



Resource for Greening Auto Body, Collision Repair and Auto Refinishing Pollution Prevention Information

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Greening Auto Body, Collision Repair and Auto Refinishing

Toronto's ChemTRAC program includes an Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423) that requires local businesses to track and report their use and release of 25 priority substances. The ChemTRAC program provides an opportunity for you to identify strategies for improving your environmental performance. Strategies include those that reduce the use and release of the 25 priority substances. Strategies may also reduce the use and release of other chemicals that may have a health and/or an environmental impact. This Greening Resource for Auto Body, Collision Repair and Auto Refinishing Sector will help you understand the chemicals that you are using and find ways to reduce or eliminate their use. For additional resources, including a Guide to Reporting, visit <http://www.toronto.ca/chemtrac/>.

Auto Body, Collision Repair and Auto Refinishing Sector

This guide focuses on auto body, collision repair and auto refinishing. The guide does not focus on general or routine maintenance work.

Priority Substances and Other Chemicals of Concern

Toronto Public Health has identified 25 substances of priority health concern that are commonly used and released by businesses in the City of Toronto. As part of ChemTRAC, the Environmental Reporting and Disclosure Bylaw requires businesses and facilities to track and report on any of the listed priority substances that a facility manufactures, uses or releases to the environment if the amounts are equal to or above the reporting limits. In addition to the priority substances, industrial processes commonly use and release other chemicals of concern that may have a health and/or an environmental impact that are not subject to the by-law.

The **Auto Body, Collision Repair and Auto Refinishing** sector may use and produce some of these priority substances and other chemicals of concern. Each of these chemicals may have an impact on human health and/or the environment. Below are the priority substances and other chemicals of concern that may be used or produced by your facility and its operation. This is not an exhaustive list.

Substances that may be used or produced by your Auto Body, Collision Repair and Auto Refinishing Sector

Leaving cars running in the shop may release these chemicals:	Paints may also contain these heavy metals:
<ul style="list-style-type: none"> • Acetaldehyde • Acrolein • Benzene • 1,3-butadiene • Nitrogen oxides (NOx) • Particulate matter 2.5 (PM_{2.5})¹ • Polycyclic aromatic hydrocarbons (PAHs) 	<ul style="list-style-type: none"> • Cadmium • Chromium • Lead (also in batteries, may be in used brake fluid, and other car components) • Nickel (may also be released from welding process) • Manganese (may also be released from welding process)
Paints, coatings, cleaning and degreasing products may contain these chemicals:	Other:
<ul style="list-style-type: none"> • Carbon tetrachloride • Chloroform • Tetrachloroethylene • Trichloroethylene • Volatile Organic Compounds² (VOCs), such as toluene and xylene 	<p>Sanding may involve the release of this chemical:</p> <ul style="list-style-type: none"> • Particulate matter 2.5 (PM_{2.5}) <p>Paint stripping may involve the use of this chemical:</p> <ul style="list-style-type: none"> • Dichloromethane (methylene chloride) <p>Switches in hood and trunk lighting assemblies may contain this chemical:</p> <ul style="list-style-type: none"> • Mercury

1 Particulate matter (PM) consists of airborne particles in solid or liquid form (e.g. dust). PM_{2.5} is airborne particulate matter with a mass median diameter less than 2.5 µm.

2 VOCs are emitted as gases from certain solids or liquids. When combined with nitrous oxides (NOx) in sunlight, smog forms. Common VOCs used and released by the auto repair sector include toluene, xylene, and methyl ethyl ketone, among others.

Understanding Your Company's Impacts: Auto Body, Collision Repair and Auto Refinishing Sector

This section provides a snapshot of the auto repair and refinishing sector's activities. For each activity the guide shows the raw materials that go into the process and the pollution (waste) that comes out of the process. Symbols show whether the wastes typically go to air, landfill, sewer systems and/or treatment facilities (liquid wastes).

The main activities that generate waste during automobile repair and refinishing are fluid changing, parts cleaning, stripping and sanding, painting, and clean-up (see the accompanying flow diagram). VOCs are the major wastes associated with these activities since many automotive paints and thinners, cleaners and degreasers contain VOCs. Spent solvents and waste paint are the other major wastes associated with auto repair and refinishing.

Painting is a major source of waste from an auto body shop. Paint generally refers to primers, sealers, filling primers, basecoats and clearcoats, paint thinner and paint hardeners. Paint formulations can contain organic solvents (VOCs) and heavy metals. A significant amount of paint is lost due to inefficiencies in transfer, either through inefficient equipment or painter technique. Spray equipment transfer efficiency (TE) substantially increases when High Volume / Low Pressure (HVLP) spray guns are used and operators are properly trained to use this equipment.

