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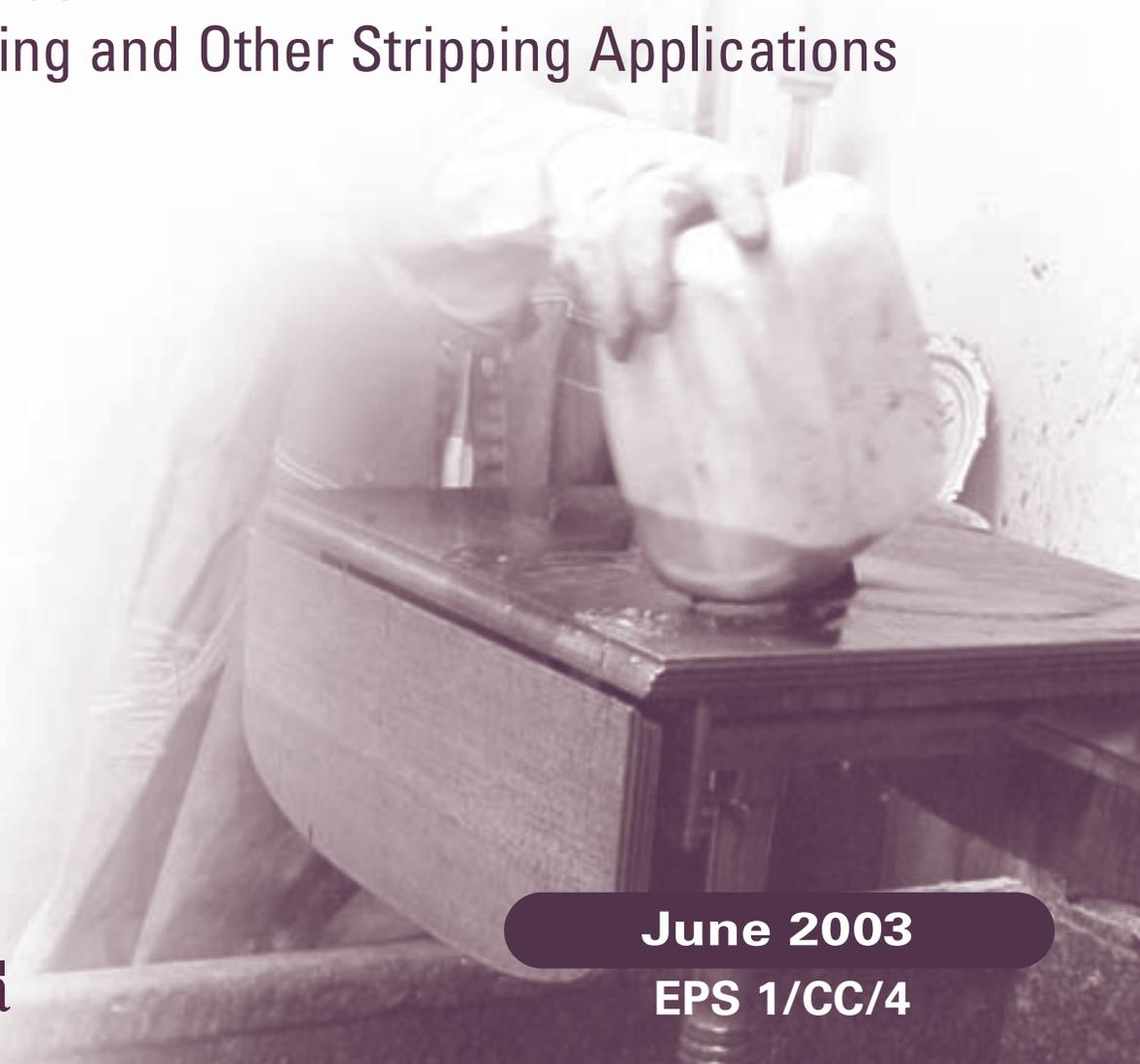
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CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999 (CEPA 1999)



Code of Practice for the Reduction of Dichloromethane Emissions from the Use of Paint Strippers in Commercial Furniture Refinishing and Other Stripping Applications

Paint Stripping

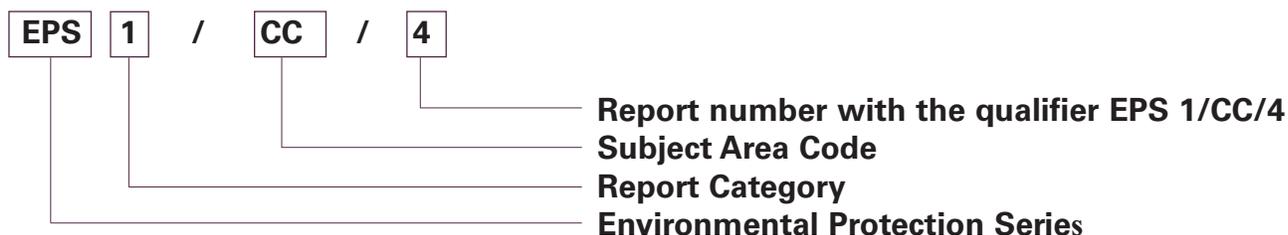


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June 2003

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Paint Stripping

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Information contained in this document is of a general nature only and is not intended to constitute advice for any specific fact situation. For particular questions, users are invited to contact their lawyer and/or the occupational safety and health authority having jurisdiction for their workplace.

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Glossary of Terms

The following words and terms used in the Code of Practice shall have the indicated meaning:

Coating – Film-forming material used for the decoration and/or protection of the surfaces of objects. Coatings include, but are not limited to, lacquers, enamels, powders, elastomeric materials, primers, 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.

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

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).

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.



Preface

Background

Dichloromethane, also known as methylene chloride, was assessed as toxic under the *Canadian Environmental Protection Act, 1999* (CEPA 1999) based on its potential to cause harm to the environment and to human health. It was concluded that current releases of dichloromethane could be sufficient to have adverse effects on some aquatic organisms and therefore harm the environment. As well, dichloromethane is classified as “probably carcinogenic to humans,” with the principal route of human exposure to dichloromethane being inhalation. As a result, Environment Canada and Health Canada implemented a Strategic Options Process (1996-1997) that was responsible for gathering relevant technical, scientific, and economic information from which recommendations were made on how dichloromethane emissions could be reduced in Canada. All industrial, commercial, and consumer applications of dichloromethane were analyzed. Stakeholders from industry, environmental non-governmental organizations, and key federal government departments participated in the Strategic Options Process.

Dichloromethane is a versatile solvent used in a wide range of industrial processes, as well as being the active chemical in paint stripping formulations. Commercial paint stripping applications (e.g., furniture restoration, auto body shops, etc.) used an estimated 1400 tonnes of dichloromethane in 1995. This usage resulted in an estimated 1300 tonnes of dichloromethane evaporation during the paint stripping process (total dichloromethane emissions from all sources in Canada in 1995 were estimated at 6300 tonnes). Commercial paint stripping operations constituted one of the largest source categories of dichloromethane emissions, with furniture restoration facilities representing approximately 70% of the use and release of dichloromethane from this source category. The final report from the Strategic Options Process produced a number of recommendations for the reduction of dichloromethane emissions. One such recommendation was to develop work practice guidelines for the commercial furniture refinishing and other stripping applications.

It has been suggested that the implementation of good work practices can conserve solvent use and minimize environmental releases, resulting in an estimated 20% solvent use reduction among commercial paint stripping operations. These work practices have been identified and described in the following Code of Practice.

This Code of Practice was developed by a multistakeholder Technical Working Committee (see Annex 1 for the list of Technical Working Committee members), which consisted of industry representatives (i.e., furniture strippers, auto body shops, paint stripper formulators, solvent recovery firms), government personnel, and environmental non-governmental organizations.

The draft Code of Practice was distributed to stakeholders for comment. It was sent directly to the Technical Working Committee and environmental non-governmental organizations, and posted on the CEPA Registry (<http://www.ec.gc.ca/CEPARRegistry/participation/>). All stakeholders were invited to submit comments on the draft Code of Practice, and those organizations that provided comments are listed in Annex 2.

Environment Canada gratefully acknowledges the contributions of all participants who assisted in developing this Code of Practice. We also gratefully acknowledge Henderson Furniture Repair Limited and Frank & Guy Auto Body for their contributions.

