

Guide to calculations for ChemTRAC reporting:

VOCs from various materials

Version 1.1

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Contents

How do I use this guide?

Part 1 of this guide will help you understand the ChemTRAC program, collect information about your facility, use the ChemTRAC calculator for VOCs of various materials, and report substances to ChemTRAC, if needed.

Part 2 of this guide will help you reduce your facility's environmental impact.

The Appendices provide additional background information

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City of Toronto, 2012

For more information about ChemTRAC, call 3-1-1 or visit www.toronto.ca/chemtrac

DISCLAIMER: This guide is for educational and informational purposes only. The City of Toronto assumes no liability for the accuracy or completeness of these materials. Readers are responsible for ensuring compliance with Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423). These materials should not be relied upon as a substitute for legal or professional advice. Readers should seek their own legal or professional advice in regard to their use of the information contained in the guide.

Introduction to the ChemTRAC program

There are chemicals in Toronto's environment that can harm our health. These substances come from vehicle exhaust, homes, businesses and other sources.

Toronto Public Health identifies 25 of these chemicals as "priority substances" because they are found in our local environment at levels that are of concern for health. Evidence links these substances to short-term health effects like respiratory problems, and longer-term impacts such as cancer. In a business setting, these substances can come from process heating, cleaning with solvents, welding and other processes.

The list of 25 substances and the reporting thresholds are included in Table 3 on page 28.

ChemTRAC is a City of Toronto program that:

- tracks where businesses use and release these priority substances;
- helps businesses reduce or replace these substances with safer alternatives; and
- provides the public with information on priority substances in their community.

As part of ChemTRAC, Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423) requires many businesses to report to the City each year if they use or release a certain amount of priority substances to the environment.

This guide is designed to help you:

- understand if your facility uses and releases any Volatile Organic Compounds (VOCs);
- use the ChemTRAC calculator for VOCs to determine if you are required to report to the City of Toronto;
- use the ChemTRAC online reporting system to submit data to the City; and
- consider ways to reduce your environmental impact.

Additional information on the ChemTRAC program and the Environmental Reporting and Disclosure Bylaw is available by calling 3-1-1 or online at:

<http://www.toronto.ca/chemtrac/>

Calculating emissions

To help Toronto businesses calculate their emissions and comply with the Environmental Reporting and Disclosure Bylaw, Toronto Public Health developed calculators that are specific to industrial sectors and processes. Access these calculators from the ChemTRAC website at

<http://www.toronto.ca/health/chemtrac/tools.htm>.

These calculators help businesses do three things:

- Identify which ChemTRAC priority substances are used or released in their facility
- Calculate the amounts of ChemTRAC priority substances used or released
- Determine what they are required to report to the ChemTRAC program.

The release of ChemTRAC priority substances can be calculated using methods other than the ChemTRAC calculators. See

<http://www.toronto.ca/health/chemtrac/tools.htm> for a list of alternative methods.

The ChemTRAC calculator for VOCs

This ChemTRAC calculator is designed to be applicable to any type of facility that manufactures, processes or otherwise uses volatile organic compounds (VOCs). It is intended to complement ChemTRAC calculators that are specific to a certain type of facility. Unlike the other ChemTRAC calculators, the ChemTRAC calculator for VOCs is not specific to any one type of facility.

There are two reasons why you should use this calculator:

- your facility has processes that will produce VOC emissions that are not included in the ChemTRAC calculator for your specific facility type; or
- you have quantified releases of the other ChemTRAC priority substances using methods other than the ChemTRAC calculators but you require a method of quantifying VOCs.

Note that if you have used a ChemTRAC calculator that is specific to your facility and that considers all of the VOC-releasing processes in your facility, you do not need to use the ChemTRAC calculator for VOCs.

In the next section, we will work through worksheets to prepare you to use the ChemTRAC calculator for VOCs.

What are VOCs?

VOCs are a group of organic chemicals that easily evaporate into the air. You can often smell them. They can be released from fuel, products such as paints and varnishes, from the combustion of natural gas, or from food products that involve fermentation such as bread or drinking alcohols.

Short-term health effects of exposure to VOCs may include eye, nose, and throat irritation, headaches, loss of coordination, and nausea. Over longer periods, VOCs can damage the liver, kidneys, and central nervous system.

For more information on the health effects of VOCs, as well as other ChemTRAC priority substances, visit

<http://www.toronto.ca/health/chemtrac/substances.htm>.

Worksheets for collecting information

The worksheet found on the next page is intended to help you collect all the information needed to use the ChemTRAC calculator for VOCs. Two worksheets are provided:

- Worksheet 1: Materials containing VOCs
- Worksheet 2: VOCs transferred from site for treatment or disposal

A printer-friendly version of the worksheets can be found as Appendix A. They can be printed and completed by hand so that you have all information available on-hand for entry into the ChemTRAC calculator.

Note: If your facility has more processes than are included in the ChemTRAC calculator for VOCs, you may need to use additional calculators to identify other emissions. A calculator specific to your facility type can likely be found on the ChemTRAC website at <http://www.toronto.ca/health/chemtrac/tools.htm>.

You can use ChemTRAC's "Calculation of Totals" calculator to combine the findings of multiple calculators and determine if you exceed ChemTRAC thresholds for any of the ChemTRAC priority substances. See Appendix B for more details.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

Worksheet 1 – Materials containing VOCs

This worksheet will help you collect information on the materials used in your facility that contain VOCs. You should collect data for the period between January 1 and December 31 of the reporting year.