Wastewater is generated in many automotive facilities through the rinsing of dirty tools and parts and the cleaning of equipment and floors. Wash water is contaminated when it mixes with oil, grease, antifreeze, battery acid, solvents, paints, gasoline, and other chemical products used in an automotive repair facility.

The following diagrams show the raw materials that may go into **Auto Body, Collision Repair and Auto Refinishing** processes and the pollution that may come out of each process. This guide outlines the *general processes Auto Body, Collision Repair and Auto Refinishing*. Your facility may have more specialized processes or only engage in a subset of these processes; however, it is possible that these priority substances and chemicals of concern may still be present. Symbols show whether the wastes typically go to air, landfill, sewer systems and/or treatment facilities (as liquid or hazardous wastes).

Symbols used in the flow diagram



Air emissions



Landfill wastes

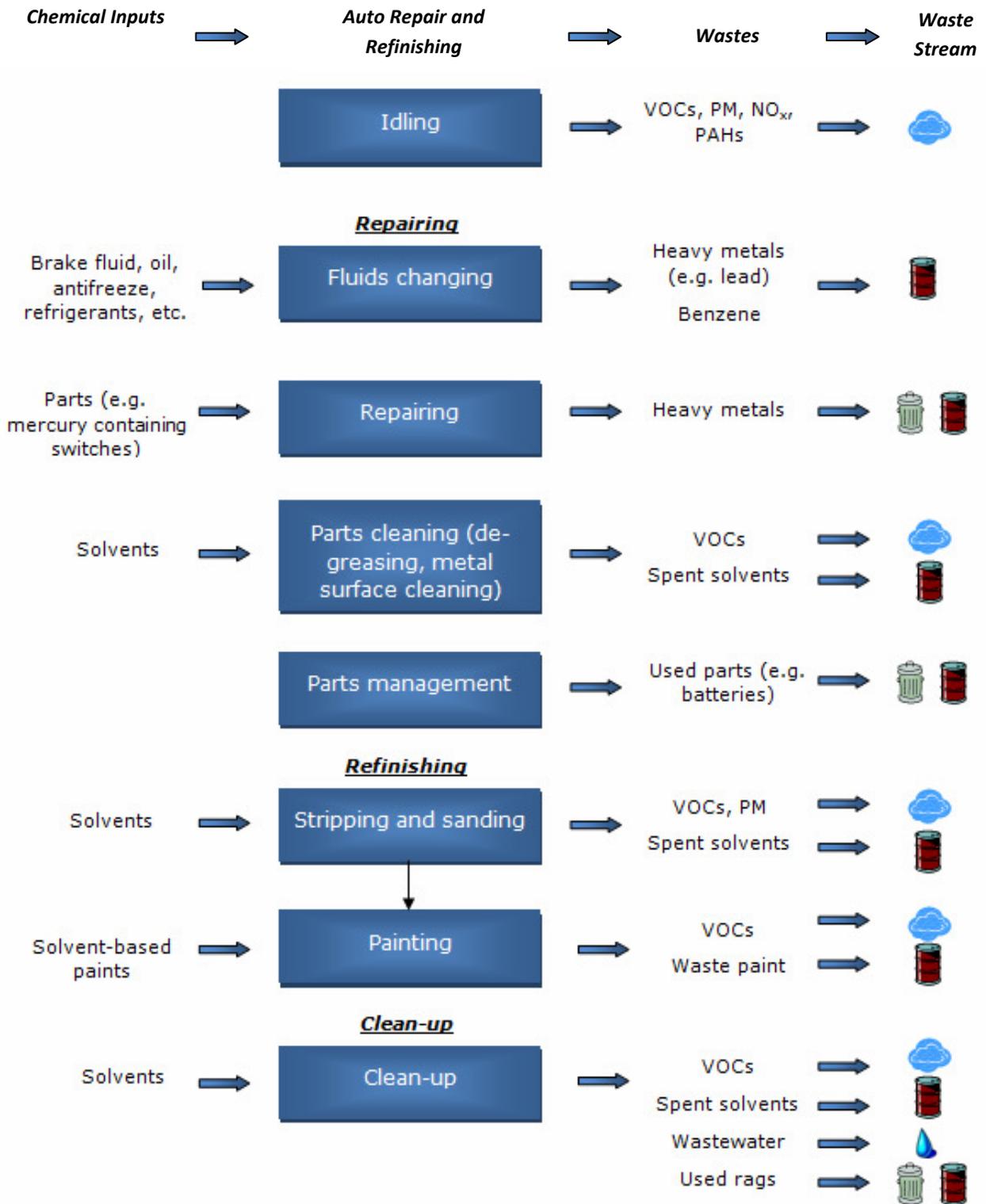


Wastewater
(sewers)