Inquiries and comments on this Code of Practice, as well as requests for additional copies of the Code, should be directed to:

Head, Controls Development Section
National Office of Pollution Prevention
Environment Canada
Place Vincent Massey
351 St. Joseph Blvd., 12th Floor
Gatineau, Quebec K1A 0H3
Fax: (819) 994-0007

Purpose

The purpose of this Code of Practice is to provide guidance for commercial paint stripping operations regarding activities that can serve to reduce emissions of dichloromethane into the environment. Although some training may be required, the owner/operator may attain several benefits by implementing the Code, including, for example:

- reduction in environmental (air, water, waste) emissions of a substance that has been found to be toxic as defined in CEPA 1999;
- reduced paint stripper usage and waste generation, both of which will reduce operating costs;
- improved product quality; and
- enhancement of community relations and overall operating performance.

Applying many of the work practices outlined in this Code of Practice to non-dichloromethane-based paint strippers or other chemicals may also achieve several of the benefits described above.

By reducing the environmental emissions of dichloromethane, it is possible that human exposure to dichloromethane may also be reduced. However, this Code of Practice is not intended to constitute advice for occupational health and safety. For this information, users are invited to contact the occupational safety and health authority having jurisdiction for their workplace, and/or their lawyer.

The work practices outlined below may not apply to all circumstances; therefore, individual facilities should determine which of the practices are most appropriate to their unique situation.

This Code of Practice is divided into two parts. Specifically, separate Codes have been developed for:

- commercial furniture restoration facilities (Part 1); and
- miscellaneous commercial paint stripping facilities (Part 2).

The specific end-use sectors discussed in Part 2 of the Code of Practice are (i) metal parts paint strippers, (ii) auto body shops, and (iii) building restorers. Several of the work practices identified in the Code of Practice may apply to entities in other sectors, not identified above, that provide commercial paint stripping services.

Unless otherwise indicated, all references to paint strippers in the Code of Practice refer to dichloromethane-based paint strippers.

1.0 Code of Practice for Paint Stripping Activities at Commercial Furniture Restoration Facilities

1.1 Applicability

Part 1 of the Code of Practice applies to furniture restoration facilities that use:

- gel-based paint stripper that is brushed onto the furniture surface; and/or
- liquid-based paint stripper that is used in a flow-over system.

Furniture restoration facilities may also use dip tanks to strip paint. However, this practice is not widespread. A discussion of work practices applicable to furniture restoration facilities that use dip tanks is provided in Part 2 of the Code of Practice (Section 2.2), which identifies work practices for metal parts paint strippers that use dip tanks.

Many of the work practices outlined below are designed to reduce the dichloromethane evaporation rate of the paint stripping formulation. Reducing the evaporation rate serves to reduce dichloromethane emissions. In addition, minimizing the evaporation rate and emissions will serve to reduce the amount of wasted paint stripper, thus reducing a facility's overall operating costs.

Not all work practices identified in this section are appropriate for every facility. Each furniture restoration facility should review the Code and implement those work practices appropriate for its specific situation.

1.2 General Recommended Work Practices

The work practices outlined in this section apply to furniture restoration facilities that use either gel- or liquid-based paint stripper.

1.2.1 Use methods other than paint stripping to restore furniture items

It is possible to avoid paint stripping entirely when restoring some furniture items. Some furniture can be simply sanded or washed to remove grease before refinishing. Other furniture items may be recoated without paint stripping or simply waxed and buffed.

Applying lacquer thinner mixed with shellac over the existing coating is another option. For some furniture items, avoiding paint removal can minimize damage that can potentially occur during the restoration process and reduce the cost of the restoration project. The potential to avoid paint stripping will depend on customer requirements and the purpose of the restoration project.



Wash furniture before refinishing.

1.2.2 Evaluate non-dichloromethane-based paint stripping alternatives

Alternatives to dichloromethane-based paint strippers may be available, but should be thoroughly evaluated before being employed. All possible benefits and drawbacks of each alternative (e.g. relative toxicity) should be compared with those of using dichloromethane-based paint strippers before a decision is made.

1.2.3 Use manual stripping for easily removed coats of paint

Coats of paint that are easily removed should be first stripped from the furniture item manually using a scraper or sandpaper prior to applying the paint stripper. Stripping excess coats of paint with a scraper or sandpaper should reduce the quantity of paint stripper required to remove the remaining coats.



Strip excess coats of paint with sandpaper before applying the paint stripper.

1.2.4 Use paint strippers with lower dichloromethane content when possible

Paint strippers used by furniture restoration facilities generally contain approximately 70-90% dichloromethane. Whenever possible, it is recommended to use paint strippers that have a lower dichloromethane content. (If product literature does not provide enough information to determine the quantity of dichloromethane in the paint stripper, consider contacting the supplier for a more precise concentration.)

Paint strippers with lower dichloromethane content will not in all instances result in reduced dichloromethane emissions. Therefore, each facility should evaluate its own particular situation and the potential benefits, if any, of using paint strippers with a lower dichloromethane content.

Lower dichloromethane content paint strippers may not remove the paint from furniture items as rapidly as paint strippers with a higher dichloromethane content. Therefore, use lower content dichloromethane-based paint strippers when time allows and when additional quantities of the paint stripper will not be necessary. Additional applications would offset the benefits of using a lower content dichloromethane-based paint stripper.

1.2.5 Clean the furniture item prior to stripping

Materials caught in crevices may prevent the paint stripper from removing all of the paint from the furniture surface. Therefore, additional applications of paint stripper may be required in order to remove all of the paint completely. Cleaning furniture items will also help to avoid contaminating the paint stripper (i.e., in a flow-over system), which reduces the product's effectiveness. Sanding can also be used to clean the furniture item and to break down the surface coating, allowing the paint stripper to more easily penetrate the coating.

1.2.6 Use paint strippers that contain a wax additive

The paint stripping formulations used should contain a wax additive that, once applied, will harden and form a barrier between the paint stripper and the surrounding air. This wax barrier reduces evaporation of dichloromethane from the paint stripper and should be left undisturbed until enough contact time between the surface and the paint stripper has elapsed.

1.2.7 Conduct paint stripping activities within the optimal temperature range whenever possible

Use paint stripper within the optimal temperature range, usually between 13°C and 18°C, whenever possible. Stripping paint in this temperature range allows for a rapid reaction time and minimizes evaporation and premature drying of the paint stripper. Applying paint stripper below 13°C may result in a slow rate of reaction between the dichloromethane and the coating. Dichloromethane may evaporate before the coatings have been stripped from the wood substrate. In addition, the wax barrier may solidify completely, thereby reducing the effectiveness of the paint stripper. Applying paint stripper at temperatures above 18°C may result in evaporation of the dichloromethane before it has reacted with the coatings. High temperatures also may inhibit the formation of the wax barrier.

Minimizing evaporation loss of dichloromethane by using the paint stripper at ambient temperatures of between 13°C and 18°C can both reduce the amount of paint stripper needed and decrease the time required for the paint stripper to act.

If working outdoors, it is recommended to apply paint stripper in cool, shaded areas. Applying paint stripper in direct sunlight should be avoided. The dichloromethane in the paint stripper may dry too quickly if the surface being stripped is heated or exposed to sunlight. An additional application of paint stripper may then be required. Paint strippers maintain their effectiveness on cool, shaded surfaces.

1.2.8 Test the surface before applying the paint stripper

Test the surface of the furniture item to determine the type of coating to be removed and to ensure that an appropriate paint stripping formulation is used. Commercial testing devices have been developed; these indicate whether the coating to be removed from the furniture item is nitrocellulose lacquer, polyurethane, or some other type of coating. These devices work by changing colour when they are applied to the furniture coating. A small section of the furniture item is usually tested. Applying alcohol or lacquer thinner to the furniture item can also indicate the type of coating that has to be removed and whether the paint stripper will be effective. For easily removable coating(s), low- or non-dichloromethane content paint strippers can be applied.

1.2.9 Cover surface areas coated with paint stripper

The use of a cover will reduce the amount of contact between the dichloromethane in the paint stripper and the surrounding air as well as allow a longer reaction time between the paint stripper and the coating. This will slow the dichloromethane evaporation rate and slow the drying of the paint stripper. As a result, using a cover may reduce the need for additional applications of paint stripper. Use wax paper, nylon, cellulose (paper)-based covers, or plastic sheeting (e.g., polypropylene) that is chemically resistant to dichloromethane and other organic solvents. Test the reaction between the paint stripper and the selected cover prior to using it on the furniture items. Used covers should be properly disposed of, as dichloromethane will eventually diffuse through them.