You will need to collect the following information:

1. **The VOC control efficiency from VOC control equipment.** VOC control equipment helps reduce but not eliminate the release of VOCs from various processes. Examples of VOC control equipment are thermal oxidizers and catalytic oxidizers.¹ If your facility does not have VOC emissions control equipment for VOCs, then record the control efficiency as 0%. The control efficiency is the percentage of VOCs that are **removed** by the control equipment. You can find VOC control technology efficiency in the technology's product manual, through site testing or by consulting your equipment supplier.
2. **The name and amount of each VOC-containing material used.** The amount recorded would be for the entire year for which you are reporting. If your facility uses the same material in multiple processes, ensure that the quantity of material is accounted for only once.
3. **The VOC content of the material.** This can be found on the Material Safety Data Sheet (MSDS) that should be on-hand at your facility for each material. If the MSDS lists a range, choose the midpoint (e.g., if VOCs is listed as 0.4 g/L - 0.6 g/L, choose 0.5 g/L).

Complete the **Worksheet 1 Table** on the following page to have all information on VOC control equipment and materials that is needed for the ChemTRAC calculator for VOCs.

Values can be written into the **Worksheet 1 Table** in any unit (g, kg, lbs, g/L, lbs/gal, etc.). However, they must be entered into the calculator using proper units (**litres** for quantity used in year and **grams per litre** for VOC content). A simple unit converter found in the calculator can help you convert values into the proper units. See page 8 of this guide for more information on unit conversion.

¹ See the *Control technologies for reducing emissions* section of this guide for more information on different types of control technologies

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Worksheet 1 Table: Information on control equipment and materials containing VOCs

VOC control efficiency from VOC emission control equipment _____%		
Material name	Quantity used in year	VOC content from MSDS
<i>Example: Solvent A</i>	<i>2000 litres</i>	<i>75 g/L</i>

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Worksheet 2 – VOCs transferred from site for treatment or disposal

If no materials containing VOCs are transferred from your facility for treatment or disposal, you can skip this worksheet.

This worksheet will help you collect information on the quantity of VOCs within materials that are transferred from your facility for treatment or for disposal. Since these VOCs are transferred from your facility, they are not released from your facility into the atmosphere. You should collect transfer data for the period between January 1 and December 31 of the reporting year.

You will need to collect the following information on the VOC-containing materials that are transferred from your facility:

- **The details of the transfer.** This includes the transferred material, its Hazardous Waste Information Network (HWIN) classification and the name of the offsite transfer company.
- **The volume and VOC content of the transferred material.** The VOC content can be found on the transferred material's MSDS. If the transferred material were a mixture of different chemicals, then the material would have VOC content that reflects the mix of these chemicals.

Complete the **Worksheet 2 Table** below to have all information that you need on VOCs transferred from your facility.

Worksheet 2 Table: Information on VOCs transferred from your facility for treatment or disposal

Transferred material	HWIN classification	Offsite transfer company	Volume of transferred waste	VOC content
<i>Example:</i> <u>Solvent A</u>	<u>Aromatic solvent</u>	<u>ABC Removal</u>	<u>1000 litres</u>	<u>75 grams per litre</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Using the calculator

To calculate your use and release of VOCs, you need to enter the information from the two worksheets in this guide into the appropriate sections of the ChemTRAC calculator for VOCs. The ChemTRAC calculator will then automatically calculate the quantity of VOCs that are released and transferred from your facility. This section of the guide provides a step-by-step walkthrough of the use of the calculator.

Getting started

The ChemTRAC calculator for VOCs can be read with software such as Microsoft Excel or Open Office. To find a copy of the calculator, go to <http://www.toronto.ca/health/chemtrac/tools.htm> and click on the "VOCs calculator" link found under the Printing Sector.

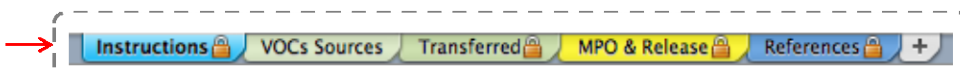
The calculator consists of four different screens:

- Instructions
- VOC sources
- Transferred
- MPO & release
- References

You only have to enter information into the VOC sources and Transferred screens.

You can navigate between screens by clicking on the tabs at the bottom of each screen:

Navigation
buttons



The Instructions screen

The calculator should open on the Instructions screen. This screen contains instructions on how to use the calculator to estimate the amount of VOCs that are used and released by your facility. It also provides a brief overview of the contents of the calculator. **You do not need to enter any information on this screen.**

The VOC sources screen

The VOC sources screen is the screen where you will enter all information applicable to materials used by your facility that contain VOCs. Information is typed in **yellow boxes** only. Any yellow cells that do not apply to your facility can

be left blank. Information in grey boxes are examples only and do not enter into any calculations. The VOC sources screen can be filled out using the information gathered for **Worksheet Table 1** of this guide.

CHEMTRAC

Version 3, Last Updated: October 20, 2011 by YB, JA, & ZJ

This spreadsheet is to assist with estimating the manufacture, process, and otherwise use (MPO) of VOCs from Miscellaneous Chemical Products used in your facility.