Liquid or
hazardous wastes

Automobile Repair and Refinishing: Chemical Inputs and Associated Wastes



Pollution Prevention Steps You Can Take

This resource identifies steps you can take to reduce or eliminate your use of the priority substances and other chemicals that may have a health and/or an environmental impact, and to prevent pollution in the **Auto Body, Collision Repair and Auto Refinishing Sector**.

The pollution prevention measures identified in this information sheet can reduce costs and/or increase profits.



Pollution Prevention Assessments – A Good First Step

Before you go too far with any given measure, you may want to do a Pollution Prevention Assessment of your business. You may need an outside expert to help. A typical Pollution Prevention Assessment will include mapping process flows, reviewing equipment uses, evaluating the way you use and store chemicals, evaluating the way you use energy, as well as reviewing waste handling practices and discharges. This assessment helps you to identify many pollution prevention opportunities (and any regulatory compliance issues) and decide which steps to take first.

Pollution Prevention - A Key to Good Management

Good management of your chemical purchases, chemical use and waste disposal is very important. You can improve your environmental performance through Pollution Prevention by:

- identifying how you are using the priority substances and other chemicals of concern that may have a health and/or an environmental impact
- figuring out how much you are using of each chemical and estimating the related emissions (see the earlier description for more information on how to estimate chemical use and emissions)
- discussing the options to reduce or to eliminate these chemicals and, where feasible, taking action. Actions could include:
 - using a different product
 - changing how you apply or clean up the chemical product/waste
 - training staff on how best to apply and clean up the chemical product/waste, or
 - installing new technology
 - maintaining equipment to ensure that leaks and general efficiencies are managed
- tracking the amount of chemicals you use and see if it goes down over time, and
- reviewing progress and identifying whether or not you need to make changes to the company's practices and procedures.

Changes you could make in your medical laboratory

The following table lists many options to help you reduce or stop using the priority substances and other chemicals of concern in your facility. Some measures will cost more than others, and some will be easier to implement than others. Employees can implement certain measures by making minor changes in their day-to-day approaches; while others will require management to invest in new technologies.

The table provides a quick and simple way to take stock of what measures your business has already put into place and those measures that your business could apply. In completing the table, you are encouraged to prioritize the actions you would take. While it is not exhaustive, the table identifies many pollution prevention opportunities for **Auto Body, Collision Repair and Auto Refinishing Sector**. When assessing the options, please consider your facility-specific conditions and how each option might affect pollution releases to the air, land and water.

The table identifies three general types of options and distinguishes each with a symbol:

	Low-cost, good operating procedures – These measures involve operational and managerial changes that can reduce chemical use. They include simple changes to normal practices, process improvements, as well as training and good housekeeping opportunities. This measure does not need new technology purchases.
	Choosing an alternative chemical – These measures involve replacing traditional products (such as solvents and cleaning products) with products that have less harmful properties. The ease and cost of these measures depends on the product and the process used.
	New technology or system – These measures involve the installation of a new system, machine or process. The cost varies depending on the technology / system.

See **More Resources** for a list of additional resources related to pollution prevention in the **Auto Body, Collision Repair and Auto Refinishing** sector.

Automobile Repair and Refinishing

Process	Pollution Prevention Opportunities	Type of activity	In place?			What level of priority do we put on implementing this measure? (High, Medium or Low)
			Yes	No	N/A	
Idling	Minimize the amount of time that engines idle in the shop.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Fluid Management	Have your used oil, brake fluid, and transmission fluid managed by a waste recycler.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Transfer gasoline in a safe storage containment unit (units can siphon, filter and dispense gasoline).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Body Repair	Minimize or eliminate the use of hazardous paint-removing solvents, such as methyl ethyl ketone (a VOC).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Use a vacuum system and bag-house to remove sand and filler dust.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Use covered scrap metal containment units. Covered units eliminate exposure to rain, preventing the contamination of storm water.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Parts Cleaning	Use water-based cleaning formulations for parts cleaning (e.g., hot tanks and hot soap cabinet washers, enzyme-cleaning systems).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Sanding	Collect sanding dust at the source using vacuum sanding with filters.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Painting	Consider computerized paint mixing systems to use paint more efficiently, reduce paint costs and waste.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Schedule batch processing of lighter shades of paint before darker shades of paint so that equipment does not need to be cleaned between batches.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Save leftover paint for reuse as the foundation coat or guide coat.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Use low VOC content paints and coatings. (*R*)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L

