked to describe the characteristics of the different protective equipment to use during paint-stripping activities.

☒ Methodology

- ☐ presentation of protective equipment;
- ☐ demonstration of use.

☒ Proposed length

30 minutes

Safety footwear

Paint strippers are very corrosive products. It is therefore important to wear footwear with toe caps, especially since heavy furniture must sometimes be handled. In addition, the soles must be corrosion resistant.

Gloves

Based on studies conducted on the chemical resistance of textiles, gloves made of PVA (polyvinyl alcohol) are recommended for handling products containing dichloromethane. However, these gloves should never come into contact with water and must be cleaned with solvents. The use of neoprene gloves is not recommended because of their low resistance.



Photo: École nationale du meuble et de l'ébénisterie

Stripping paint requires the use of safety equipment.

Safety goggles

Dichloromethane can cause irreversible eye damage. Wearing good quality plastic goggles with full side protection or a visor is a very good way to protect the eyes and face from splashing paint stripper. Keep in mind that paint strippers can damage certain types of plastic.

Clothing

When actively stripping paint from large surfaces or intricate pieces, wearing long-sleeved painter's coveralls is strongly recommended. They protect the skin on the arms and body from coming into contact with paint stripper. For small surfaces, a rubber apron over a long-sleeved shirt provides adequate protection.

Masks

There are two types: cartridge respirators (see photo) with a cartridge that is appropriate for the product being used, and air line masks. Always remember that paint strippers are extremely corrosive products. When inhaled, the vapours they release harm the respiratory system and can cause brain damage. Consequently, large pieces should never be stripped without good ventilation, meaning an air exhaust system and an efficient air exchange system to bring fresh air back into the workshop. A mask may be required when ventilation is inadequate.

MODULE 4



SAFE WORK METHODS

NOTES FOR THE INSTRUCTOR

☒ Objective

At the end of this module, students will be able to apply good paint-stripping practices that conform to health and safety regulations and are environmentally responsible.

☒ Content

This module describes the aspects and criteria to consider when choosing work methods so that students can make good decisions and strip paint properly. In particular, this module covers:

- ☐ the choice of paint-stripping method;
- ☐ performing the work in each step;
- ☐ methods for recovering materials.

All the procedures recommended have been suggested by the Code of Practice developed by Environment Canada, which describes the risks of dichloromethane on health and the environment.

☒ Exercise

Students will be asked to describe the steps required to complete a paint-stripping task using chemicals (choice of methods and equipment).

☒ Methodology

- ☐ presentation of work methods with photos from the guide as a visual aid;
- ☐ demonstrations in a practical workshop (see Appendix I).

☒ Proposed length

90 minutes

4.1 Tools and accessories required for paint stripping

Before starting, ensure you have the following equipment:

- ☐ paint brushes to spread the paint stripper (different sizes);
- ☐ #2 and #3 steel wool;
- ☐ synthetic steel wool (e.g., Scotch-Brite);
- ☐ wood and paint scrapers;
- ☐ putty knives and spatulas in a variety of widths;
- ☐ stiff chemical resistant brushes;
- ☐ sandpaper;
- ☐ rinsing tub;
- ☐ rags and old newspapers.



Photo: École nationale du meuble et de l'ébénisterie

Spreading paint stripper, and scraping and cleaning surfaces require the proper tools for completing all aspects of the process on a flat surface or on carved pieces.

4.2 General work practices

Before starting to strip paint, consider this important question: Are chemicals needed for the work?

Depending on the customer's requirements or purpose of the restoration project, some surfaces merely need sanding or washing to remove their film.

In other cases, a new coat of paint or wax can be applied without stripping the paint, if stripping might damage the item during restoration.

If there is no choice except chemical paint stripping, what techniques would help reduce dichloromethane emissions?

- ☐ Scraping off coats of paint that can be removed easily reduces the amount of paint stripper required.
- ☐ Sanding roughens the surface and allows the paint stripper to act more rapidly.

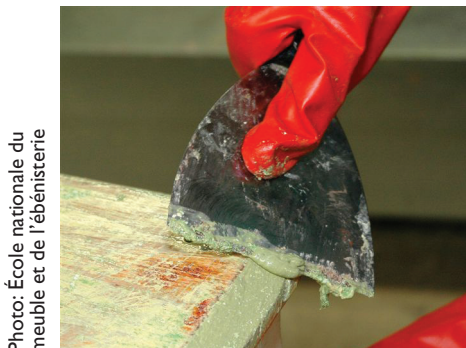


Photo: École nationale du meuble et de l'ébénisterie

Before applying paint stripper, use a scraper or sandpaper to remove coats of paint that come off easily.

- ❑ Antique furniture whose finish, value and look should be preserved can be dry stripped. The layers of coating can be scraped away gently, with limited use of a mild solvent. In general, old furniture is coated with a natural resin-based lacquer that can be stripped without the use of dichloromethane (DCM).
- ❑ Use a paint stripper with a lower DCM content. Paint strippers contain an average of 70% to 90% of DCM, but “green” products exist that have little or no DCM. Nevertheless, they have one inconvenience, in that they are much slower acting.
- ❑ To avoid having to apply two layers of paint stripper, clean and sand the furniture to remove materials caught in crevices that could prevent the product from removing the paint. This helps to avoid contaminating the paint stripper and optimizes its use.
- ❑ Use paint strippers that contain a wax additive. This hardens on the surface of the product after application (let it set) and reduces contact between the DCM and the surrounding air.
- ❑ Strip paint in a temperature range between 13°C and 18°C. The product reacts more rapidly and evaporates less. At temperatures below 13°C, the protective layer may solidify; at temperatures above 18°C, the DCM evaporates too quickly before reacting as desired with the coat of paint.
- ❑ Strip paint in a cool, shaded area outdoors.
- ❑ Choose a paint stripper that is appropriate for the type of coating to remove. Products exist on the market for conducting patch tests on small surfaces to determine whether an item has a nitrocellulose, polyurethane or other type of coating. If the coating is easy to remove, paint stripper with little or no DCM may suffice.
- ❑ To slow down drying of the paint stripper, and at the same time reduce DCM emissions, cover surfaces after applying the product. Contact between the DCM and the surrounding air can be reduced by covering the surface with wax paper, a cellulose-based cover or plastic sheeting.
- ❑ This practice is particularly effective on a flat surface or a coating that is difficult to strip, and helps avoid the need to apply a second layer of paint stripper. Small items can be placed in a small plastic bag after they are coated with paint stripper.