Enter the efficiency of VOCs control device → 70%

VOCs MPO from Various Materials (Enter data in columns A, B, C and D. Column E will calculate automatically)				
A	B	C	D	E
Material	Select VOC MPO	Amount used in the year	VOC Content (lb-m/MFNS ²)	VOC Quantity
		L	gal	kg
Example: Chemical XYZ	Processed	150	8.50	1.34
Solvent A	Evaporated	200	75	150.0
	Miscellaneous			0.00
	Miscellaneous			0.00
	Spillage			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
	Spillages			0.00
Total VOC usage				150.0 kg

Imperial-Metric Unit Conversion
Enter number in "INPUT" column

INPUT		OUTPUT	
Imperial		Metric	
528.4	gal	=	2000.212 L
1	Regal	=	119.828 g/L
1	c	=	0.001 kg
1	b	=	0.454 kg

Properties calculation
Enter number in "INPUT" column

INPUT		OUTPUT	
Concentration in % w/w to g/L			
Percent Weight ^a	Specific Gravity	=	VOC Content
10	0.75	=	75000 g/L
Mass to volume using density			
Mass (kg)	Density (gbs/l)	=	Volume
1	1	=	1000 L

The image above also displays where the sample information from Worksheet 1 can be entered. In this example, the user has indicated that control equipment with 70% VOC removal efficiency is in place at the facility. The user has also entered 2000 litres of “Solvent A” as a material that is processed and contains 75 grams of VOCs per litre.

It is important that values are entered in litres for amounts, and in g/L for VOC content. If you have amounts in imperial units, the unit conversion box can be used to convert into litres. As an example, the picture above shows that 528.4 gallons is equivalent to approximately 2000 litres. If you do not have VOC content in g/L, you can use the properties box to convert from percent weight and specific gravity², or from mass and density into g/L of VOC content. As an example, the

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image on the previous page indicates that a material with 10% VOCs by weight with a specific gravity of 0.75 will have a VOC content of 75 g/L.

Once you have input your facility's information into the appropriate yellow boxes, the calculator automatically calculates the quantity of VOCs that are manufactured, processed, or otherwise used (MPO).³ In the example used, 150 kg of VOCs are manufactured, processed, or otherwise used at the facility.

The MPO values are also displayed in the MPO & release screen of the calculator along with the amount of VOC that are released to air. It is not the MPO amount but the amount of VOCs that are **released to air** that should be compared to the ChemTRAC threshold for VOCs. The amount of VOCs that are released to air factor in both the control equipment in place as well as the amount of VOCs that are transferred from site. This amount is calculated in the Transferred screen.

The Transferred screen

If no materials containing VOCs are transferred from your facility for treatment or disposal, you can skip this screen of the calculator.

The Transferred screen is the screen where you will enter all information applicable to VOC-containing materials that are transferred from your facility for treatment or disposal. Information is typed in **yellow boxes** only. Any yellow cells that do not apply to your facility can be left blank. Information in grey boxes are examples only and do not enter into any calculations. The Transferred screen can be filled out using the information gathered for **Worksheet Table 2** of this guide.

The image on the next page illustrates the different areas of the Transferred screen.

³ The definitions for 'Manufactured', 'Processed', 'Otherwise Used', and 'Released to Air' can be found on the References screen of the ChemTRAC calculator.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

CHEMTRAC
Version 3, Last Updated: October 20, 2011 by YS, JA, & ZI

This spreadsheet is to assist with estimating the amount of VOCs transferred from your facility for treatment or disposal.

VOCs Transferred from Various Materials					
(Enter data in columns A, B, C, D, E and Column F will calculate automatically)					
A	B	C	D	E	F
Transferred Material	HWIN ¹ Classification	Offsite Transfer Company	Volume of Transferred Waste	VOC Content	VOC Transferred
			L	g/L	kg
*Example: Degreaser	Aliphatic Solvents	ABC Removal	190	4.98	0.95
Solvent A	Aromatic solvent	ABC Removal	1000	75.00	75.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
					0.00
Total transferred			1000 L		75 kg

Enter data from Worksheet Table 2 here

Use this box to convert from imperial to metric units

Imperial-Metric Unit Conversion

Enter number in "INPUT" column

INPUT		OUTPUT	
Imperial		Metric	
1	gal	=	3.785 L
1	lb/gal	=	119.828 g/L
1	g	=	0.001 kg
1	lb	=	0.454 kg

Properties calculation

Enter number in "INPUT" column

INPUT		OUTPUT	
Concentration in % w/w to g/L			
Percent Weight ²	Specific Gravity	=	VOC Content
1	1	=	10.000 g/L
Mass to volume using density			
Mass (kg)	Density (g/ml)	=	Volume
1	1	=	1.000 L

Use this box to calculate VOC content

Entering information from Worksheet 2: VOCs transferred from site for treatment or disposal

The image above also displays where the sample information from worksheet 2 can be entered. In this example, the user has indicated that 1000 litres of Solvent A, which has a VOC content of 75 g/L, was transferred to ABC Removal. The user has also noted that Solvent A is classified as an aromatic solvent.

Amounts of materials transferred must be entered in litres and VOC contents must be entered in g/L. As was the case for information entered in the VOC sources screen, the unit conversion box and the properties box can be used to get the appropriate units.

Once you input your facility's information into the appropriate yellow boxes, the calculator calculates the quantity of VOCs that are transferred from your facility. In the example shown in the image above, 75 kg of VOCs are transferred from the facility.

The amount of VOCs transferred is reflected in the numbers shown in the MPO & release screen of the calculator.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

The MPO & release screen

This screen summarizes the amounts of VOCs that are manufactured, processed, otherwise used and released to air from your facility. The image below summarizes the sample information that we have used as examples throughout the guide.