This work practice may be more suitable for (i) furniture items with flat surfaces, such as tables, and (ii) coats that have proven difficult to remove and will require a long penetration time.

1.2.10 Optimize ventilation with consideration for worker exposure

It is important to ensure that there is adequate ventilation for workers using dichloromethane-based paint strippers; however, creating major air disturbances in the work area can increase solvent emissions by accelerating evaporation. Ensure that the amount of ventilation is sufficient, but not so excessive as to create major air disturbances.

1.3 Recommended Work Practices – Hand Stripping (Gel-based Paint Stripper)

The work practices outlined in this section apply to furniture restoration facilities that use gel-based paint stripper. Gel-based paint strippers are typically applied manually with a brush.

1.3.1 Brush paint stripper onto the furniture surface in one direction, using as few strokes as possible

Paint strippers should not be applied to the furniture item using back and forth strokes, as this disturbs the wax seal that forms on the surface. When applying the paint stripper, minimize the number of strokes over the surface, since this also disturbs the wax seal. Disturbing the wax seal results in exposure of the dichloromethane in the paint stripper to the surrounding air, which increases the evaporation rate of the stripper. Excessive brushing will also result in the entrainment of air in the paint stripper, which reduces the contact between the dichloromethane and the surface area to be stripped. Excessive brushing will therefore reduce the effectiveness of the paint stripper and increase the solvent emissions.



Brush paint stripper onto the furniture surface in one direction.



Apply paint stripper to small, workable areas.

1.3.2 Apply paint strippers to workable surface areas

Paint stripper should be applied in small, workable areas that will allow the paint to be scraped off before the paint stripper dries. The dichloromethane and other solvents in the paint stripper will eventually evaporate, causing the applied paint stripper to dry. Should this happen prior to removal of the paint surface, an additional application of paint stripper will be required. It may be more difficult to remove the paint once a coat of paint stripper has been left to dry on a piece of furniture. Stripping furniture in segments will prevent this from happening. The size of the workable area will depend on the experience of the individual applying the paint stripper.

Applying stripper using the manufacturer's recommended rate will minimize the number of instances of paint stripper drying prior to removal. Although the amount required will depend upon the item in question and how many coats must be removed, as a guide, each 3.8 litres (1 gallon) of paint stripper should be able to strip about 7-9 square metres (75-100 square feet) of surface.

1.3.3 Leave the paint stripper on the surface for a sufficient length of time

Frequent testing of the furniture surface being stripped will disrupt the surface wax layer that forms to minimize dichloromethane emissions.

To reduce waste, ensure that the paint stripper has fully penetrated the paint before scraping it off. Paint stripper that is removed before it penetrates the paint may not fully remove all coats of paint, and another application of paint stripper may be required. Test the paint stripper to determine whether it has penetrated the paint and is ready to be removed. An indication that the paint stripper has penetrated the paint and is ready to be scraped off can vary, depending on the coat, but may include bubbling of the surface coat or flaking or sheeting of paint when tested. When testing the paint stripper, test only a small area and, as much as possible, try not to disturb the wax layer formed to minimize solvent emissions.

1.3.4 Remove paint stripper from storage containers in small quantities

Unused gel-based paint stripper is not typically returned to its storage container once the stripping job is complete. Due to evaporation of the dichloromethane and other solvents, the returned paint stripper would not have the same composition and properties as the paint stripper in the storage container. Therefore, unused paint stripper is typically disposed of. Removing small amounts from the storage container as required will minimize the quantity of paint stripper wasted.

1.3.5 Capture and reuse paint stripper where applicable

Stripping vertical furniture surfaces or surfaces that are close to the floor may cause paint stripper to drip onto the floor. If these drippings are caught on trays (e.g., pie plates placed under the furniture legs), they can be reapplied to the surface being stripped. This will reduce the overall quantity of paint stripper used.



Capture and reuse paint stripper, if possible.

1.3.6 Use high-viscosity (i.e., thick) paint strippers

The use of high-viscosity paint strippers on vertical surfaces reduces drippings from the surface being stripped, such that additional applications of stripper may not be necessary. Liquid-based paint strippers should not be brushed onto vertical furniture surfaces, as the paint stripper will not form a film and will run off the surface before it can react with the coating.

1.3.7 Scrape layers of paint from the furniture starting at the top

When removing the paint stripper and coats of paint, always begin the scraping process at the top of the furniture item being stripped and proceed downward. Starting the scraping process at the top of the furniture item prevents the potential for recoating of previously stripped area with paint or paint stripper scrapings. This may reduce the amount of paint stripper used.



Begin scraping at the top of the furniture item and proceed downward.

1.4 Recommended Work Practices – Flow-over (Liquid-based Paint Stripper)

The work practices outlined in this section apply to furniture restoration facilities that use liquid-based paint stripper, typically applied using a flow-over system. Consider equipping flow-over systems or any tanks containing dichloromethane-based paint stripper with dikes and a drain containment system with sufficient capacity to contain spills or leaks before they evaporate.



Flow-over system

1.4.1 Strategically plan paint stripping activity

By strategically planning paint stripping activities, exposure of the paint stripper left in the flow-over tank (or the unsealed storage container) to the surrounding air can be minimized. Paint stripping activity can be scheduled so that all of the furniture items to be stripped for the day are dealt with sequentially (e.g., in the morning). Therefore, the paint stripper contained in the flow-over tank storage container can be sealed after the last item has been stripped. If paint stripping activities occur throughout the day, paint stripper in the flow-over tank will be exposed to the atmosphere for an extended period of time, thus increasing the dichloromethane evaporation rate and emissions and potentially decreasing the efficiency of the paint stripper as its composition changes.

1.4.2 Collect paint chips entering the recirculating system in a strainer

If a pump is used to circulate paint stripper, collect the paint chips that flow through the drain in the flow-over tank and into the circulation system in a strainer. A strainer can catch the paint chips that flow through the flow-over tank drain. These paint chips can then be removed from the strainer. The dichloromethane should be allowed to drain separately into a paint can or similar collection device. The paint stripper that is captured in this system can then be recycled into the flow-over system. In certain circumstances, it may be possible to add a thin water layer to the collection device to minimize dichloromethane emissions.



Remove paint chips from used paint stripper with a strainer.

1.4.3 Apply paint stripper close to the drain for the recirculating system

The furniture item that is placed in the flow-over tank should be located near the drain for the recirculating system. This should ensure that paint stripper poured over the furniture item has a minimum distance to travel to reach the drain and the recirculating system. This should reduce the length of time the paint stripper is exposed to the surrounding air and, consequently, will likely reduce dichloromethane emissions.



Place furniture item close to the flow-over tank drain to catch excess paint stripper.

1.4.4 Introduce paint stripper into the flow-over tank by pouring it into the circulation system

When introducing paint stripper into the flow-over system, pour paint stripper into the container that captures the paint stripper draining out of the flow-over tank. A hose attached to this container draws paint stripper up to be poured over the furniture item being stripped. This process is designed to minimize disturbance to the paint stripper and its exposure to the surrounding air. If paint stripper were poured directly into the flow-over tank, then it would have greater exposure to the surrounding air. In addition, pouring paint stripper directly into the flow-over tank rather than the container would entail considerably more splashing.

1.4.5 Circulating pumps should be kept off when the flow-over system is not in use

Turn off pumps that circulate paint stripper in the flow-over system when the system is not in use. Turning circulation pumps off will stop the flow of the paint stripper and, therefore, halt exposure of the paint stripper to the surrounding air.



Circulating tank pump

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

Keeping the hose end close to the furniture item being stripped should reduce the distance that the paint stripper has to travel and therefore reduce its exposure to the surrounding air. The distance between the hose and the furniture item being stripped will depend on the item. For instance, the hose end may be held higher when stripping a table so as to disperse the paint stripper more efficiently.