Photo: Environment Canada

Wash furniture before refinishing.



Photo: École nationale du meuble et de l'ébénisterie

Some coatings are easier to strip than others.

- ❑ Finally, work in a well-ventilated area that is sheltered from air disturbances, which can increase solvent emissions.



Photo: École nationale du meuble et de l'ébénisterie

In a workshop, paint stripping requires a good ventilation system. Ideally, it should be at floor level since vapour pressure is heavier than air.

4.3 Recommended practices – hand stripping (gel-based paint stripper)

Gel-based paint strippers are the most frequently used. Below are some instructions to follow to optimize the amounts of paint stripper used and to reduce DCM emissions.

- ❑ Apply paint stripper in one direction, keeping brush strokes to a minimum. This ensures uniform wax seal and the DCM is less exposed to the surrounding air.



Photo: Environment Canada

Apply paint stripper, always brushing in one direction.

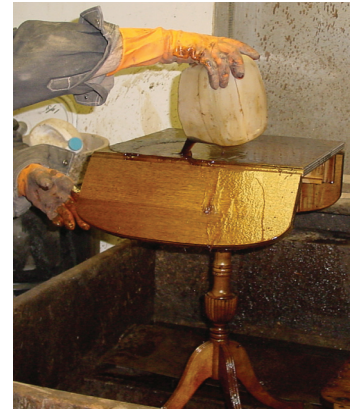
- ❑ Apply small amounts of paint stripper in a small, workable area at a time to reduce waste and minimize the need for a second application. This helps keep the DCM from evaporating before the surface is scraped.



Photo: Environment Canada

Apply paint stripper to a small area at a time.

- ❑ Apply the amount of paint stripper recommended by the manufacturer. Normally, 3.8 litres of paint stripper are enough for 7 to 9 square metres.
- ❑ Paint stripper needs time to react. Removing it too soon could require the unnecessary application of a second coat of paint stripper (and result in more DCM emissions). Test the penetration of the paint stripper on a small surface at a time to avoid disturbing the wax seal unnecessarily.
- ❑ Use a tray or pie plate (avoid aluminum containers, if possible) to capture paint stripper that drips onto the floor after application to a vertical surface or one close to the floor. The recovered paint stripper can be reused on the surface to be stripped. Drips can be avoided by using high-viscosity paint strippers on vertical surfaces.
- ❑ To keep paint stripper from recoating previously stripped areas, always work from the top down.



Capture and reuse paint stripper, if possible.

Photo: Environment Canada



Scrape layers of paint from furniture starting at the top.

Photo: Environment Canada

4.4 Recommended practices – flow-over system (liquid-based paint stripper)

Furniture restoration firms use liquid paint strippers.

The paint stripper is contained in a flow-over system equipped with dikes and a drain designed to contain spills or leaks before they evaporate. The practices proposed below all have the same objective: to minimize contact between the DCM and surrounding air.



Flow-over tank

Photo: Environment Canada

- ❑ It is essential to plan paint-stripping activities so as to minimize exposure of the paint stripper in the flow-over tank to the surrounding air. Do not leave the tank open; plan the furniture stripping sequence so that the tank can be closed as soon as the work is done. Leaving the tank open unnecessarily increases the emissions of DCM.
- ❑ Stripping paint creates paint chips that can enter the recirculating system. Use a strainer to collect the chips that escape through the drain and prevent them from reaching the flow-over tank. After they are recovered, place the strainer over an empty paint can or similar container to allow the DCM to drain. This way, the paint stripper can be captured and recycled into the flow-over system. Adding a thin layer of water to the container also minimizes DCM emissions.



Photo: Environment Canada

Use a strainer to collect paint chips that enter the recirculating system.

- ❑ To minimize the exposure of paint stripper to the surrounding air, the drip distance must be as short as possible. It is therefore important to apply the paint stripper close to the recirculating system drain to release as little DCM as possible into the air. This also applies to the hose, which must be as close as possible to the furniture to be stripped. The distance will vary depending on the type of furniture to strip and the degree of dispersion desired.



Photo: Environment Canada

Keep the hose end close to the furniture item being stripped.

- ❑ To minimize disturbance of the paint stripper and its exposure to the air, do not pour paint stripper directly into the tank, but rather into the container that captures the paint stripper draining out of the flow-over system. A hose attached to this container draws paint stripper up to be poured over the furniture item being stripped. The purpose is always to minimize contact between the paint stripper and the surrounding

air. Similarly, circulating pumps should be kept off when the flow-over system is not in use, to halt the flow of paint stripper and keep the product from being exposed to the surrounding air.



Photo: Environment Canada

Recirculating system

- ❑ Allow paint stripper to drip from furniture before rinsing; maximizing the amount of paint stripper returned to the flow-over tank reduces the quantity lost in the rinsing area. Using a paint brush to brush off the excess over or near the tank helps capture the product; less paint stripper needs to be purchased.



Photo: Environment Canada

***Place the furniture item
in the tank near the
recirculating system drain.***

- ❑ On furniture items with several coats of finish, using recycled paint stripper makes it possible to remove most of the paint initially. Then new paint stripper can be applied to remove the remaining paint. New paint stripper should be used on furniture items that have thin coatings.
- ❑ Sending paint chips and sludge to a recycler is also an effective way of reducing DCM emissions in the workshop. Solvent recovery technology is also available to extract DCM in paint chips on site.
- ❑ To limit the number of applications of paint stripper, do not allow it to dry on the furniture item to be stripped and ensure that all paint is removed while the paint stripper is still wet.