CHEMTRAC
Version 3, Last Updated: October 20, 2011 by YS, JA, & ZI

From the VOC sources screen

OUTPUT SUMMARY				
ChemTRAC Substances	Quantity (kg/yr)			
	Manufactured ¹	Processed ¹	Otherwise Used ¹	Released to Air ^{1, 2}
Total Volatile Organic Compounds (VOCs)	0	150	0	23

¹ Definitions available on References tab.
² Product transferred offsite has been taken into account

Compare this value to the ChemTRAC threshold for VOC releases

The amount of VOCs calculated in the VOC sources screen are all considered as processed. The Release to Air value considers the amount of VOC-containing material used in your facility, the control efficiency of your VOC control equipment and the amount of transferred VOCs. The Released to Air value is calculated as follows:

Released to air

$$= (\text{Processed VOCs} - \text{transferred VOCs}) \times (1 - \% \text{ control efficiency})$$

For VOCs, it is the Released to Air value that is compared to the ChemTRAC reporting threshold. If the Released to Air value is larger than the reporting threshold, then you are required to report this amount as well as the amount of VOCs manufactured, processed or otherwise used in your facility. See *Interpreting Results* on page 13 for more information.

Interpreting results

Compare results to thresholds. Once the amounts of VOCs released to air have been calculated, you must compare this amount to the ChemTRAC reporting threshold listed in the Environmental Reporting and Disclosure Bylaw.⁴ Thresholds are also listed in Appendix B of this guide.

Combining multiple calculation methods. Some facilities may need to add results of the ChemTRAC calculator for VOCs with emissions from other processes in the facility. This is discussed in Appendix B.

If there are no other processes and, the ChemTRAC calculator is the only tool used to estimate emissions, the values in the Output Summary table of the calculator can be compared directly to the ChemTRAC reporting thresholds.

If results exceed the threshold you must report. If VOCs are released to air in an amount equal to or greater than its ChemTRAC reporting threshold, then you would need to report the quantity released to air as well as the MPO amount.

Table 1 below compares a sample MPO & release table to the VOC ChemTRAC threshold.

Table 1. Comparison of results from the ChemTRAC calculator and reporting thresholds

Output Summary table from the ChemTRAC calculator					Comparison to ChemTRAC thresholds	
ChemTRAC Priority Substances	Manufactured (kg/yr)	Processed (kg/yr)	Otherwise used (kg/yr)	Released to Air (kg/yr)	Reporting threshold (kg/yr)	Is reporting required?
VOC	0	781	0	294	100	YES

In the Table 1 example, VOCs are **released to air** in an amount greater than the reporting threshold⁵. Therefore, in this example, VOCs released to air and the quantity of VOCs processed would need to be reported to the ChemTRAC program.

⁴ The full by-law can be found at <http://www.toronto.ca/health/chemtrac/report.htm>.

⁵ Because VOCs are a “group C” ChemTRAC substance, VOCs only need to be reported if the release to air exceeds thresholds. If VOCs are manufactured, processed or otherwise used but are not released, reporting is not required.

Reporting to ChemTRAC

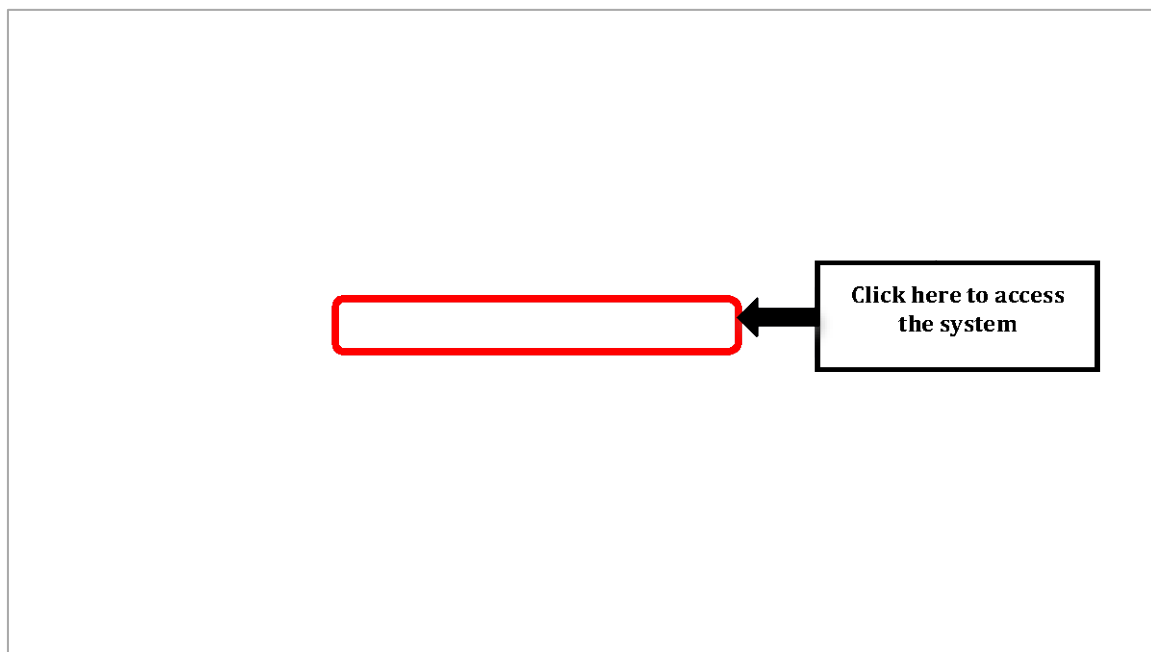
You are only required to report to ChemTRAC if you meet or exceed reporting thresholds for one or more priority substances.

Facilities that meet or exceed reporting thresholds for one or more substances must use the Online Reporting System to report to the ChemTRAC program. You can access the system from any computer with an internet connection. If your facility is exempt or below reporting thresholds, you can use the system to notify the City and volunteer environmental information.

