

Guide to calculations for ChemTRAC reporting:

Wood container and pallet manufacturing

Version 1.0

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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 Wood container and pallet manufacturing, and report to ChemTRAC, if needed.

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

The Appendices provide additional information about emissions calculations.

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

Introduction to the ChemTRAC program.....	1
The Wood Container and Pallet Manufacturing sector.....	2
Identifying ChemTRAC substances.....	3
Calculating emissions.....	4
Worksheets for collecting information.....	5
Using the calculator.....	7
Interpreting results.....	12
Reporting to ChemTRAC.....	13

Part 2: Reducing your facility's environmental impact

Pollution prevention strategies.....	19
Control technologies for reducing emissions.....	20
More ways to reduce costs and improve performance.....	21
Getting started with pollution prevention.....	22

Additional Material

Appendix A. Printer-friendly worksheets.....	24
Appendix B. Additional material related to the ChemTRAC calculator.....	24
Appendix C. Combining the Wood Container and Pallet calculator with other sources.....	29
Appendix D. Reporter Checklist.....	32

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 4 on page 31.

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. Wood container and pallet manufacturers are covered by this bylaw.

This guide is designed to help you and other wood container and pallet manufacturer facility owners:

- understand if your facility uses and releases any ChemTRAC priority substances
- use ChemTRAC calculators 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/>

The Wood Container and Pallet Manufacturing sector

The North American Industrial Classification System (NAICS) code 321920 includes all establishments that manufacture wood containers, container parts (shook) ready for assembly, cooper's products and parts, and pallets. It includes facilities that manufacture barrels, baskets, buckets, containers, crates, fruit containers, shipping cases, skids and veneer.

Wood container and pallet manufacturers are required to report their data every year if they use or release any of the 25 substances above the reporting threshold. The report is due by June 30 each year. Annual data that is reported each June should cover the period from January 1 to December 31 of the previous year.

Identifying ChemTRAC substances in wood container and pallet manufacturers

Table 1 lists the typical processes used in a wood container and pallet manufacturing facility. Most facilities will use sawing and sanding as part of manufacturing.

Table 1 also shows the ChemTRAC priority substance that is released in a typical wood container and pallet manufacturing facility: Particulate Matter 2.5 (PM_{2.5}).

The ChemTRAC calculator can help you estimate the level of this substance in your business.

Table 1. ChemTRAC substances released from processes in a typical wood container and pallet manufacturer

ChemTRAC priority substances	Processes used in manufacturing	
	Sawing	Sanding
Particulate matter (PM _{2.5})	X	X

Particulate Matter 2.5 (PM_{2.5}). The term “particulate matter” describes solid and liquid particles found in the air we breathe. Particulate matter that is smaller than 0.0025 millimetres in diameter is called PM_{2.5} and may not be visible to the naked eye. In a wood container and pallet manufacturer, PM_{2.5} is released into the air during the sawing and sanding of wood and other materials.

The health effects of PM_{2.5}

PM_{2.5}. Because of their small size, PM_{2.5} can lodge deeply into the lungs. Numerous studies have linked PM to aggravated cardiac and respiratory diseases such as asthma, bronchitis and emphysema, and to heart disease.

For more information on the health effects of these substances, as well as other ChemTRAC priority substances, visit <http://www.toronto.ca/health/chemtrac/substances.htm>.

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.

Appendix B describes how the calculators calculate estimates of the quantities of ChemTRAC priority substances that are released from your facility.

The release of ChemTRAC priority substances can be calculated using methods other than the ChemTRAC calculators. For a list of alternative methods, see <http://www.toronto.ca/health/chemtrac/tools.htm>.

In the next section, we will work through worksheets to prepare you to use the ChemTRAC calculator for Wood container and pallet Manufacturing.

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 Wood container and pallet Manufacturing. One worksheet is provided:

- Sawing and sanding.