Photo: Environment Canada

***Clean the stripped surface
with a damp steel wool pad
rather than hosing it down.***

- ❑ Rather than simply covering the flow-over tank when the system is not in use, drain the tank completely and store the paint stripper in a sealed container. A cover is adequate only when stripping is stopped for a short period of time.



Photo: Environment Canada

***Cover the flow-over tank
when it is not in use.***

- ❑ If no recirculating system is available, use a tight-fitting cover to reduce contact between the DCM and the surrounding air. Contact can also be reduced by decreasing the tank size. Is yours larger than necessary?

MODULE 5



STORAGE, HANDLING AND RECORD KEEPING

NOTES FOR THE INSTRUCTOR

☒ Objective

At the end of this module, students will be able to:

- ☐ adopt good practices for paint stripper storage that comply with health and safety regulations and are environmentally responsible;
- ☐ apply recommendations for waste handling and disposal; and
- ☐ enter the required information in a record.

☒ Content

This module describes the standards related to handling products and how to use the information on material safety data sheets. The topics covered in this module are:

- ☐ paint stripper handling and storage;
- ☐ waste handling and disposal;
- ☐ record keeping.

All the recommended storage and handling procedures have been suggested by the Code of Practice developed by Environment Canada, which describes the risks of dichloromethane (DCM) on health and the environment.

☒ Exercise

Students will be asked to describe the storage methods and understand the material safety data sheet for a paint stripper.

You can also help them calculate the annual use of DCM based on the content shown on the product and the quantity used.

☒ Methodology

- ☐ presentation on storage and handling methods;
- ☐ demonstration of a material safety data sheet issued by the supplier;
- ☐ demonstrations by means of the practical workshop (see Appendix I).

☒ Proposed length

30 minutes

All instructions related to storage, handling and disposal have the same objective: reducing contact between the paint stripper and the surrounding air, to avoid dichloromethane (DCM) emissions.

5.1 Paint stripper handling and storage

As soon as the product has been removed from the container, close the lid tightly. Dry DCM is not corrosive to metal. At high temperatures and in the presence of water, DCM can corrode iron, certain stainless steels, copper and aluminum.

Containers must be stored in a cool, dry, well-ventilated location. Exposure to high temperatures may cause paint stripper containers to leak or swell. Closed containers exposed to heat can even explode.

Before disposing of a paint stripper container, ensure that it is completely empty.

When transferring paint stripper, ensure that the hose opening from which it will pour is inside or near the opening of the new container.

Ensure that the storage methods comply with local standards, such as fire codes. Eliminate all possible sources of fire (sparks and flames).

Set up a system to prevent any spills or leaks (containment system).



Photo: École nationale du meuble et de l'ébénisterie

Paint-stripping and finishing products must be stored neatly in a dry, well-ventilated location. Ideally, a containment system should be built on the floor.

5.2 Waste handling and disposal

Empty, non-recyclable containers should be disposed of immediately, using approved methods for the type of waste and following municipal and government regulations.

Containers used to capture material for recycling or waste disposal must have airtight lids.

After the stripping process, collect materials soaked with paint stripper and put them in a container designed for this type of waste. They will then be disposed of by a specialized firm. Suppliers can provide more details about this.

The tools used for paint stripping (brushes, rags, etc.) should also be stored in an airtight container.

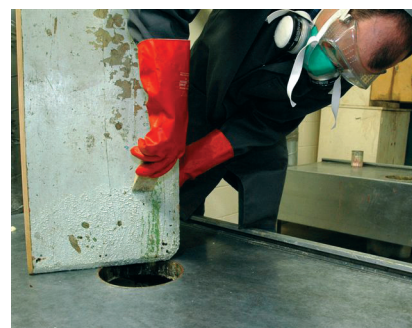


Photo: École nationale du meuble et de l'ébénisterie

Capture paint stripper waste in a suitable container and close the container tightly.

Avoid hosing down stripped surfaces to prevent introducing paint stripper residue into the municipal wastewater system.

5.3 Record keeping

To help track the use of DCM, it is recommended that a record with the relevant information be kept for three years. The record must contain the following:

- ☐ The specific measures adopted to reduce DCM emissions, indicating the date the measures were taken.
- ☐ The quantity of DCM contained in paint strippers that is used per year; this quantity can be determined with the help of suppliers who track information on annual paint stripper purchases.

Commercial firms and individuals can use Material Safety Data Sheets to determine their annual use of DCM. These sheets indicate the approximate or real DCM content in the paint stripper, expressed in weight or volume. A mathematical calculation taking into account the content and quantity of product used can then determine the amount used.

The quantities of waste containing DCM should also be recorded and included in the emissions calculations. The contact information for the waste disposal and/or recycling company and method used should also be recorded.

It is important to file the Material Safety Data Sheets properly so that they can be referred to quickly when the following information is needed:

- ☐ product identification and use;
- ☐ first aid in case of ingestion, inhalation, etc.;
- ☐ hazardous ingredients in the paint stripper;
- ☐ physical properties of the paint stripper;
- ☐ risk of fire and explosion;
- ☐ data on reactivity;
- ☐ toxicological properties;
- ☐ preventive measures;
- ☐ WHMIS classification;
- ☐ protective clothing to wear.

An appendix to this user guide contains two samples of Material Safety Data Sheets for paint strippers.

BIBLIOGRAPHY

CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME), *Guidelines for the reduction of VOC emissions in the wood furniture manufacturing sector*, PN 1336, Winnipeg, 2004, 37 pp.

CENTRE TECHNIQUE DU BOIS ET DE L'AMEUBLEMENT (CTBA), *Guide de rédaction du schéma de maîtrise des émissions de composés organiques volatils pour le secteur de l'ameublement*, Paris, September 2004, 112 pp.

CRUMP, Derrick, *The Complete Guide to Wood Finishes*, Fireside, New York, 1993, 176 pp.