You can find the online reporting system on the ChemTRAC webpage:
<http://www.toronto.ca/health/chemtrac/report.htm>.

You will need the following information to report to ChemTRAC


- Your First Time Access Code **OR** Registration ID
- Your facility name, address, number of employees and contact information
- Your NAICS code
- The names of substances you are reporting
- Quantities of priority substances (in kilograms).



Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

[Frequently asked questions](#)
[Contact us](#)
[Terms of use](#)
[User Guide](#)

You are in a secure site.



Welcome to the ChemTRAC data reporting system

This application will allow you to:

- Report the use and release of priority substances under Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423)
- Indicate if your facility is below reporting thresholds
- Indicate that the reporting requirements do not apply to your facility
- Provide information on your facility's environmental activities

To report online, you will need the **First Time Access Code** or your **Registration ID**.

To protect your privacy and security it is recommended that you close the browser after submitting your information.

To protect the secured exchange of information between you and this secure site, this transaction requires that your browser supports 128-bit data encryption. To continue, you may be asked to download and install the latest version of your browser.

As a security precaution, page sessions will end automatically as indicated at the top of each page.

To proceed with reporting information on chemical use and release you must read and consent to the [Terms of Use](#) and click the **I Agree** button below.

Note: Use of the browser Back button is not supported. Please use the reporting system's back/next button(if applicable) to navigate when necessary.

First Time Access Code for new users

If you are a first time user, you will need a "First Time Access Code" to use the system. The City sends most businesses their First Time Access Code by mail. If you did not receive or have lost your First Time Access Code, please call 3-1-1.

Registration ID for facilities already in the system

If you have already reported in the online system, you have been issued a Registration ID. This ID number is to be used for future visits to the ChemTRAC reporting system. If you have lost your Registration ID, please call 3-1-1.

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The screenshot shows the ChemTRAC login interface. It has a blue sidebar on the left. The main content area has a header 'First Time Signing In?' with a button 'Register with First Time Access Code'. Below that is a section 'Already Registered?' with a text input field for 'Registration ID:'. A message below the field says 'If you have lost or forgotten your Registration ID, please contact us at (416) 338-7600'. At the bottom is a 'Sign In' button.

Once you have entered the online reporting system

The online system has seven steps. You will see your progress at the top of the screen. In the screenshot below, Step 1 is complete and Step 2 is in progress.

The screenshot shows the ChemTRAC progress bar. At the top left is the 'Toronto' logo. Below it is a sidebar with links: 'Frequently asked questions', 'Contact us', 'Terms of use', and 'User Guide'. The main area is titled 'ChemTRAC' and says 'You are in a secure site.' Below this is a progress bar with seven steps, each with a leaf icon: 'Step 1 Facility Registration' (complete), 'Step 2 Reporting Period' (in progress), 'Step 3 Chemical Selection', 'Step 4 Use & Release (0 of 0)', 'Step 5 Environmental Statement', 'Step 6 Summary Notification', and 'Step 7 Confirmation & Print'. At the bottom left is a '15min' timer icon. A note at the bottom says: 'Note: This registration session will automatically end fifteen minutes after this Web page has finished loading.'

To move to the next step, you must enter all the required information on the screen and click the “Next” button at the bottom of the screen. You can use the “Back” button to change the information you provided in previous steps.

Please remember to have all your information ready before you enter the system. **You will only have fifteen minutes to complete each screen before the system logs you out.** If your session expires before you hit the "submit" button, you will need to re-enter all your information. If you are running out of time, you can reset the countdown without losing information by switching to a different page then returning to the page you were working on.

Step 1. Facility registration

In Step 1, you will enter your facility name, address, number of employees and company contact information. You will also enter your **NAICS code** in the section entitled “Type of facility”. You must begin by selecting the 2-digit NAICS code from the dropdown menu. The NAICS code for wineries (312130) is shown as an example.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

NAICS 2-Digit:	31 – Manufacturing
NAICS 4-Digit:	3121 – Beverage Mfg.
NAICS 6-Digit:	312130 – Wineries

Step 2. Reporting period

In Step 2, you will choose the calendar year from the dropdown menu and select “Yes” in response to the statement “I am ready to report for the year above”.

If your calculations showed you to be below the reporting threshold, you can enter “No” in response to the statement “I am ready to report for the year above” and then enter “I do not meet the threshold.”

Step 3. Chemical selection

In Step 3, you will identify the substances that your facility used or released at or above reporting thresholds. As an example, we will report on VOCs.

<input type="checkbox"/>	Polycyclic Aromatic Hydrocarbons (PAHs)
<input type="checkbox"/>	11104-93-1 Nitrogen Oxides (NOx)
<input type="checkbox"/>	Particulate Matter 2.5 (PM 2.5)
<input checked="" type="checkbox"/>	Volatile Organic Compounds (VOCs) Total

Step 4. Use and release

In Step 4, you will enter information for each substance that you identified in Step 3.







The ChemTRAC calculator for VOCs reports on VOCs that are “processed” and “released to air”.

Next, you will need to **enter the total quantity of the substances that your facility manufactured and released, in kilograms and without decimals**. For example, 17.2 kg would be rounded to 17 kg and 17.6 kg rounded to 18 kg.

Finally, you will select an estimation method from the dropdown menu.

Select “ChemTRAC calculator” if you have used the ChemTRAC calculator. The example on the next page illustrates how to complete Step 4 for VOCs using sample information.