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

1.4.7 Allow paint stripper to drain from the furniture in the flow-over tank before rinsing

Before removing furniture from the flow-over tank and taking it to the rinse area, let the furniture item drain completely (i.e., the paint stripper has stopped dripping). In addition to rotating furniture above the flow-over tank, use a brush to help return excess paint stripper to the flow-over tank. Maximizing the amount of paint stripper returned to the flow-over tank should reduce the quantity lost in the rinsing area. This will also reduce the quantity of paint stripper required. The furniture items can be physically manipulated or brushed in order to assist in removing excess paint stripper. Flat surfaces, such as a tabletop, can be leaned against the side of the flow-over tank so that the paint stripper will drain back into the flow-over tank.

1.4.8 Apply recycled paint stripper to furniture items with numerous coats

Apply recycled paint stripper to furniture items that have several layers of coating in order to remove most of the paint. Then apply new paint stripper to remove the remaining paint. Using this process should reduce the amount of paint stripper contaminated with paint chips. Contamination of paint stripper with paint chips reduces its effectiveness. The first layers may be easier to remove and, therefore, the lower-strength, contaminated paint stripper can be used. New paint stripper should be used on furniture items that have light coatings or that are nearly bare.

1.4.9 Use solvent recovery companies or in-house recycling technology

Paint chips and sludge can be drained at the furniture restoration facility to recycle paint stripper, or the paint chips/sludge can be sent to the solvent recycling company at various stages of the recycling process. For instance, the paint chips/sludge can be sent to the recycler immediately after capture, or they can be sent after the furniture restoration facility has collected as much of the paint stripper as possible. The furniture restoration facility can determine at which stage it would be in its best interest to send the paint chips/sludge to a solvent recycler.

Solvent recovery technology is available to extract dichloromethane contained in paint chips removed from furniture at restoration facilities. These solvent recovery systems are generally used only after the collected paint chips have been put through the recycling system at the furniture restoration facility. That recycling system usually consists of allowing paint stripper to drain by gravity from the collected paint chips. The paint chips are then introduced into the solvent recovery system to capture the remaining dichloromethane. The benefits and potential drawbacks of using solvent recovery technology should be fully evaluated prior to making a decision about its use at each furniture restoration facility.

1.4.10 Ensure that the paint stripper does not dry on the furniture item being stripped

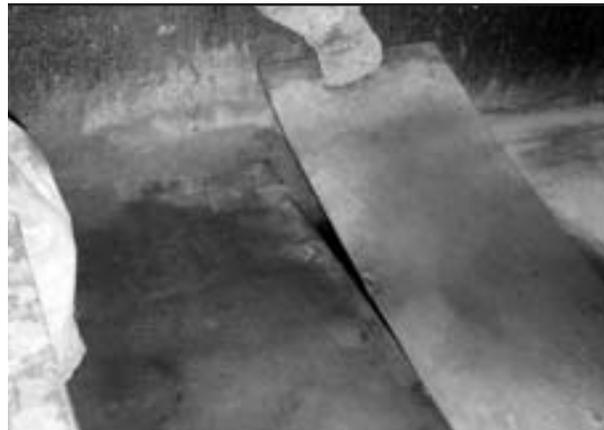
Do not allow paint stripper to dry on the surface of the furniture item being stripped. Scrape all paint off the furniture item when the paint stripper coating is wet. The dichloromethane and other solvents in the paint stripper will eventually evaporate, causing the applied paint stripper to dry out. Should this happen prior to removal of the paint surface, an additional application of paint stripper will be required, resulting in more emissions.

1.4.11 Drain paint stripper from the flow-over tank when the tank is not in use

Draining paint stripper from the flow-over tank and storing it in a sealed container will reduce contact between the paint stripper and the surrounding air. This work practice should result in less dichloromethane evaporation than simply covering the flow-over tank when the system is not in use. However, covers may be more practical when paint stripping activities have ceased for only a short period of time (e.g., lunch break).

1.4.12 Cover the flow-over tank when not in use

For those furniture restoration facilities that do not use a circulating system, a tight-fitting cover should be placed on top of the flow-over tank at all times, except when the system is in use. This cover will reduce contact between the paint stripper and the surrounding air, and should minimize the evaporation of dichloromethane.



Cover the flow-over tank when not in use.

1.4.13 Reduce the surface area of the flow-over tank

Flow-over tanks come in various sizes (height, width, length). Using a deeper flow-over tank that is shorter and narrower will reduce the surface area of the exposed paint stripper in the flow-over tank. Minimizing surface area should reduce the amount of paint stripper in contact with the surrounding air, and should reduce emissions.

1.5 Recommendations for Paint Stripper Handling and Storage

Storage and handling information is communicated on the Material Safety Data Sheets. Refer to these sheets for further instructions.

- ✓ It is recommended to keep the lids on paint stripper containers tightly closed at all times. Refasten paint stripper container lids immediately after paint stripper is removed from the container.
- ✓ Paint stripper containers should be stored in a cool, dry, well-ventilated location. Exposure to high temperatures or to the sun may cause paint stripper containers to leak or swell.
- ✓ Try to remove as much of the paint stripper from its storage container as possible before disposing of the storage container.
- ✓ When filling smaller vessels from the larger paint stripper storage container, keep the tap near, if not in, the entry hole to reduce exposure to the surrounding air.
- ✓ All handling and storage activities should be in compliance with local regulations, such as provincial fire codes, etc.
- ✓ Consider equipping storage tanks containing dichloromethane-based paint stripper with dikes and a drain containment system with sufficient capacity to contain spills or leaks before they evaporate.

1.6 Recommendations for Waste Handling and Disposal

Hazardous waste disposal information is communicated on the Material Safety Data Sheets. Refer to these sheets for further instruction.

- ✓ It is recommended to dispose of empty, non-returnable containers immediately using an approved method. Treat the containers as waste or hazardous waste as appropriate to the residues in the container.
- ✓ All waste handling and disposal should be in compliance with local provincial, aboriginal, territorial, and federal regulations, such as the *Transportation of Dangerous Goods Act*. Note

that generators of hazardous waste may require registration with provincial or territorial authorities.

- ✓ If a container is to be used to accumulate material for recycling or waste disposal, it should be stored with lids and all other openings tightly sealed after every addition.
- ✓ Ship waste or recyclable materials in closed, airtight containers.
- ✓ After the paint stripping process, collect materials soaked with paint stripper and transfer them immediately to the designated waste storage container. Dispose of this waste through a government authorized waste disposal or processing company. Suppliers of paint stripper may have a collection service for contaminated paint stripper. Contact the local county, municipal, or provincial government authority for instructions on disposal.
- ✓ It may be possible to wipe the stripped surface down with a damp (with water or lacquer thinner) cloth, steel wool pad, or stiff bristle brush instead of hosing down the surface. This will avoid the introduction of paint stripper residue and dichloromethane into the municipal wastewater system. Place the used scrubbing materials (e.g., brush, cloth, etc.) in a sealed storage container after use, and dispose of them according to the environmental requirements of the local municipal authority.



Wipe the stripped surface with a damp steel wool pad instead of hosing it down.

1.7 Recommendations for Record-keeping

The information required in this section should be kept for three years to track paint stripper use and to help develop an internal dichloromethane emission reduction system.

- ✓ It is recommended to record specific actions implemented to reduce the quantity of paint stripper used or the quantity of dichloromethane emissions. These actions may be contained in this Code of Practice or may be developed by the facility. Also record the date on which these actions were initiated at the paint stripping facility.
- ✓ It is also recommended to record the quantity of dichloromethane, as contained in paint strippers, used per year.

Commercial paint strippers should ask the paint stripper manufacturer or their supplier to track the facility's annual paint stripper purchases as well as the dichloromethane content of that product. Running totals on invoices may be provided, indicating the total paint stripper and dichloromethane usage for the year to date.

Should the manufacturer or supplier be unable to provide a running total of annual dichloromethane consumption, this amount may be estimated. To determine the quantity of dichloromethane used per year, keep records on the quantity (volume) of dichloromethane-based paint stripper purchased per year and its percent dichloromethane content. Product information sheets for the paint stripper will contain either a range of the dichloromethane content in the paint stripper (e.g., 3-7%, 5-10%, 40-70%) or the actual content (e.g., 80%). The percent dichloromethane content may be expressed on a weight or volume basis. Use the value given to calculate total dichloromethane consumption for the year.