ÉCOLE QUÉBÉCOISE DU MEUBLE ET DU BOIS OUVRÉ, Cégep de Victoriaville, *Diplôme d'études professionnelles en finition, programme de cours, module 11 : décapage des surfaces planes en bon état*, Victoriaville, Quebec.

ENVIRONMENT CANADA, *Code of Practice for the Reduction of Dichloromethane Emissions from the Use of Paint Strippers in Commercial Furniture Refinishing and Other Stripping Applications*. Government of Canada, June 2003, Ottawa, 23 pp.

FLEXNER, Bob, *Understanding Wood Finishing*, Rodale Press, United States, 1994, 309 pp.

INSTITUT NATIONAL DE RECHERCHE ET DE SÉCURITÉ, *Dichlorométhane*, Fiche toxicologique no. 34, France, 1997, 4 pp.

ST-PIERRE, Alain, *Le décapage des surfaces*, École québécoise du meuble et du bois ouvré du Cégep de Victoriaville, Course notes, Finishing Department, 2004.

APPENDIX 1

PRACTICAL WORKSHOP

To allow students to apply the theoretical concepts taught earlier, we suggest that you organize a workshop to review them from a different perspective. This will help participants to better understand and apply the recommendations made in the code of practice developed by Environment Canada.

DESCRIPTION

You will demonstrate paint-stripping methods on different items. The aim is to properly teach the methods for applying paint stripper, cleaning the surface and recovering material, all with the same objective: TO MINIMIZE CONTACT BETWEEN THE DICHLOROMETHANE AND THE SURROUNDING AIR.

OBJECTIVES

Teach students to:

- ☐ Determine the nature of the finish to be stripped and select a suitable product (is a paint stripper containing dichloromethane necessary?).
- ☐ Choose proper protective equipment according to the work to be done.
- ☐ Know and comply with health and safety rules.
- ☐ Apply paint stripper properly and comply with the product's reaction time.
- ☐ Scrape and remove an old finish.
- ☐ Neutralize paint stripper and clean a flat surface.
- ☐ Read Material Safety Data Sheets.
- ☐ Use approved containers for transferring or storing products containing dichloromethane (DCM) while minimizing contact with the surrounding air.
- ☐ Identify the risks associated with DCM emission in a workshop and ensure proper ventilation.
- ☐ Capture paint-stripping waste.

AGENDA

The workshop agenda can be varied to suit the material resources available. The procedure proposed below requires certain basic equipment and sufficient space to accommodate the group.

We suggest that you strip a flat piece and, ideally, a carved piece, emphasizing the safety and environmental concepts taught in the theory. The following steps are suggested:

STEP 1

Description of health and safety equipment (protective equipment, ventilation, etc.)

- ☐ describe the different tools and accessories required for paint-stripping activities;
- ☐ show how the ventilation system works;
- ☐ explain the storage and collection systems for products.

STEP 2

Description of paint-stripping products (Material Safety Data Sheets)

- ☐ explain the content of technical instructions written on containers;
- ☐ use containers with gel-based and liquid-based paint stripper;
- ☐ demonstrate product transfer methods.

STEP 3

Demonstration of paint-stripping methods on a flat surface and, ideally, on carved pieces coated with finishes that have as a base the products mentioned above.

- ☐ encourage students to consider whether the task requires a paint stripper with DCM or whether a biodegradable paint stripper is sufficient.
- ☐ strip the paint from a flat surface using a gel-based product, following each of the steps, in particular regarding:
 - the paint stripper application method (small areas);
 - the paint stripper's reaction;
 - the methods for removing material and capturing waste;
 - neutralizing the paint stripper;
 - cleaning the surface and quality control;
- ☐ you can then repeat the operation using a carved piece to be stripped.

At each step in the paint-stripping process, emphasize the importance of minimizing contact between the paint stripper and the surrounding air when applying the product, transferring it between containers, capturing used product, etc.



Photo: École nationale du meuble et de l'ébénisterie

Ideally, the paint-stripping demonstration in the workshop can be done with a furniture item that has a flat surface and a carved piece, such as this table leg.

Following the same instructions, if facilities are available, demonstrate liquid stripping activities using a flow-over system. Students will be able to see the methods used to capture materials and how recycled paint stripper can be reused in preliminary paint-stripping activities to remove a large amount of material.

STEP 4

Storage and handling methods for products containing DCM

- ☐ emphasize the importance of tightly sealed lids and room temperature;
- ☐ demonstrate how waste containers are stored;
- ☐ if your workshop keeps records on the quantity of DCM used and paint stripper purchases, demonstrate the process to the students.

APPENDIX 2

KNOWLEDGE ASSESSMENT TEST

To allow students to review the theoretical and practical concepts learned in training, we suggest you hand out this test. These are general questions about the main aspects of the material covered. You can then correct them as a group.

Calculation of results: based on the number of points shown in parentheses, for a total of 25.

Estimated length: 15 minutes

1. **What other name is used to designate dichloromethane (DCM)?** (1 point)

Answer: Methylene chloride

2. **Name one advantage and one disadvantage of non-DCM paint strippers.** (2 points)

Answer: - They do not damage the wood fibres and do not release toxic emissions.
- Their chemical reaction is much slower.

3. **Name two effects on humans related to DCM toxicity.** (2 points)

Answer: - Skin inflammation
- Eye inflammation
- Strongly suspected of having a carcinogenic effect

4. **Name five of the main protective accessories used in paint stripping.** (5 points)

Answer: - Safety footwear
- Apron
- PVA gloves
- Safety goggles
- Cartridge respirator

5. **What is the average DCM content in paint strippers?** (1 point)

Answer: 70 to 90%

6. **True or False. To avoid unnecessary evaporation of DCM, paint stripper is applied in small amounts on small areas. (1 point)**

Answer: True

7. **True or False. To spread paint stripper properly, several brush strokes should be made in all directions to cover the entire surface. (1 point)**

Answer: False

8. **True or False. It is recommended that a stripped surface be hosed down with water. (1/2 point) Explain. (1/2 point)**

Answer: False. This method can introduce paint stripper residue into the municipal wastewater system.