A printer-friendly version of the worksheet can be found as Appendix A. It 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 Wood container and pallet Manufacturing, you may need to use additional calculators to identify other emissions. You would then add these amounts to the numbers generated by the ChemTRAC calculator for Wood container and pallet Manufacturing. You can use ChemTRAC's "Calculation of Totals" calculator to combine the findings of multiple calculators and determine if you exceed ChemTRAC thresholds. See Appendix C for more details.

Worksheet 1 – Dust collectors (for sawing and sanding)

Skip this worksheet if no dust collectors, baghouses, fabric filters or cyclones are in operation at your facility.

This worksheet will help you collect information on any dust collectors at your facility that help control the sawdust from sawing and sanding. The term “dust collectors” also refers to baghouses, fabric filters and cyclones associated with sanding and sawing. You should collect data on your facility for the period from January 1 to December 31 of a calendar year.

1. If dust collectors are in operation at your facility, what are the details of their use?

Information is needed on the airflow rate of the dust collector. Airflow is the speed at which the dust collector takes in air. You can find the airflow rate in the dust collector’s operating manual. You can collect this information in:

- Cubic feet per minute (cfm)
- Cubic metres per second (m³/s)
- Cubic metres per hour (m³/h)
- Litres per minute (L/m) OR
- Litres per second (L/s).

You can then use the conversion tool in the ChemTRAC calculator to enter the airflow rate in cubic feet per minute (cfm).

You will specify the process associated with the dust collector.

You will also need to estimate the amount of time that the dust collectors are removing dust from the air. This information can be put into [Worksheet 1 Table 1](#) below.

Information on a typical dust collector has been filled out as an example. If multiple dust collectors are found in the facility, you should enter them separately (in different rows of the table).

[Worksheet 1 Table 1 – Dust collectors](#)

Air flow rate	Airflow rate units	Process	How often are dust collectors operating?		
			Hours per day	Days per week	Weeks per year
<i>example:</i> <u>2,000</u>	<input type="checkbox"/> cfm <input type="checkbox"/> m ³ /s <input type="checkbox"/> L/m <input type="checkbox"/> L/s <input type="checkbox"/> m ³ /h	<u>Sanding</u>	<u>8</u>	<u>5</u>	<u>50</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Using the calculator

This section of the guide provides a step-by-step walkthrough of the main two screens of the calculator. The calculator can be used properly by entering the information from the worksheets found in the previous section of this guide into the appropriate sections of the calculator. The ChemTRAC calculator will then automatically calculate the quantities of ChemTRAC substances released from processes found in your wood container and pallet manufacturing facility.

Getting started

The ChemTRAC calculator for wood container and pallet manufacturers 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 *Wood Container and Pallet Manufacturers* link found under the *Manufacturing (NAICS 32 and 33)* heading.

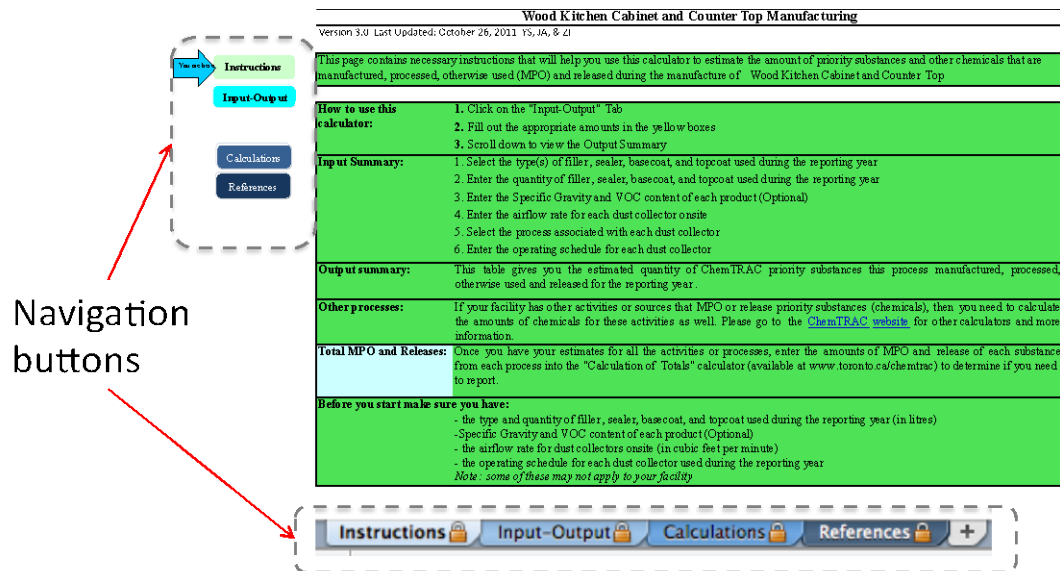
The calculator consists of four different screens:

- Instructions
- Input-Output
- Calculations
- References

You only have to enter information into the Input-Output screen. The Instructions screen illustrated below can help you use the calculator. The other two screens (Calculations, References) are provided mainly for reference and are discussed in Appendix B. You do not need to enter information in these screens.¹

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

¹ If you have site-specific emission factors for any ChemTRAC substance, they can be entered manually in the Calculator screen. See Appendix B for details.



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 ChemTRAC substances and other substances that are used and released by your wood container and pallet manufacturer. It also provides a brief overview of the contents of the calculator. **You do not need to enter any information on this screen.**

The Input-Output screen

The Input-Output screen is the screen where you will enter all of the information applicable to your facility. Information is typed in **yellow and orange boxes** only. Any cells that do not apply to your facility can be left blank. **Dropdown menus** are also used to input some information.

The Input-Output screen can be filled out using the responses to the questions found within **Worksheet 1** of this guide. The input-output screen includes examples that do not enter into your facility's calculation.

Once you input your facility's information into the appropriate yellow boxes and dropdown menus, the calculator automatically calculates the quantities of ChemTRAC substances that are manufactured, processed, otherwise used and released to air from your facility.² The values are displayed in the **Output table** found at the bottom of the Input-Output screen. The next pages will walk you through the Input-Output screen and Output table. The image on the next page illustrates the different areas of the input-output screen.

² 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

INPUT

For dust collectors, baghouses, fabric filters, or cyclones onsite associated with sanding and sawing, please indicate the following:

Flow rate (cfm)	Process	Operating schedule		
		Hours/Day	Days/Week	Weeks/Year
<i>Example</i> 2000	Sanding	8	5	50
	Select			
	Select			
	Select			
	Select			
	Select			
	Select			
	Select			
	Select			
	Select			

Enter data from Worksheet 1 here

Unit Conversion Table

1	cubic metres per second	=	2118.88	cfm
1	litres per minute	=	0.035315	cfm
1	litres per second	=	2.11888	cfm
1	cubic metres per hour	=	0.588578	cfm

Use this box to convert flow rate to cfm

OUTPUT (ChemTRAC Priority Substances only)

ChemTRAC Priority Substances	Quantity (kg/yr)			
	Manufactured ¹	Processed ¹	Otherwise Used ¹	Released to Air ¹
Particulate Matter 2.5 (PM2.5)	0.0	0.0	0.0	0.0

n/a - not applicable
¹ Definitions available in the References

The output values are calculated here

Entering information from Worksheet 1: Dust collectors

The image on the next page displays the area of the Input-Output screen where you enter information from Worksheet 1 on dust collectors. As an example, the sample information from Worksheet 1 is entered into the appropriate areas of the screen.

Worksheet 1, Question 1: The **flow rate** of “**2,000**” **cfm** is entered into the yellow box. Then, the **process** of “**sanding**” is selected from the dropdown menu. Finally, an operating schedule of **8** hours per day, **5** days per week, **50** weeks per year is entered in the appropriate boxes:

For dust collectors, baghouses, fabric filters, or cyclones onsite associated with sanding and sawing, please indicate the following				
Flow rate (cfm)	Process	Operating Schedule		
		Hours/Day	Days/Week	Weeks/Year
<i>Example</i>				
2,000	Sanding	8	5	50
2,000	Sanding	8	5	50
	Select			

If your flow rate is in units *other than cfm*, you will need to use the cfm conversion box at the bottom right hand side of the input-output screen:

1	cubic metres per second	=	2118.88 cfm
1	litres per minute	=	0.0353147 cfm
1	litres per second	=	2.11888 cfm
1	cubic metres per hour	=	0.5885778 cfm

This cfm conversion box allows you to convert flow rates into cfm (cubic feet per metre). Enter the flow rate in cubic metres per second (cms), litres per minute, litres per second or litres per hour in the appropriate yellow box. The tool will automatically calculate the flow rate in cfm in the blue column at the right of the table. Enter the flow rate in cfm into the main input table.