For instance, 10 drums, each 205 litres, of dichloromethane-based paint stripper were purchased during the year. This gives $10 \times 205 = 2050$ litres of paint stripper purchased for the year. If the average

dichloromethane content of the paint stripper is 70% by volume, $2050 \text{ litres} \times 0.70 = 1435$ litres of dichloromethane were purchased during the year. If the average dichloromethane content of the paint stripper is 70% by weight, first convert the 2050 litres of paint stripper to mass using the density of the formulation (found on the Material Safety Data Sheet). Then multiply that mass by 0.70 to obtain the total mass of dichloromethane purchased for the year. To convert the mass of dichloromethane into volume, divide the mass (in kilograms) by the density of dichloromethane (1.32 kilograms per litre).

Record the quantities of dichloromethane-containing waste along with the details of the waste disposal and/or recycling company and method of disposal or recovery. Subtract this quantity from purchases to estimate releases.

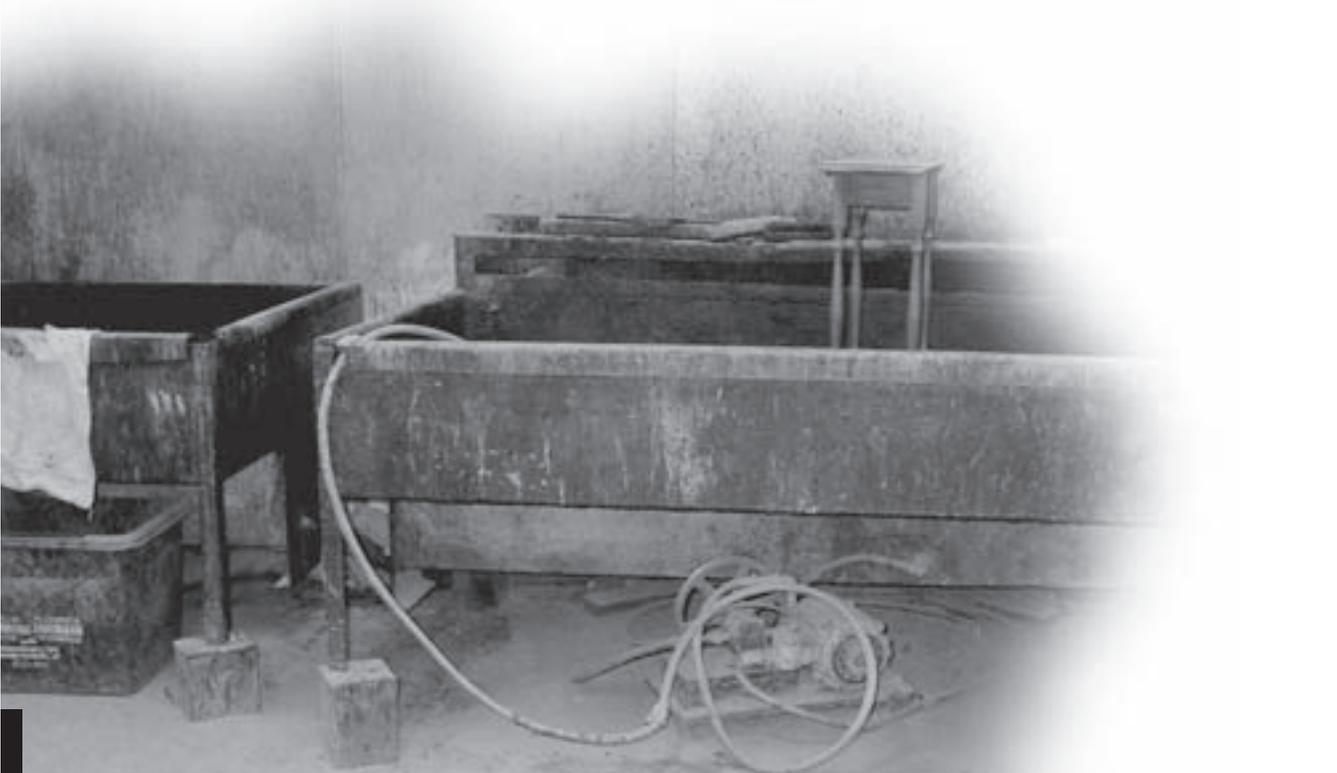
If the ownership of a commercial paint stripping operation is transferred, it is recommended to transfer records related to paint stripper use and reduction measures implemented to the new owner along with a copy of this Code.

1.8 Recommended Training

- ✓ It is recommended to train individuals responsible for paint stripping to use the specific work practices contained in this Code of Practice. In addition to an initial training period, give all operators an annual refresher course. The training provided should teach the skills necessary to implement the work practices in this Code of Practice.
- ✓ Train the individuals responsible for paint stripping to implement the recommended paint stripper application instructions provided by the manufacturer.
- ✓ Employers should ensure that employees are familiar with Material Safety Data Sheets, other health and safety documents, and any paint stripper product literature provided by suppliers. If the provided product literature does not enable the employer to accurately determine the quantity of dichloromethane in the paint stripper, the employer

may wish to contact the supplier for a more precise concentration.

- ✓ Consider enrolling in a paint stripping course (e.g., Fanshawe College in Ontario currently offers an eight-week course on furniture refinishing).
- ✓ Train all employees involved in the handling and use of paint strippers to use the appropriate personal protective and emergency equipment.



2.0 Code of Practice for Miscellaneous Commercial Paint Stripping Facilities

2.1 Applicability

Part 2 of the Code of Practice applies to (i) metal parts paint strippers, (ii) auto body shops, and (iii) building restoration firms. Not all work practices identified in this section are appropriate for every facility. Each commercial paint stripper should review the Code and implement those work practices appropriate to its specific situation. The work practices that reduce the dichloromethane evaporation rate will also serve to minimize paint stripper waste, thus reducing the facility's overall operating costs.

Several of the work practices identified in this section may apply to facilities that provide commercial paint stripping services in areas other than those identified above.

2.2 General Recommended Work Practices – Commercial Metal Parts Stripping Facilities

Work practices outlined in this section refer to commercial paint strippers that utilize a dip tank to strip the paint from metal parts. Consider equipping dip tanks or any tanks containing dichloromethane-based paint stripper with dikes and a drain containment system with sufficient capacity to contain spills or leaks before they evaporate.

2.2.1 Evaluate non-dichloromethane-based paint stripping alternatives

Some alternatives to dichloromethane-based paint strippers include thermal stripping, caustic stripping, and media blasting. Any alternative should be thoroughly evaluated before being employed. All possible benefits and drawbacks of each alternative should be compared with those of using dichloromethane-based paint strippers before a decision is made.

2.2.2 Use paint strippers with lower dichloromethane content when possible

Paint strippers used by metal cleaning facilities generally contain approximately 70-90% dichloromethane. Whenever possible, it is recommended to use paint strippers with a lower dichloromethane content.

Lower dichloromethane content paint strippers will not in all instances result in reduced dichloromethane emissions. Therefore, each facility should evaluate its own unique situation and the potential benefits, if any, of using paint strippers with a lower dichloromethane content.

Lower dichloromethane content paint strippers may not remove the paint from metal parts as rapidly as paint strippers with a higher dichloromethane content. Therefore, use lower content dichloromethane-based paint strippers when time allows and when additional quantities of the paint stripper will not be necessary. Additional applications would offset the benefits of using a lower content dichloromethane-based paint stripper.

2.2.3 Clean metal parts prior to stripping

Material caught in crevices may prevent the paint stripper from removing all of the paint from the metal surface. The metal part may have to be submersed in the dip tank again in order to completely remove all of the paint.

2.2.4 Ensure that dip tanks are properly fitted with lids

Dip tanks should be fitted with lids. Keep the lid on the dip tank whenever possible. Lids should be opened only when placing metal parts in or taking metal parts out of the dip tank. Close the lid on the dip tank immediately after the metal part has been lowered into or taken out of the dip tank. Keeping the lid closed on the dip tank whenever possible reduces contact between the paint stripper and the surrounding air,

therefore minimizing dichloromethane emissions. Lids for dip tanks may be constructed of several different materials. Stainless steel is the most desirable, but other metals (i.e., galvanized metals) may work as well. Plywood or polypropylene lids can be used, but they may retain dichloromethane through absorption or diffusion and release vapours over time.

Minimize the gap between the lid and the dip tank. Lids for dip tanks may warp due to normal wear and tear. Reducing the gap between the lid and the dip tank will reduce the level of evaporation and will likely reduce dichloromethane emissions.