9. **How can recovered paint stripper be used? (1 point)**

Answer: It can be reused to remove a large amount of the coating on a new surface to be stripped that has several layers of paint.

10. **How much surface can normally be covered by 3.8 litres of paint stripper? (1 point)**

Answer: From 7 to 9 square metres

11. **What is the name of the document that contains all the information about the chemical and toxicological properties of a paint stripper? (1 point)**

Answer: The Material Safety Data Sheets

12. **How long should records about the use of DCM be kept? (1 point)**

Answer: Three years

13. **Why should paint stripper not be allowed to dry on the surface of furniture? (1 point)**

Answer: To prevent the solvents from evaporating before the surface is scraped and thereby requiring an unnecessary second application of paint stripper.

14. Why are high-viscosity paint strippers suggested for vertical surfaces? (1 point)

Answer: To reduce dripping of the product before it reacts.

15. Name five categories of information on a Material Safety Data Sheets. (5 points)

Answer:

- Physical properties
- Chemical properties
- Toxicity
- Chronic effects on humans
- Risk of fire and explosion

APPENDIX 3

PAINT-STRIPPING GLOSSARY

Agent

Substance often added to a finishing product in low concentrations to develop certain qualities designed to improve manufacturing, conservation, application or other conditions.

Brush

Tool used to scrape and clean a surface before and after stripping.

Chemical stripping

Stripping a surface to remove paint, varnish, lacquer or grease using solvent-based paint strippers. Depending on the situation, it can be accompanied by mechanical stripping, sandblasting, immersion in a dip tank or use of a heat gun.

Coating

Film-forming material used for the decoration and/or protection of the surfaces of objects. Coatings include, in particular, lacquers, enamels, elastomeric materials, primer surfacers, basecoats, midcoats, and clearcoats.

Commercial paint-stripping facility

Operation that provides paint-stripping services to the general public as well as to other commercial enterprises.

Dichloromethane

Colourless, very volatile solvent with an ether-like odour generally perceptible between 200 and 300 ppm. It has low solubility in water but is miscible with most organic solvents. It is used to dissolve a large number of substances, such as greases, oils and resins, hence its use as a solvent in lacquer and paint strippers.

Dip tank

Paint-stripping process in which a coated piece is lowered into (and often submersed in) a tank containing a paint-stripping product.

Drying

Series of physical, chemical or physiochemical reactions that change a liquid coating applied to a surface into a hard, adhesive film.

Emission

The release or discharge, whether directly or indirectly, of volatile organic compounds (VOC) into the ambient air.

Evaporation

Process by which solvents change from a liquid to a vapour state during drying of the product.

Film

Continuous coat created by applying one or more coats of paint, varnish or similar products to a surface, and which adhere to this surface after drying.

Finish

General appearance of a coated surface, created by the specific topography of a film after it has completely dried. In general, finishes are categorized according to their reflective properties (matte, satin, glossy and other finishes).

Flow-over system

Paint-stripping process in which a paint-stripping formulation is applied to a coated piece in order to loosen the coating. The item being stripped sits in a shallow tank with an inclined bottom. The paint stripper is applied either manually (e.g., bucket) or automatically (e.g., hose/pump system).

Neutralizer

Product used to halt the chemical reaction of a paint stripper.

Operator

The person who is responsible for completing the routine paint-stripping tasks and who is normally on the premises during the hours of operation.

Paint

A pigmented product that leaves an opaque film when applied.

Paint brush

Object made of hairs attached to a handle and placed according to length to form a thick unit used to apply paint stripper.

Paint stripper

Preparation that creates a physical or chemical reaction to facilitate or produce the removal of films of varnish or paint.

Sanding

Process that prepares a surface using abrasives to make it perfectly smooth.

Scraper

Tool designed to remove the coating after a paint stripper has been applied.

Solvent

Plain or mixed liquid that is volatile under normal drying conditions and has the ability to completely dissolve the binder to make a product sufficiently fluid for easy application.

Vapour mask

Accessory covering the mouth and nose that filters, retains or absorbs particles, dust and toxic vapours released by finishing or paint-stripping activities.

Varnish

Unpigmented preparation composed of binders, solvents, and possibly thinners and additives, that is applied in thin coats to a suitably prepared surface to give an adhesive, hard film that is generally smooth and provides protective properties.

Ventilation

The replacement, by natural or artificial means, of the air in a finishing workshop that is contaminated by dust or toxic vapours.

Viscosity

The resistance to flow of a liquid whose molecules adhere to each other.

APPENDIX 4

SAMPLES OF MATERIAL SAFETY DATA SHEETS

Acknowledgements:

- ☐ Chemcraft International Inc., Warwick, Quebec
- ☐ CanLak, Victoriaville, Quebec

Material Safety Data Sheet

Section 1. Product Identification and Use

Product Name - Trade Name **DECAPANT 3000 HV** **870-1589**

Supplier - Manufacturer **Produits Chemcraft inc.**

274, Saint-Louis, Local 6,
Warwick Qué
JOA 1MO

Telephone (819) 358-7500 Fax (819) 358-7569

Email pjossinet@chemcraft.com

For Transport Emergency or After Hours

In case of Emergency CANUTEC (613) 966-6666

Code 870-1589

Chemical Family Paint.