 Low-cost, good operating procedures	 Choosing an alternative chemical	 New technology or system
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Process	Pollution Prevention Opportunities	Type of activity	In place?			What level of priority do we put on implementing this measure? (High, Medium or Low)		
			Yes	No	N/A	H	M	L
	Use high-solids paints and coatings.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Replace or minimize paints that contain heavy metals (e.g., lead, chromium, cadmium).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use High Volume / Low Pressure (HVLP) paint guns to reduce paint use (by increasing transfer efficiency and decreasing overspray), paint costs and VOC emissions). (*R*)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use electrostatic painting methods to reduce paint costs (works best for the application of non-metallic paints).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Post spray gun set-up, operating and cleaning instructions at spray booth.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use sealed downdraft paint booths to reduce VOC emissions.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Scrape excess paint from paint cups before rinsing with solvent.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use Teflon-lined paint cups to prevent paint from sticking or use paint guns with disposable pots liners.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Give excess paint to customers for touch-ups.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
Other	Ensure that shop wastes are not discharged to the ground surface or to septic tanks. Plug floor drains.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use drip pans under leaking cars, machinery and pipes rather than cleaning them up with absorbents. The liquids can be reused or recycled.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Dispose of lead-acid batteries as hazardous waste, if not recycled.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L

R* - Ontario Ministry of Environment Certificate of Approval requirement for an automotive paint spray booth and associated equipment (Ontario Regulation 419/05: Air Pollution – Local Air Quality)

	Low-cost, good operating procedures		Choosing an alternative chemical		New technology or system
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Maintenance, Management and Good Housekeeping

Process	Pollution Prevention Opportunities	Type of activity	In Place?			What level of priority do we put on implementing this measure? (High, Medium or Low)		
			Yes	No	N/A			
Purchasing and Inventory	Review suppliers' products regularly and select the most environmentally-responsible products when available.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Keep an accurate inventory of products used, especially in relation to the number of vehicles painted.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Order solvents, paints and other product containers sized for minimum storage time to reduce waste from expired products.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Work with suppliers to take back unused product.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
Equipment and Shop Cleaning	Substitute less harmful cleaning products such as water-based biodegradable cleaners (no-VOC or low-VOC) or use recyclable solvents.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Improve manual cleaning practices: <ul style="list-style-type: none"> • Do not soak rags or cloths in solvent. • Use a spray bottle. • Reuse shop towels or wipes for repetitive tasks. 		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Laundry towels that have been used for cleaning to recover solvent. Either launder towels on-site, or collect and send to a laundry facility off-site.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Do not allow rags to dry before being placed in collection cans and keep lids on cans to stop the VOCs from going into the air.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
Regularly maintain and clean equipment to reduce cleaning effort, to extend equipment life, and to reduce solvent use.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L	

	Low-cost, good operating procedures		Choosing an alternative chemical		New technology or system
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Process	Pollution Prevention Opportunities	Type of activity	In Place?			What level of priority do we put on implementing this measure? (High, Medium or Low)		
			Yes	No	N/A			
	Use an enclosed paint gun washer for the final stage of gun cleaning to reduce solvent use and VOC emissions.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use a two-stage cleaning process. Flush paint guns with used solvent before cleaning with new solvent.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use solvents until they lose their effectiveness, as opposed to when they look dirty.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use an interceptor or alternative separation treatment system before wastewater is discharged.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Discharge wastewater in accordance with local sewer use by-laws. (*R1*)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
Solvent Recovery	Install a drying rack and/or drip pan to collect solvents from washed parts.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Recover solvents on-site from towels using one of the following methods: <ul style="list-style-type: none"> • A gravity drain. • Mechanical wringing. • Centrifuge - when towels are spun, solvent is whisked from the towels. • A solvent still – solvent is separated from other contaminants. 		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L
	Use a commercial solvent recycler to reclaim waste solvent cleaners, or recycle them off-site. By recycling and reusing your solvents, you are purchasing less solvent and hauling less waste off-site.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	M	L