Opening and closing the lid to the dip tank generates air disturbances over the surface of the paint stripper in the tank and results in dichloromethane emissions. Minimize the number of times the tank lid is opened and the duration that the lid remains open each time. Gently opening and closing the lid could reduce the air disturbance, which should reduce dichloromethane emissions. To further minimize air disturbance, fit dip tanks with sliding covers.

2.2.5 Use water to form a seal on top of the paint stripper when appropriate

A water seal may not be appropriate in all cases, as it may react with the accelerators in the paint stripper, possibly reducing the efficiency of the paint stripper. Users should confirm compatibility before considering a water seal.

Water seals added on top of the paint stripper in the dip tank form a barrier between the paint stripper and the surrounding air. The depth of the water seal will depend on the size of the metal parts that the dip tank can accommodate. Facilities should evaluate the most effective depth for the water seal, but a water layer of 10 cm (4 inches) should properly seal most dip tank designs.

Introducing metal parts to and removing metal parts from the dip tank will break the water seal and expose the paint stripper to the surrounding air.

2.2.6 Use inert floating balls to form a seal on top of the paint stripper when appropriate

Inert floating balls (e.g., Teflon® balls) that are 1.5-2.5 cm (0.5-1 inch) in diameter can be added to the dip tank so that they float on top of the paint stripper. The inert balls create a barrier and reduce the surface area of the paint stripper exposed to the surrounding air. These balls should not absorb paint stripper. Users of this method should ensure that the balls are compatible with the paint stripper and that they are clean, so that the paint stripper does not adhere to contamination on the balls. The number of inert balls added to the dip tank will depend on the dimensions of the dip tank.

Inert balls can be accidentally removed when extracting metal parts from the dip tank. It is recommended to clean these balls immediately and return them to the dip tank.

2.2.7 Reduce the surface area of the dip tank

It is recommended to minimize the surface area of the paint stripper in the dip tank as much as possible. Dip tanks come in various sizes (height, width, length). Using a deeper dip tank that is shorter and narrower will reduce the surface area of the exposed paint stripper in the dip tank. Minimizing surface area should reduce the amount of paint stripper in contact with the surrounding air, which will likely minimize emissions.

2.2.8 Place metal parts strategically on the rack to be lowered into the dip tank

Avoid placing metal parts on the rack in such a way that they fill with paint stripper. The paint stripper will not be able to drain from the parts back into the dip tank if the liquid is captured in the metal part. Stand concave metal parts on end to ensure that the paint stripper drains off when the parts are removed from the dip tank. Hollow metal parts should be placed with the cavity facing downward so that the paint stripper drains out of the part when it is removed from the dip tank.

2.2.9 Let excess paint stripper drip from the metal part

Drain metal parts removed from the dip tank until most of the paint stripper has dripped back into the tank. The time needed for the paint stripper to drain from the metal part back into the dip tank will depend upon the configuration of the part being stripped.

The rack holding the metal parts can be lifted out of the dip tank in steps (e.g., a few centimetres or inches at a time). Removing the rack in steps allows the rack to be agitated or jarred so that more of the paint stripper may be released from the part and allowed to drip back into the dip tank. Removing the rack in a fluid motion may not recapture as much of the paint stripper.

2.2.10 Evaluate the use of paint strippers that contain a wax additive

Evaluate the use of paint stripping formulations that contain a wax additive. The wax will harden on the top of the paint stripping formulation when applied. The solidified wax forms a barrier on the exterior of the metal part, which reduces contact between the dichloromethane in the paint stripper and the surrounding air, thus likely reducing emissions.

2.2.11 Maintain the quantity of paint stripper in the dip tank at the lowest possible level

Emissions of dichloromethane can occur when air flows over the paint stripper in an open dip tank and the dichloromethane evaporates. Keeping as much of the paint stripper as possible in a sealed storage container, and only the minimum amount of paint stripper necessary in the dip tank, will reduce exposure of the paint stripper to air and will likely reduce emissions of dichloromethane. In operations with a high rate of air flow, extend the sides of the dip tank vertically. Longer vertical sides will create a deeper dip tank, which will reduce the amount of surrounding air that contacts the paint stripper.

2.2.12 Minimize contact with air when introducing new paint stripper

It is recommended to use a valve and hose system to introduce new paint stripper from the storage container to the dip tank. Place the end of the hose below the surface of the paint stripping solution. This system will allow the paint stripper to flow into the dip tank with reduced exposure to the surrounding air. This also minimizes disturbance to the surface of the paint stripper in the dip tank.

2.2.13 Recycle dichloromethane removed in the rinsing process

Use a recycling system to capture dichloromethane where feasible. This recycling system captures dichloromethane that is still contained on the stripped metal part after removal from the dip tank. After removing metal parts from the dip tank, submerge them in a rinsing tank instead of spraying them to remove paint chips and excess paint stripper. Since dichloromethane has low water solubility and is denser than water, excess dichloromethane remaining on the metal part settles to the bottom of the rinsing tank. The dichloromethane can then be removed from the bottom of the rinsing tank through a valve opening and internally recycled or sent to a recycler to be reclaimed. Very little, if any, of the dichloromethane evaporates when in the rinsing tank because of the water barrier in the tank.

Pumps should be used to remove spent paint stripper from the dip tank and into drums without exposing the dichloromethane to the surrounding air. This pumping system can also be used to remove dichloromethane that has settled to the bottom in the rinsing tank.

2.2.14 Assess the feasibility of venting the air around the dip tank through activated carbon

The air flow above the dip tank can be directed through an activated carbon filter to trap dichloromethane. This work practice may be more viable for large operations that have high concentrations of dichloromethane in the air surrounding the dip tank. Properly handle and regularly dispose of the carbon containing dichloromethane.

2.3 General Recommended Work Practices – Auto Body Shops

Work practices outlined in this section refer to auto body shops that utilize paint strippers to remove coatings from various auto body surfaces. This Code of Practice addresses gel- and aerosol-based paint strippers, which are typically used by auto body shops.

2.3.1 Evaluate the use of non-dichloromethane-based alternatives or lower dichloromethane content paint stripping alternatives

Some non-dichloromethane paint stripping alternatives used in auto body shops include sanding and media blasting. Any alternative should be thoroughly evaluated before being employed. All possible benefits and drawbacks of each alternative should be compared with those of using dichloromethane-based paint strippers before a decision is made.

Paint strippers used by auto body shops generally contain approximately 70-85% dichloromethane. Whenever applicable, it is recommended to use paint strippers with a lower dichloromethane content.

It is important to note that lower dichloromethane content paint strippers may not remove the paint from auto body surfaces as rapidly as paint strippers with a higher dichloromethane content. This may result in the use of larger quantities of lower content dichloromethane-based paint strippers. Therefore, lower dichloromethane content paint strippers will not always result in reduced dichloromethane emissions. Each facility should evaluate its own particular situation and the potential benefits and drawbacks of using paint strippers with a lower dichloromethane content.

2.3.2 Sand the surface before applying paint stripper

Sanding the area to be stripped before applying the paint stripper will remove the clearcoat on the auto body surface. Sanding the clearcoat reduces the quantity of paint stripper required, as fewer coating layers will have to be removed. In addition, sanding will also allow the paint stripper to penetrate the coating layers more easily.



Sand the surface before applying paint stripper.

It is recommended to make minute scratches with sandpaper in the coatings that are to be stripped so that, when the paint stripper is applied, the grooves channel the paint stripper. This will reduce the amount of paint stripper wasted on areas that do not need it.



Hand sanding

2.3.3 Apply masking tape over crevices in the auto body surface

Masking tape can be applied to cover the crevices between the hood and the side of the car to ensure that the paint stripper does not run under the hood. Masking tape can also ensure that the paint stripper does not flow onto painted sections of the auto body that are not meant to be stripped.

When stripping large surfaces (e.g., the hood), evaluate the effectiveness of constructing an elevated border to channel the paint stripper over the desired areas. This would effectively prohibit access to the areas of the automobile that are not to be stripped, reducing the amount of wasted paint stripper.

2.3.4 Brush paint strippers onto the surface in one direction

Paint strippers should not be applied onto the auto body surface in back and forth strokes, as this disturbs the wax seal that forms on the vehicle surface. Disturbing the wax seal results in exposure of the dichloromethane in the paint stripper to the surrounding air, which increases the dichloromethane evaporation rate. Air also becomes entrained in the paint stripper, reducing contact between the dichloromethane and the surface area to be stripped. Excessive brushing will reduce the effectiveness of the paint stripper.