Product Identification Number (PIN) 1992 FLAMMABLE LIQUIDS, POISONOUS, N.O.S. (Methanol, Methane, dichloro-)



Section 2. Hazardous Ingredients

Exposure Limits

Name	CAS #	% by Weight	LC ₅₀ /LD ₅₀	TLV/PEL
Methylene chloride	75-09-2	60 - 100	Not available.	OSHA (Canada). TWA: 25 ppm STEL: 125 ppm RSST (Canada, 2001). : 50 ppm : 174 mg/m ³
Methanol	67-56-1	5 - 10	Not available.	RSST (Canada, 2001). : 200 ppm : 262 mg/m ³
Distillats léger (petrole), hydrotraites	64742-47-8	5 - 10	Not available.	ACGIH (United States). TWA: 100 ppm CEIL: 125 ppm TWA: 525 mg/m ³ CEIL: 720 mg/m ³
methylbenzene	108-88-3	1 - 5	Not available.	ACGIH (Canada, 1991). TWA: 100 ppm OSHA (Canada). TWA: 100 ppm STEL: 150 ppm ACGIH (Canada, 1991). STEL: 150 ppm RSST (Canada, 2001).

Continued on Next Page

DECAPANT 3000 HV 870-1589**Page Number: 2**

: 50 ppm
: 188 mg/m³

Trace impurities and additional material names not listed above may appear in other sections of this MSDS. These materials may be listed for toxicological concerns, local compliance, or other reasons.

Section 3. Physical Data

Physical State and Appearance	Liquid.
pH (1% soln/water)	Neutral.
Boiling Point	The lowest known value is 39.8°C (103.6°F) (Methane, dichloro-). Weighted average: 51.14°C (124.1°F)
Melting Point	May start to solidify at -94.5°C (-138.1°F) based on data for: Toluene. Weighted average: -96.72°C (-142.1°F)
Specific Gravity	1.168 (Water = 1)
Vapor Pressure	The highest known value is 46.5 kPa (348.8 mm Hg) (at 20°C) (Methane, dichloro-). Weighted average: 39.57 kPa (296.8 mm Hg) (at 20°C)
Vapor Density	The highest known value is 4.8 (Air = 1) (Distillats leger (petrole), hydrotraites). Weighted average: 2.9 (Air = 1)
Odor Threshold	The lowest known value is 1 ppm (Distillats leger (petrole), hydrotraites) Weighted average: 199.24 ppm
Water/Oil Dist. Coeff.	The product is much more soluble in octanol.
Dispersion Properties	Not dispersible in cold water, hot water. See solubility in methanol, diethyl ether, n-octanol.
Solubility	Easily soluble in methanol, diethyl ether. Soluble in n-octanol. Insoluble in cold water, hot water.
COV (g/L)	198.56 (g/l).

Section 4. Fire and Explosion Hazard

The Product is :	Flammable.
Fire Hazards in Presence of Various Substances	Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge.
Fire Fighting Media and Instructions	SMALL FIRE: Use dry chemical powder. LARGE FIRE: Use water spray or fog. Never direct a water jet into the container in order to prevent any splashing of the product, which could cause the fire to spread. Cool containers with water jet in order to prevent pressure build-up, auto-ignition or explosion.
Special Remarks on Fire Hazards	Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition, it emits acrid smoke and irritating fumes. (Methanol)
Flash Points	The lowest known value is Closed cup: 6°C (42.8°F). (Tagliabue.). Open cup: 9°C (48.2°F). (Tagliabue). (Toluene)
Flammable Limits	The greatest known range is Lower: 6% Upper: 36.5% (Methanol)
Auto-Ignition Temperature	The lowest known value is 240°C (464°F) (Distillats leger (petrole), hydrotraites).

Continued on Next Page

DECAPANT 3000 HV**870-1589****Page Number: 3**

Products of Combustion	These products are carbon oxides (CO, CO ₂), halogenated compounds, hydrogen chloride.
Explosion Hazards in Presence of Various Substances	Highly explosive in the presence of the following materials or conditions: open flames, sparks and static discharge.

Section 5. Reactivity Data

Stability	The product is stable.
Decomposition products	These products are halogenated compounds, hydrogen chloride.
Conditions of Instability	Not available.
Incompatibility with various substances	Highly reactive or incompatible with the following materials: oxidizing materials and organic materials. Reactive or incompatible with the following materials: reducing materials, metals, acids and alkalis. Non-reactive or compatible with the following materials: combustible materials and moisture.

Section 6. Toxicological Properties

Routes of Entry	Dermal contact. Inhalation. Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 1987 mg/kg [Mouse]. (Methane, dichloro-). Acute dermal toxicity (LD50): 4650 mg/kg [Rabbit]. (Methane, dichloro-).
Effects of Acute Exposure	Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (permeator)
Chronic Effects on Humans	Slightly hazardous in case of eye contact (irritant), of inhalation (lung irritant). CARCINOGENIC EFFECTS: Classified 2B (Possible for humans.) by IARC [Methane, dichloro-]. Classified A2 (Suspected for humans.) by ACGIH [Methane, dichloro-]. Classified A5 (Not suspected for humans.) by ACGIH, 4 (Probably not for humans.) by IARC, None. by OSHA [Methanol]. MUTAGENIC EFFECTS Not available. TERATOGENIC EFFECTS Not available. DEVELOPMENTAL TOXICITY PROVEN [Methane, dichloro-] The substance is toxic to kidneys, the nervous system, the reproductive system, liver, cardiovascular system. Repeated or prolonged exposure to the substance can produce target organs damage.
Special Remarks on Chronic Effects on Humans	Human: passes through the placenta, excreted in maternal milk. (Methane, dichloro-)
Special Remarks on Other	
Toxic Effects on Humans	
Exposure Limits	Not available.