Part 1: Gathering data, using the calculator, and reporting to ChemTRAC

Volatile Organic Compounds (VOCs) Total (Reporting Threshold = 100.0 kg)		
	Quantity (kg)	Estimation Method
If you used more than one method to estimate data, please choose the main one		
Manufactured: 	<input type="text"/>	- Select Estimation Method From List -
Processed: 	<input type="text" value="781"/>	ChemTRAC calculator
Otherwise Used: 	<input type="text"/>	- Select Estimation Method From List -
Total Use:	<input type="text" value="781"/>	
Release to Air: 	<input type="text" value="294"/>	ChemTRAC calculator
Release to Land: 	<input type="text"/>	- Select Estimation Method From List -
Release to Surface Water: 	<input type="text"/>	- Select Estimation Method From List -
Total Release:	<input type="text" value="294"/>	

Step 5. Environmental statement

In Step 5, you have the option of entering information about your environmental activities including: if you have completed environmental training courses, created a Pollution Prevention Plan, or adopted an Environmental Management System. Pollution Prevention Plans are discussed briefly in Part 2 of this guide. You will also specify if you report to the National Pollutant Release Inventory or to the Toronto Sewer Use Bylaw.

Steps 6 and 7. Summary notification, confirmation and printing

In Steps 6 and 7, you will not enter any new information. You will review the information you provided, submit your report, and receive a printable record.

Optional reporting for facilities below threshold levels of priority chemicals

For those businesses or facilities that do not meet or exceed ChemTRAC thresholds, the online reporting system allows you to identify yourself as a “non-reporter”. This will allow you to stay informed on ChemTRAC program initiatives. It will also help Toronto Public Health assess trends over time and gauge the effectiveness of the ChemTRAC program.

Part 2: Reducing the environmental impact of your facility

This section of the guide provides information about reducing the environmental impact of your facility.

- *It provides an overview of pollution prevention strategies*
- *It identifies relevant control technologies for reducing emissions*
- *It provides guidance on getting started with pollution prevention.*

Pollution prevention strategies

The ChemTRAC program requires facilities to report on substances that are manufactured, processed, otherwise used or released to air in quantities that are equal to or greater than ChemTRAC reporting thresholds. Although it is not required as part of the ChemTRAC program, it is good business practice for facilities to also take action to reduce the creation, use and release of ChemTRAC priority substances.

Minimizing the use and release of harmful substances at the source is called pollution prevention (or P2) and is widely recognized as good business practice. Collecting data for ChemTRAC gives you the information you need to consider P2 options in your facility.

How can a business benefit from pollution prevention (P2)?

- P2 can reduce operating costs from the use of chemicals and energy
- P2 can reduce the costs of waste management and the risk of liability
- P2 can improve worker health and safety
- P2 can improve community relations and build a business' reputation as socially and environmentally responsible
- P2 can improve a business' ability to respond to consumer demands for "greener" products

Pollution prevention strategies

Businesses have many options for reducing the use of harmful substances in their facilities. Not all of the options will be relevant to all businesses. Three types of strategies and examples are presented below.

1. **Use low-cost, good operating practices.** Simple changes to normal practices can reduce the use and release of harmful chemicals at no cost to business owners.

For example: Well-maintained equipment reduces waste, saves money, and reduces emissions.

2. **Install control technologies or equipment.** New control technologies and equipment can reduce the release of harmful chemicals and save money by improving operating efficiency.

For example: Install equipment to destroy VOCs. VOC control equipment can reduce emissions by 90%.

3. **Modify products or inputs.** Traditional products and processes can be replaced with alternatives that use and release less harmful chemicals.

For example: Switch to water-based biodegradable cleaners. Though not discussed in the guide, caustic or acidic cleaners emit VOCs.

Control technologies for reducing emissions

Control technologies can reduce, but not eliminate, the quantity of VOCs that are released from your facility.

VOC control equipment

There are three common control technologies that can decrease the release of volatile organic compounds: carbon adsorbers, catalytic incinerators, and wet scrubbers.

Carbon adsorbers. Carbon adsorbers remove VOCs from an air stream by adsorbing the vapour onto an activated carbon surface. They are estimated to remove about 90% of VOCs.

Catalytic incinerators. In a catalytic incinerator, VOCs are destroyed by oxidation at low temperatures on a catalytic bed. They are compact systems that have low operating costs and remove about 70% of emissions.

Wet scrubbers. In a wet scrubber, pollutants are removed from a gas stream by dissolving or absorbing them into the liquid. They are estimated to remove about 90% of VOCs.

The ChemTRAC calculator can be used to estimate a control technology's emission reduction potential.

Without changing any other values entered in the VOC sources screen, enter a percent VOC control efficiency. Check the new level of VOCs released to air in the MPO & release screen – it should be lower than before.

The table below summarizes VOC control technologies.

Table 2. VOC control technologies

Control technology	ChemTRAC substance being controlled	Reduction ability of the control technology
Carbon adsorbers	Volatile organic compounds	Reduces VOC creation by up to 90%
Catalytic oxidizers	Volatile organic compounds	Reduces VOC creation by up to 70%
Wet scrubbers	Volatile organic compounds	Reduces VOC creation by up to 90%

More ways to reduce costs and improve performance

Minimizing the use and release of harmful substances is one aspect of improving environmental performance. Facilities can also take other steps to improve their economic and environmental sustainability.

1. **Reduce energy use.** By reducing energy use, facilities can save money on energy bills and reduce their environmental impact. Many energy-efficiency technologies have very short payback periods. Utilities also offer incentives for energy efficiency measures.