2.3.5 Apply paint strippers to workable surface areas

Paint stripper should be applied in small, workable areas that will allow the paint to be removed before the paint stripper dries.

The dichloromethane and other solvents in the paint stripper will eventually evaporate and cause the applied paint stripper to dry out. Should this happen prior to removal of the paint surface, an additional application of paint stripper will be required.

The manufacturer's recommended rate guidelines for paint stripper application should be considered, as they are expected to minimize the number of occasions on which the paint stripper dries before the paint is scraped from the surface.

2.3.6 Leave the paint stripper on the surface for a sufficient length of time

The softening of the coating on the auto body surface signifies that the paint stripper and the coatings are ready to be removed. Scraping the paint stripper off the vehicle surface prior to this softening reaction risks leaving some of the coating in place. An additional application of the paint stripper will then be required to remove the remaining coating.

2.3.7 Remove paint stripper from storage containers in small quantities

Unused gel-based paint stripper is not typically returned to its storage container once the stripping job is complete. Due to evaporation of the dichloromethane and other solvents, the returned paint stripper would not have the same properties as the new paint stripper in the storage container. Therefore, unused paint stripper is typically disposed of. Removing small amounts from the storage container as required will minimize the quantity of paint stripper wasted.

2.3.8 Use gel-based instead of aerosol-based paint strippers whenever possible

Gel-based paint strippers should be applied instead of aerosol-based paint strippers whenever possible.

The size of certain auto body parts (e.g., grill) results in large quantities of the aerosol paint stripper being sprayed onto areas that are not to be stripped, therefore wasting the product. In these instances, a gel-based paint stripper should be used. Aerosol-based paint strippers are also generally harder to control than gel-based paint strippers. The fan of the aerosol spray is difficult to direct, and often some spray enters other areas (e.g., the air). Using a gel-based paint stripper allows better control and more effective and efficient

application of the paint stripper to the desired surface area. Some areas on the auto body surface (e.g., crevices) may be better suited for aerosol-based paint strippers, since it is difficult to apply the gel-based paint stripper to these areas.

2.3.9 Capture and reuse gel-based paint stripper where applicable

Stripping vertical auto body surfaces or surfaces that are close to the floor may cause gel-based paint stripper to drip onto the floor. If these drippings are caught on metal/plastic trays, they can be reapplied to the surface being stripped. This will reduce the quantity of new paint stripper used.

Thicker gel-based paint stripper should be used when stripping vertical auto body surfaces or surfaces close to the floor. Thicker gel-based paint stripper will be less likely to drip onto the floor and be wasted.

2.3.10 Follow manufacturer/supplier's recommendations for optimum application temperature

Some manufacturers of auto body paint strippers have suggested that optimum paint stripping results can be achieved when the auto body surface is heated to a temperature of 32-40°C before the paint stripper is applied. This is because paint strippers work faster when applied to a heated surface. However, the paint stripper will dry more quickly if the surface is heated. Only small areas of the automobile surface should be preheated at a time to ensure that the paint can be removed before the paint stripper dries. The manufacturer/supplier of the paint stripper used should be contacted to identify the optimum temperature range. This information may be contained in the application instructions printed on the paint stripper container.

2.4 General Recommended Work Practices – Building Restoration

Work practices outlined in this section refer to building restoration firms that utilize paint strippers to remove

coatings from various building surfaces, such as floors, porch railings, and walls. The use of paint strippers to remove graffiti from building surfaces is another important application. This Code of Practice addresses gel-based paint strippers, which are typically used by building restoration firms.

2.4.1 Evaluate the use of non-dichloromethane-based or lower dichloromethane content paint stripping alternatives

Some non-dichloromethane paint stripping alternatives used by building restoration firms include alcohol-based strippers and caustic strippers. Any alternative should be thoroughly evaluated before being employed. All possible benefits and drawbacks of each alternative should be compared with those of using dichloromethane-based paint strippers before a decision is made.

Paint strippers used by building restoration firms generally contain approximately 35-75% dichloromethane. Whenever applicable, it is recommended to use paint strippers with a lower dichloromethane content. It is important to note that lower dichloromethane content paint strippers may not remove the paint from building surfaces as rapidly as paint strippers with a higher dichloromethane content. This may result in the use of larger quantities of lower content dichloromethane-based paint strippers. Therefore, lower dichloromethane content paint strippers will not always result in reduced dichloromethane emissions. Each facility should evaluate its own particular situation and the potential benefits and drawbacks of using paint strippers with a lower dichloromethane content.

2.4.2 Use chemical-resistant sheeting where possible to reduce evaporation rate

Once the paint stripper is applied, the surface in question should be covered with chemical-resistant sheeting (e.g., polypropylene, nylon). Tape down the corners of the chemical-resistant sheeting. The use of protective sheeting will extend the paint stripper drying time and help the stripper to penetrate the

coatings. This will increase the effectiveness of the paint stripper, so that more paint is stripped off and less additional paint stripper will be required to finish the job.

2.4.3 Distribute paint stripper evenly over the surface area to be stripped

Applying an even coat of paint stripper ensures that the entire surface receives the same quantity of paint stripper and that no area will dry more quickly than others.

2.4.4 Perform a test with the paint stripper on the surface area to be stripped

It is recommended to test the surface to be stripped to determine the quantity of paint stripper that will be required to remove the coatings. When performing a test, ensure that the test area reflects the entire surface in question. Non-dichloromethane-based paint strippers can also be tested to determine if they would work on the surface being stripped. Testing the surface area will determine the optimum amount of paint stripper to be applied to remove the coatings. This should reduce the need for application of additional paint stripper. If alternative paint strippers prove to be effective in the test, the use of the dichloromethane-based paint stripper can be avoided.

If there are other areas of the project in which different or additional coatings are suspected, then a test zone of that area would also be warranted.

2.4.5 Apply paint strippers to workable surface areas

Paint stripper should be applied in small, workable areas that will allow the paint to be removed before the paint stripper dries. The dichloromethane and other solvents in the paint stripper will eventually evaporate and cause the applied stripper to dry. Should this occur before the paint surface is removed, an additional application of paint stripper will be required.

Applying the manufacturer's recommended amount will likely minimize the number of occasions on

which the paint stripper dries before the paint is removed from the surface.

2.4.6 Maintain optimum working conditions for the paint stripper

Dichloromethane dries more quickly if the surface being stripped is heated – for instance, if it is in direct sunlight. Paint strippers dry more slowly and maintain their effectiveness for longer periods on cooler and shaded surfaces. When applying dichloromethane-based paint strippers to large areas (as in building restoration), the surface should be cool and shaded to prevent the paint stripper from drying before it can be removed. The optimum ambient temperature when working with paint strippers is between 13°C and 24°C.

2.5 Recommendations for Paint Stripper Handling and Storage

Storage and handling information is communicated on the Material Safety Data Sheets. Refer to these sheets for further instructions.

- ✓ Ship paint stripper in closed, airtight containers.
- ✓ It is recommended to keep the lids on paint stripper containers tightly closed at all times. Refasten paint stripper container lids immediately after paint stripper is removed from the container.
- ✓ Paint stripper containers should be stored in a cool, dry, well-ventilated location. Exposure to high temperatures or to the sun may cause paint stripper containers to leak or swell.
- ✓ Try to remove as much of the paint stripper from its storage container as possible before disposing of the storage container.
- ✓ When filling smaller vessels from the larger paint stripper storage container, keep the tap near, if not in, the entry hole to reduce exposure to the surrounding air.
- ✓ All handling and storage activities should be in compliance with local regulations, such as provincial fire codes, etc.
- ✓ Consider equipping storage tanks containing dichloromethane-based paint stripper with dikes

and a drain containment system with sufficient capacity to contain spills or leaks before they evaporate.

2.6 Recommendations for Waste Handling and Disposal

Hazardous waste disposal information is communicated on the Material Safety Data Sheets. Refer to these sheets for further instruction.