	Low-cost, good operating procedures		Choosing an alternative chemical		New technology or system
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Process	Pollution Prevention Opportunities	Type of activity	In Place?			What level of priority do we put on implementing this measure? (High, Medium or Low)
			Yes	No	N/A	
Storage	Store chemicals according to manufacturer's recommendations.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Keep solvent, paint, etc. containers tightly covered at all times. Storing liquids properly reduces air emissions and waste products.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Eliminate all open buckets. Provide solvent in easily used, closed containers.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Date containers when opened to ensure you use them before products expire. Recycle containers when empty.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Label all containers to identify the contents to avoid improper handling or disposal.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Collect and segregate all wastes generated. Do not mix incompatible wastes.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Training	Train workers to follow the standard work procedures (such as cleaning and set up), good housekeeping, and correct material handling methods to make sure all operators follow the same steps to reduce chemical use and waste.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Train spray gun operators in proper spray techniques to minimize coating waste generation. (*R2*)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Spills	Develop a spill response plan and post it so that it is available for all employees.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Make spill kits available at the chemical storage rooms or racks for easy access.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
	Train workers in emergency spill response.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L

	Low-cost, good operating procedures		Choosing an alternative chemical		New technology or system
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Process	Pollution Prevention Opportunities	Type of activity	In Place?			What level of priority do we put on implementing this measure? (High, Medium or Low)
			Yes	No	N/A	
	Use spill decks and containment units under solvent and hazardous waste pails/drums.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L
Other	Ask employees for P2 suggestions.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H M L

R1 - City of Toronto Pollution Prevention and Sewer Bylaw for Auto Refinishing (Bylaw #457-2000)

R2 - Ontario Ministry of Environment Certificate of Approval requirement for an automotive paint spray booth and associated equipment (Ontario Regulation 419/05: Air Pollution – Local Air Quality)

Contact us to provide your feedback on this resource or to suggest any additional pollution prevention resources (email chemtrac@toronto.ca or call 416-338-7600).

	Low-cost, good operating procedures		Choosing an alternative chemical		New technology or system
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More Resources

Automotive Industries Association of Canada. 2004. Shifting into High Gear: The Benefits of Pollution Prevention Practices in the Automotive Aftermarket.

<http://www.aiacanada.com/uploads/Final%20EBP%20Report.pdf>

- *A comprehensive document that reviews the current best practices for dealing with a variety of waste streams common to the automotive aftermarket.*

CIIA (Canadian Industry Information Assistance). 2008. Pollution Prevention Tips.

<http://www.autobodyhelp.ca/pollution.html>

- *autobodyhelp.ca is an online service to assist shops in meeting and exceeding legal compliance levels in Ontario. The website provides pollution prevention tips, reporting guidance, health and safety tips, a virtual collision repair shop, and more.*

CCME. 1998. National Standards and Guidelines for the Reduction in Volatile Organic Compounds (VOCs) from Canadian Commercial/Industrial Surface Coating Operations – Automotive Refinishing. http://www.ccme.ca/assets/pdf/pn_1288_e.pdf

- *A checklist for good P2 practices for automotive refinishing facilities.*

Colorado Department of Public Health and Environment. Pollution Prevention for Auto Body and Auto Repair Shops. <http://www.p2pays.org/ref/16/15277.pdf>

- *A checklist of P2 measures for parts cleaning, brake cleaning, painting, etc.*

Eco-Efficiency Centre. Fact Sheet: Eco-efficiency in the Auto Body Repair and Painting Industry. http://eco-efficiency.management.dal.ca/Files/Business_Fact_Sheets/auto_paint_fs1.pdf

- *Suggestions for changes in auto body repair and painting workplace practices, behaviours and technologies to improve a business's environmental and economic performance.*

Florida Department of Environmental Protection. A Guide on Hazardous Waste Management for Florida's Auto Repair Shops.

http://www.dep.state.fl.us/waste/quick_topics/publications/shw/hazardous/business/autorepair02.pdf

- *Hazardous waste management options for auto repair shops. Some of the guidance is specific to U.S. Federal and Florida regulations, but much of it is applicable.*

Additional relevant resources include:

General P2 Resources

Environment Canada. Pollution Prevention Planning Handbook.

<http://www.ec.gc.ca/NOPP/DOCS/P2P/hbook/En/index.cfm>

- *Detailed information about general pollution prevention planning processes and techniques.*

Do-it-Yourself P2 Tools

Canadian Centre for Pollution Prevention. Environmental Accounting Online Training Tool.

<http://learning.c2p2online.com/>

- *A training tool designed to familiarize participants with the steps and tools available for identifying and estimating the costs and benefits associated with pollution prevention options identified during the pollution prevention planning process.*

P2 Database and Resource Centres

Canadian Pollution Prevention Information Clearinghouse (CPPIC) <http://www.ec.gc.ca/cppic/en/index.cfm>

- *Online database providing access to pollution prevention resources for specific sectors.*