To reduce energy use, low-cost, good operating procedures can be adopted, and new technology or equipment can be installed. This includes:

- Undergoing an energy audit to identify opportunities for savings
- Encouraging employees to turn off lights and equipment when not in use
- Replacing old equipment with more efficient equipment
- Installing a programmable thermostat to control heating and cooling

2. **Reduce water use.** Working to reduce water use can save money and provide environmental benefits. You can do a number of things to reduce water use.

To reduce energy use, low-cost, good operating procedures can be adopted, and new technology or equipment can be installed. This includes:

- Sweeping floors and machines instead of hosing them down with water
- Posting signs near sinks and hoses to encourage employees to use less water
- Purchasing high pressure, low volume cleaning equipment
- Purchasing water sprayers with automatic shut-off nozzles.

Getting started with pollution prevention

The good news is that you've already started by calculating emissions of ChemTRAC priority substances.

Next steps can include:

1. Evaluating actions to reduce use and release of energy, water and ChemTRAC substances.
2. Identifying funding for upgrades to facilities and equipment.
3. Implementing all cost-effective upgrades.
4. Tracking changes in the use and release of energy, water and substances.

To help in these steps, ChemTRAC is offering **free technical assistance visits**, **free training workshops** and additional resources to help businesses create an inventory of chemicals used at their facility, comply with the ChemTRAC program, and identify opportunities to improve their facilities' environmental performance.

For more information, visit:

http://www.toronto.ca/health/chemtrac/assistance_program.htm and
<http://www.toronto.ca/health/chemtrac/gogreen.htm>.

Appendices

The remaining pages of this guide offer additional material for your reference:

Appendix A. Printer-friendly versions of the two worksheets.

Appendix B. Combining the ChemTRAC calculator with other sources:

How to combine the ChemTRAC calculator for VOCs with emissions data from other sources.

Worksheet 1 Table: Information on control equipment and materials containing VOCs

Guide to calculations for ChemTRAC reporting: VOCs from various materials


Additional Material

Worksheet 2 Table: Information on VOCs transferred from your facility for treatment or disposal

Transferred material	HWIN classification	Offsite transfer company	Volume of transferred waste	VOC content
<i>Example: Solvent A</i>	<i>Aromatic solvent</i>	<i>ABC Removal</i>	<i>1000 litres</i>	<i>75 grams per litre</i>

Appendix B. Combining the VOCs calculator with other sources

Depending on your facility, you may need to use more than one calculator to calculate the use and release of ChemTRAC substances from all processes. The "Calculation of Totals" calculator can be used to compile your data.⁶ In this calculator, you can enter the values for each process at your facility. The calculator returns the total manufactured, processed or otherwise used amounts, as well as the amount released to air for the facility, by substance, and then compares it to the corresponding reporting threshold.



Calculation of Totals
Last Update: October 21, 2011 by YS, J.A. & ZI

Instructions

- This page gathers information to help you determine your facility-wide substance manufacture, process, otherwise use (MPO) and release estimates.
- For each source of priority substances, enter the process name and then provide the quantity of each substance manufactured, processed, otherwise used and released.
- In the "MPO" column, identify whether the priority substance was Manufactured, Processed or Otherwise used. To do this you may consult the "Guide to Reporting" available at www.toronto.ca/chemtrac. The definitions are provided in the Example tab.
- At the end of each row, you will find the facility-wide totals that need to be compared with the Mass Reporting Thresholds.
- The last 4 columns indicate the amount of each substance that you must report to the City of Toronto.

Calculation

Example

The total quantities of ChemTRAC substances that would have to be reported are listed here

Group	Chemical	Process #1				Process #2				Total to be compared with threshold (kg/yr)	Mass Reporting Threshold (kg/yr)	Reportable?	To be reported			
		Manufactured	Processed	Otherwise Used	Released to Air	Manufactured	Processed	Otherwise Used	Released to Air				Total Manufactured (kg/yr)	Total Processed (kg/yr)	Total Otherwise Used (kg/yr)	Total Released to Air (kg/yr)
A	Acetaldehyde*									0	100	No	---	---	---	---
	Acrolein*									0	100	No	---	---	---	---
	Benzene*									0	100	No	---	---	---	---
	1,3-Butadiene*									0	100	No	---	---	---	---
	Carbon tetrachloride*									0	100	No	---	---	---	---
	Chloroform (Trichloromethane)*									0	100	No	---	---	---	---
	Chromium (hexavalent)*									0	100	No	---	---	---	---
	1,2-Dibromomethane (Ethylene dibromide)									0	100	No	---	---	---	---
	1,4-Dichlorobenzene*									0	100	No	---	---	---	---
	1,2-Dichloroethane (Ethylene dichloride)*									0	100	No	---	---	---	---
	Dichloromethane (Methylene chloride)									0	100	No	---	---	---	---
	Formaldehyde*									0	100	No	---	---	---	---
	Manganese*									0	10	No	---	---	---	---
	Nickel*									0	100	No	---	---	---	---
	Perchloroethylene (Perchloroethylene)									0	100	No	---	---	---	---
Trichloroethylene*									0	100	No	---	---	---	---	
Vinyl chloride									0	100	No	---	---	---	---	
Cadmium*									0	1	No	---	---	---	---	
Chromium (hexavalent)*									0	10	No	---	---	---	---	
Lead									0	10	No	---	---	---	---	
Mercury*									0	1	No	---	---	---	---	
B	Total polycyclic aromatic hydrocarbons (PAHs)*									0	10	No	---	---	---	---
	Nitrogen oxides (NOx)									0	200	No	---	---	---	---
C	Particulate matter 2.5 (PM2.5)									0	30	No	---	---	---	---
	Total Volatile organic compounds (VOCs)*									0	100	No	---	---	---	---

The total combined release of substances (whether from the ChemTRAC VOCs calculator only, or from other substance quantification methods as well) should be compared to the mass reporting thresholds listed in Schedule A of the Environmental Reporting and Disclosure Bylaw and provided in Table 3 on the following page.