Continued on Next Page

Section 7. Preventive Measures

Personal Protection	Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Impervious gloves.	
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Suggested protective clothing might not be adequate. Consult a specialist before handling this product.	
Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are close to the workstation location.	
Small Spill	Absorb with an inert material and transfer the spilled material and absorbent to an appropriate waste disposal container.	
Large Spill	Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with dry earth, sand or other non-combustible material. Do not allow water to enter container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas. Dike if necessary. Call for assistance on disposal.	
Waste Disposal	Waste must be disposed of in accordance with federal, state and local environmental control regulations.	
Precautions	Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. 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. Keep away from incompatibles such as oxidizing agents, metals, alkalis.	
Storage	Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).	
TDG Classification	3	
PIN	1992	FLAMMABLE LIQUIDS, POISONOUS, N.O.S. (Methanol, Methane,PG: II dichloro-)
Special Provisions for Transport	-	
Federal and State Regulations	WARNING: This product contains chemical/chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.: Methane, dichloro-SARA 302/304/311/312 extremely hazardous substances: Methane, dichloro-CERCLA: Hazardous substances.: Methanol;	
Other Regulations	OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).	
Other Classifications	WHMIS (Canada)	Class D-1A: Material causing immediate and serious toxic effects (Very toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).
	HCS (U.S.A.)	Contains material which may cause cancer Target organ effects
Hazardous Material Information System (U.S.A.)	Health Hazard	* 1
	Fire Hazard	3
	Reactivity	0
	Personal Protection	G
National Fire Protection Association (U.S.A.)	Health	0
	Fire Hazard	0
	Reactivity	0
	Specific Hazard	

Continued on Next Page

DECAPANT 3000 HV 870-1589**Page Number: 5****Section 8. First Aid Measures**

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	Wash with soap and water. Get medical attention if irritation develops.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion	Do not induce vomiting. Examine the lips and mouth to ascertain if the tissues are damaged, a possible indication that 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.

Section 9. Preparation Information

Related Information This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by CPR.

Preparation Information Validé et vérifié le 25/04/2007.
Printed 30/04/2007.

Information Contact Laboratoire Recherche et Développement
Produits Chemcraft Inc., 274 Saint-Louis, local # 6
WARWICK QC. JOM 1M0
Tél: (819) 358-7500, télécopieur: (819) 358-7569, courriel: pjossinet@chemcraft.com

Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS	Protective Clothing	TDG Road/Rail
 	  	

Section I. Product Identification and Uses

Common/Trade name	414-021 Thick remover	CI#	Not applicable.
Synonyms	Not available.	DSL	CEPA DSL: No products were found.
Chemical name	Not applicable.	CAS#	Mélange
Chemical formula	Not applicable.	Code	414-021
Chemical family	Solvent.	Molecular weight	Not applicable.
Supplier	PEINTURE CAN-LAK INC 674 RUE PRINCIPALE DAVELUYVILLE, QUÉBEC G0Z 1C0 (819) 367-3264 EMERGENCY PHONE CANUTEC: (613) 996-6666	Manufacturer	PEINTURE CAN-LAK INC 674 RUE PRINCIPALE DAVELUYVILLE, QUÉBEC G0Z 1C0 (819) 367-3264 EMERGENCY PHONE CANUTEC: (613) 996-6666
Material uses	Coatings: Paint remover. Varnish removers.		

Section IA. 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. Get medical attention.
Skin contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Hazardous skin contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Slight inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Hazardous inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.
Slight ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.
Hazardous ingestion	Not available.

Section II. Hazardous Ingredients

			Exposure Limits	
Name	CAS #	% by Weight	TLV/PEL	LC₅₀/LD₅₀
Ethyl alcohol	64-17-5	0.1-1	ACGIH (Canada). TWA: 1000 ppm TWA: 1900 mg/m ³ ACGIH (Canada). TWA: 200 ppm	ORAL (LD50): Acute: 8300 mg/kg [Mouse]. 13700 mg/kg [Rat]. ORAL (LD50): Acute: 5628 mg/kg [Rat]. 7300 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR
MÉTHANOL	67-56-1	10-30		

Continued on Next Page

414-021 Thick remover				Page Number: 2
XYLENE	1330-20-7	1-5	OSHA (Canada). TWA: 100 ppm STEL: 100 ppm	(LC50): Acute: 64000 ppm 4 hour(s) [Rat]. ORAL (LD50): Acute: 4300 mg/kg [Rat].
TOLUENE	108-88-3	5-10	OSHA (Canada). TWA: 200 ppm CEIL: 300 ppm	ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 12124 mg/kg [Rabbit].
METHYLENE CHLORIDE	75-09-2	60-100	Not available.	ORAL (LD50): Acute: 1600 mg/kg [Rat]. VAPOR (LC50): Acute: 31113 mg/m ³ 4 hour(s) [Rat]. 19049 mg/m ³ 4 hour(s) [Mouse].

Section III. Physical Data

Physical state and appearance	Liquid.	Odor	SOLVENT
pH (1% soln/water)	Neutral.	Taste	Not available.
Odor threshold	The lowest known value is 0.2 ppm () Weighted average: 128.78 ppm	Color	Milky
Volatility	100% (v/v). (METHYLENE CHLORIDE.) Weighted average: 88% (v/v) 100% (w/w). (METHYLENE CHLORIDE.) Weighted average: 98% (w/w).		
Melting point	May start to solidify at -48°C (-54.4°F) based on data for: . Weighted average: -94.71°C (-138.5°F)		
Boiling point	The lowest known value is 39.8°C (103.6°F) (METHYLENE CHLORIDE). Weighted average: 54.52°C (130.1°F)		
Specific gravity	Weighted average: 1.12 (Water = 1)		
Vapor density	The highest known value is 3.7 (Air = 1) (). Weighted average: 2.62 (Air = 1)		
Vapor pressure	The highest known value is 46.5 kPa (349 mmHg) (at 20°C) (METHYLENE CHLORIDE). Weighted average: 34.74 kPa (260.57 mmHg) (at 20°C)		
Evaporation rate	0.71 (METHYLENE CHLORIDE) compared to ethylic ether		
Viscosity	Not available.		
Water/oil dist. coeff.	The product is more soluble in octanol.		
Ionicity (surface active agent)	Not available.		
Critical temperature	Not available.		
Instability temperature	Not available.		
Conditions of instability	to avoid excessive heat, open flame temperature > 102 oC (METHYLENE CHLORIDE)		
Dispersion properties	Is not dispersed in cold water, hot water.		
Solubility	Very slightly soluble in methanol, diethyl ether, n-octanol, acetone. Insoluble in cold water, hot water.		