- ✓ It is recommended to dispose of empty, non-returnable containers immediately using an approved method. Treat the containers as waste or hazardous waste as appropriate. Local solid waste authorities can usually assist with this.
- ✓ All waste handling and disposal should be in compliance with local, provincial, aboriginal, territorial, and federal regulations, such as the *Transportation of Dangerous Goods Act*. Note that generators of hazardous waste may require registration with provincial or territorial authorities.
- ✓ If a container is to be used to accumulate material for recycling or waste disposal, it should be stored with lids and all other openings tightly sealed after every addition.
- ✓ Ship waste or recyclable materials in closed, airtight containers.
- ✓ After the paint stripping process, collect materials soaked with paint stripper and transfer them immediately to the designated waste storage container. Dispose of this waste through a government authorized waste disposal or processing company. Suppliers of paint stripper may have a collection service for contaminated paint stripper. Contact the local county, municipal, provincial or territorial government authority for instructions on disposal.
- ✓ It may be possible to wipe the stripped surface down with a damp (with water or lacquer thinner) cloth, steel wool pad, or stiff bristle brush instead of hosing down the surface. This will avoid the introduction of paint stripper residue and dichloromethane into the municipal wastewater system. Place the used scrubbing materials

(e.g., brush, cloth, etc.) in a sealed storage container after use, and dispose of them according to the environmental requirements of the local municipal authority.

2.7 Recommendations for Record-keeping

The information required in this section should be kept for three years to track paint stripper use and to help develop an internal dichloromethane emission reduction system.

- ✓ It is recommended to record specific actions implemented to reduce the quantity of paint stripper used or the quantity of dichloromethane emissions. These actions may be contained in this Code of Practice or may be developed by the facility. Also record the date on which these actions were initiated at the paint stripping facility.
- ✓ It is also recommended to record the quantity of dichloromethane, as contained in paint strippers, used per year. Commercial paint strippers should ask the paint stripper manufacturer or their supplier to track the facility's annual paint stripper purchases as well as the dichloromethane content of that product. Running totals on invoices may be provided, indicating the total paint stripper and dichloromethane usage for the year to date.

Should the manufacturer or supplier be unable to provide a running total of annual dichloromethane consumption, this amount may be estimated. To determine the quantity of dichloromethane used per year, keep records on the quantity (volume) of dichloromethane-based paint stripper purchased per year and its percent dichloromethane content. Product information sheets for the paint stripper will contain a range of the dichloromethane content in the paint stripper (e.g., 3-7%, 5-10%, 40-70%) or the actual content (e.g., 80%). The percent dichloromethane content may be expressed on a weight basis or a volume basis. Use the actual or an estimated content level to calculate total dichloromethane consumption for the year.

For instance, 10 drums, each 205 litres, of dichloromethane-based paint stripper were purchased

during the year. This gives $10 \times 205 = 2050$ litres of paint stripper purchased for the year. If the average dichloromethane content of the paint stripper is 70% by volume, $2050 \text{ litres} \times 0.70 = 1435$ litres of dichloromethane were purchased during the year. If the average dichloromethane content of the paint stripper is 70% by weight, first convert the 2050 litres of paint stripper to mass using the density of the formulation (found on the Material Safety Data Sheet). Then multiply that mass by 0.70 to obtain the total mass of dichloromethane purchased for the year. To convert the mass of dichloromethane into volume, divide the mass (in kilograms) by the density of dichloromethane (1.32 kilograms per litre).

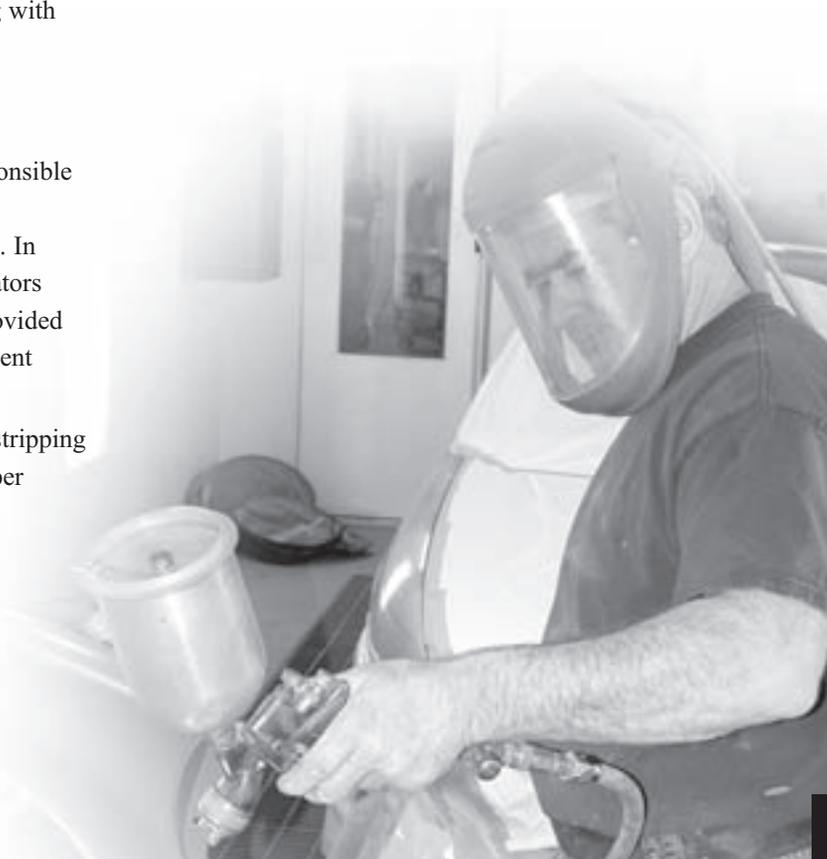
Record the quantities of dichloromethane-containing waste along with the details of the waste disposal and/or recycling company and method of disposal or recovery. Subtract this quantity from purchases to estimate releases.

If the ownership of a commercial paint stripping operation is transferred, it is recommended to transfer records related to paint stripper use and reduction measures implemented to the new owner along with a copy of this Code.

2.8 Recommended Training

- ✓ It is recommended to train individuals responsible for paint stripping to use the specific work practices contained in this Code of Practice. In addition to an initial training, give all operators an annual refresher course. The training provided should teach the skills necessary to implement the work practices in this Code of Practice.
- ✓ Train the individuals responsible for paint stripping to implement the recommended paint stripper application instructions provided by the manufacturer.

- ✓ Employers should ensure that employees are familiar with Material Safety Data Sheets, other health and safety documents, and any paint stripper product literature provided by suppliers. If the provided product literature does not enable the employer to accurately determine the quantity of dichloromethane in the paint stripper, the employer may wish to contact the supplier for a more precise concentration.
- ✓ Train all employees involved in the handling and use of paint strippers to use the appropriate personal protective and emergency equipment.



Members of the Technical Working Committee Assisting in Code of Practice Development

The Technical Working Committee, which assisted in developing the Code of Practice, included the members indicated below.

Consultative Members

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Mark Chaimberg	Swing Paints Ltd.
Beverlie Cook	Automotive Industries Association of Canada
Dominique Dore	Environment Canada
Chris Hughes	Production Paint Stripping Ltd.
John Keegan	Greenwich Metal Cleaning Services
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Jim Bird	Van Waters and Rogers Ltd.
Greg Brown	HCI Canada Inc.
Robert Clarke	Automotive Retailers Association
John Crawley	Chemcraft Finishes Ltd.
Gabriel Cruceru	Techno Strip Ltd.
Marty Lederman	APCO Industries Ltd.
Vasu Mahadevan	Denalt Paints
Anne Monette	NCH Canada
Giuliano Muccin	BASF Canada Inc.
Carl Saunders	No Dip Furniture Stripping Ltd.
Vern Schock	Zytec Inc.
Arnold Vanderlinder	Jacklyn Industries
Mark Waldrop	BASF Corp.

Organizations that Provided Comments on the Draft Code of Practice during the Fall 2002 Comment Period

1. Commercial Chemicals Division,
Environmental Protection Branch
Prairie and Yukon Region, Environment Canada
2. WHMIS Division, Healthy Environments and
Consumer Safety Branch, Health Canada
3. Headquarters Operations
Manitoba Conservation
4. Environmental and Natural Areas
Management Division
Nova Scotia Department of Environment and Labour
5. Halogenated Solvents Industry Alliance
6. Occupational Health and Safety Division
Workers Compensation Board of P.E.I.
7. Toxicological Services
Commission de la santé et de la sécurité du travail
du Québec (CSST)

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CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999 (CEPA 1999)

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