⁶ The Calculation of Totals calculator can be found under the Totals bullet at <http://www.toronto.ca/health/chemtrac/tools.htm>.

Additional Material

Table 3. ChemTRAC priority substances and their reporting thresholds (adapted from Schedule A of the Environmental Reporting and Disclosure bylaw)

ChemTRAC substance	ChemTRAC Mass reporting threshold (kg/yr)	Concentration threshold ^c % w/w
Group A: report if sum of quantity manufactured, processed and otherwise used exceeds thresholds		
Acetaldehyde	100	1
Acrolein	100	1
Benzene	100	1
1,3-Butadiene	100	1
Cadmium and its compounds	1	0.1
Carbon tetrachloride	100	1
Chloroform (Trichloromethane)	100	1
Chromium, Hexavalent and its compounds	10	0.1
Chromium, Non-hexavalent and its compounds	100	1
1,2-Dibromo ethane (Ethylene dibromide)	100	1
1,4-Dichlorobenzene	100	1
1,2-Dichloroethane (Ethylene dichloride)	100	1
Dichloromethane (Methylene chloride)	100	1
Formaldehyde	100	1
Lead and its compounds	10	0.1
Manganese and its compounds	10	1
Mercury and its compounds	1	0
Nickel and its compounds	100	1
Tetrachloroethylene (Perchloroethylene)	100	1
Trichloroethylene	100	1
Vinyl chloride	100	1
Group B: report if sum of quantity released, disposed and transferred exceeds thresholds		
Polycyclic Aromatic Hydrocarbons (PAHs)	10	N/A ^b
Group C: report if quantity released to air exceeds thresholds		
Nitrogen Oxides (NO _x)	200	N/A
Particulate Matter 2.5 (PM _{2.5})	30	N/A
Volatile Organic Compounds (VOCs) total	100	N/A

Notes:

- N/A = not applicable
- The concentration threshold % w/w is not relevant to the emissions quantified using the ChemTRAC calculator for Wineries

Appendix C. Reporting Checklist

Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423)

Checklist for Facilities in Toronto

Make sure the data you submit in your reports are accurate. Here is a checklist to help you.

- Enter complete facility and contact information. If you are a consultant, identify yourself as the technical contact.
- Submit a **separate** report for **each** facility in Toronto.
- Complete the statement of certification.
- Report **all** of the priority substances (chemicals) that meet or exceed (equal to or greater than) the reporting thresholds.
- Report **both use and release** amounts of all priority substances that meet or exceed the reporting thresholds.
- Estimate use and release for **all** sources and processes in your facility.
 - This includes process such as heating by natural gas combustion, welding, equipment cleaning, drilling, grinding, crushing, sanding, and blending.
- Review the exemptions in the bylaw, such as building heating, and do not include these in your calculations.
- Compare current year estimates with that of previous years (if available) and explain any differences if present.
- If you report to NPRI and there is a difference between the amount of a substance reported to ChemTRAC and NPRI, explain the reason for the difference.
- You may need to make your records available for audit purposes. Securely store the records you based your report on and document:
 - Assumptions and parameters used for calculation and estimation of emissions
 - Procedures and methods used to measure emissions
 - Calibration records of any equipment used to measure emissions

Additional Material

Use and Release Calculations

- There are many sources of information that can help you identify the priority substances in your facility. Be sure to check all of them, including:

purchase records	year-end inventory	Material Safety Data Sheets (MSDS)
raw materials	Certificate of Approval or Environmental Compliance Approval	correspondence with supplier

- Use the best available method for use and release estimation. Use (if any) the most appropriate and most recent ChemTRAC calculator (available at toronto.ca/health/chemtrac/tools.htm).
- Enter all the reportable data in kilograms (kg).
- Calculate the **total** amount of a substance used and released in **all** processes.
 - For example, process 1 used 90 kg VOC and released 75 kg. Process 2 used 60 kg VOC and released 56 kg. The total amount of use would be $90+60=150$ kg and release $75+56=131$ kg.
 - To help with these calculations you can use the free online ChemTRAC totals calculator.
- Double check that **decimal places** are entered in the correct place (e.g. 3.47 vs. 347)
- Check that the **total release** amount (release to land+water+air) is equal to or less than **total use** amount (manufactured+processed+otherwise used).
- Use the **average value** for use and release estimation if the substance content is listed in a range (e.g. 10-12% VOCs) on Material Data Safety Sheets or on other sources of substance data.
- The following priority substances are VOCs. Be sure to report them separately **and also include** them in your VOC estimation:

Acetaldehyde	Acrolein	Benzene
1,3-butadiene	Carbon Tetrachloride	Chloroform
1,4-Dichlorobenzene	1,2-Dichloroethane	Formaldehyde
Trichloroethylene	Vinyl chloride	Polycyclic Aromatic Hydrocarbons (PAHs)

Additional Material

- Consider the effects of pollution control devices (e.g. filter) in the emission calculations.
- Consider the amount of waste transferred off-site (if any) in emission calculations.

Disclaimer: This checklist is for information only. The City of Toronto assumes no liability for accuracy or completeness. Readers are responsible for ensuring compliance with Toronto's Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423). This information should not be relied upon as a substitute for legal or professional advice. Readers should seek their own legal or professional advice in regard to their use of the information contained in it.