Section IV. Fire and Explosion Data

The product is:	Flammable.
Auto-ignition temperature	The lowest known value is 385°C (725°F) (METHANOL).
Fire degradation products	These products are carbon oxides (CO, CO2).
Flash points	The lowest known value is Closed cup: 4°C (39.2°F). (Setaflash). Open cup: 12.78°C (55°F). (METHYLBENZÈNE)

Continued on Next Page

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Flammable limits	The greatest known range is LOWER: 6% UPPER: 36% (MÉTHANOL)	
Fire extinguishing procedures	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Never direct a water jet in the container in order to prevent any splashing of the product which could cause spreading of the fire. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.	
Flammability	Highly flammable in presence of open flames, sparks and static discharge, of heat, of combustible materials. Remark Evolves toxic fumes when heated to the decomposition state. (METHYLENE CHLORIDE)	
Risks of explosion	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Remark We believe that the product is sensible to electrostatic discharge when vapors concentrations are in inferior explosive limit and superior one. Closed containers exposed to heath can exploded. (METHYLENE CHLORIDE)	
Section V. Reactivity Data		
Stability	The product is stable.	
Hazardous decomp. products	Not available.	
Degradability	Not available.	
Products of degradation	These products are carbon oxides (CO, CO2) and water. The products of degradation are less toxic than the product itself. Remark Not available.	
Corrosivity	Not available. Remark Not available.	
Reactivity	Highly reactive with oxidizing agents, acids. Reactive with metals, alkalis, moisture. Remark Avoid humidity because it can contaminate the productAvoid:strong oxidizers, liquid oxygen, caustik. Contact with water or rhumidity can produce chloridric acid. Methanol, amino, nitric acid, aluminium powder. Aromatic hydrocarbon and trichloroethane-1,1,1. Chemistry active compounds. Alkalis steel, lithium, potassium and sodium alloying. The product can react with perchloric acid and dimethyl sulfoxide and explode. When it is dry (without water), methylene chloride is not corrosive with steel. High temperature and in presence of water, methylene chloride can corrode iron, stainless steel, copper, and aluminium. Attack steel in presence of humidity. The product can react in presence of certain types of rubber, plastic or coating and dommage them. (METHYLENE CHLORIDE)	
Section VI. Toxicological Properties		
Routes of entry	Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.	
TLV	Not available.	
Toxicity to animals	Acute oral toxicity (LD50): 636 mg/kg [Rat]. (MÉTHYLBENZÈNE). Acute dermal toxicity (LD50): 12124 mg/kg [Rabbit]. (MÉTHYLBENZÈNE). Acute toxicity of the gas (LC50): 5000 ppm 4 hour(s) [Rat]. (). Acute toxicity of the vapor (LC50): 980 ppm 4 hour(s) [Mouse]. (MÉTHYLBENZÈNE). Remark Not available.	
Continued on Next Page		

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Chronic effects on humans	<p>Slightly hazardous in case of skin contact (irritant, permeator), of inhalation.</p> <p>CARCINOGENIC EFFECTS: Classified 4 (Probably not for human.) by IARC, None. by OSHA [Ether hydroxypropylique de la cellulose]. Classified None. by CRIC, None. by OSHA []. Classified None. by OSHA [MÉTHYLBENZÈNE]. Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [MÉTHYLBENZÈNE]. Classified + (Proven.) by OSHA+ (Proven.) by NIOSH [METHYLENE CHLORIDE]. Classified 2B (Possible for human.) by IARC [METHYLENE CHLORIDE]. Classified A2 (Suspected for human.) by ACGIH [METHYLENE CHLORIDE].</p> <p>MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [METHYLENE CHLORIDE]. Classified None. for human [PARAFFINE WAX].</p> <p>TERATOGENIC EFFECTS: Classified PROVEN for human []. Classified None. for human [METHYLENE CHLORIDE]. Classified None. for human [PARAFFINE WAX].</p> <p>DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED] [MÉTHANOL]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [PROVEN] [MÉTHYLBENZÈNE]. Classified Non-toxic to the female reproductive system. [METHYLENE CHLORIDE].</p> <p>The substance is toxic to kidneys, the reproductive system, liver, brain, central nervous system (CNS), ears.</p> <p>The substance may be toxic to lungs, mucous membranes, heart, digestive system, cardiovascular system, skin, eyes.</p> <p>Repeated or prolonged exposure to the substance can produce target organs damage.</p>	
	<p>Remark</p> <p>It's declared that it cause congenital malformation to rats who are exposed at more than 20000 ppm. (MÉTHANOL)</p>	
Acute effects on humans	<p>Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of eye contact (irritant). Slightly hazardous in case of skin contact (permeator).</p>	
	<p>Remark</p> <p>This product may cause central nervous system depression: headache, dizziness, drowsiness. nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. The product can cause ravel vision , numbness, kidney and livers effects, important pulmonary problems, methemoglobinemy, ventreculary fibrillation and cardiac problem. (METHYLENE CHLORIDE)</p>	
Section VII. Preventive Measures		
Waste disposal	Recycle, if possible. Consult your local or regional authorities.	
Storage	Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).	
Precautions	Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. 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. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis, moisture.	
Small spill and leak	Absorb with an inert material and put the spilled material in an appropriate waste disposal.	
Large spill and leak	Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.	
Protective clothing in case of 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.	

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Section VIII. Classification

TDG road / rail

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Shipping name: Paint or paints related materials : UN 1263 PG: II

Remark

WHMIS

Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
 Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
 Class D-2A: Material causing other toxic effects (VERY TOXIC).
 Class D-2B: Material causing other toxic effects (TOXIC).



Remark

Not available.

Section IX. Protective Clothing

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent.
 Gloves.

**Section X. Other Information**

References

-Manufacturer's Material Safety Data Sheet.
 -Material safety data sheet issued by: la Commission de la Santé et de la Sécurité du Travail du Québec.

Not available.

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Verified by Kim Beauvilliers.

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