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

Reading the Output table

The Output table displays the quantities of ChemTRAC substances that are manufactured, processed, released, or otherwise used in your facility. These values are the results of all of the calculations based on the information you entered about your facility.

You should compare the values that are manufactured, processed or otherwise used to the ChemTRAC reporting thresholds to see if you are required to report ChemTRAC substances. See Interpreting Results on page 12 for more details.

OUTPUT (ChemTRAC Priority Substances only)				
ChemTRAC Priority Substances	Quantity (kg/yr)			
	Manufactured ¹	Processed ¹	Otherwise Used ¹	Released to Air ¹
Particulate Matter 2.5 (PM2.5)	120.3	0.0	0.0	120.3

Interpreting results

Compare results to thresholds. Once the amounts of ChemTRAC substances manufactured, processed, otherwise used have been calculated, you must compare these amounts to the ChemTRAC reporting thresholds listed in the Environmental Reporting and Disclosure Bylaw.³ These thresholds are also listed in Appendix C of this guide.

If results exceed thresholds you must report. If a ChemTRAC priority substance is manufactured, processed, or otherwise used in an amount equal to or greater than its ChemTRAC reporting threshold, then you would need to report that substance and the quantity released to air.

Combining multiple calculation methods. Some facilities may need to add results of the ChemTRAC calculator for Wood Container and Pallet Manufacturing with emissions from other processes that happen in the facility. This is discussed in Appendix C.

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. See an example in Table 2.

Table 2 compares the Output table from the section above to ChemTRAC thresholds. This example uses the values from Worksheet 1.

Table 2. Comparison of output from the ChemTRAC calculator and reporting thresholds

Output Summary table from the ChemTRAC calculator					Comparison to thresholds	
ChemTRAC Priority Substances	Manufactured (kg/yr)	Processed (kg/yr)	Otherwise used (kg/yr)	Released to Air (kg/yr)	ChemTRAC reporting threshold (kg/yr)	Is reporting required?
Particulate Matter (PM _{2.5})	120	0.0	0.0	120	30	YES

In the Table 2 example, PM_{2.5} is manufactured, processed, or otherwise used in quantities above the reporting thresholds.

Therefore, in this example, the manufacturing and release to air of PM_{2.5} would need to be reported to ChemTRAC.

³ The full by-law can be found at <http://www.toronto.ca/health/chemtrac/report.htm>.

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).

The screenshot shows the Toronto City website's navigation menu with options like 'LIVING IN TORONTO', 'DOING BUSINESS', 'VISITING TORONTO', and 'ACCESSING CITY HALL'. The main content area is titled 'ChemTRAC - 4 Steps to Reporting' and includes a sub-header 'Reporting to the Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423)'. A prominent link 'Ready to report? ChemTRAC Online Reporting System' is highlighted with a red box. A callout box with an arrow points to this link, containing the text 'Click here to access the system'. Below the link, there is explanatory text about the reporting responsibility and a four-step process flowchart.

Step 1	Step 2	Step 3	Step 4
Determine if the Bylaw applies to	Determine if you need to report in a	Prepare your data for reporting	Submit your data online by June 30th

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

ChemTRAC
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 416-338-7600.

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

First Time Signing In?

Register with First Time Access Code

Already Registered?

Registration ID:

If you have lost or forgotten your Registration ID, please contact us at (416) 338-7600

Sign In

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.

Toronto

ChemTRAC

You are in a secure site.

Step 1 Facility Registration

Step 2 Reporting Period

Step 3 Chemical Selection

Step 4 Use & Release (0 of 0)

Step 5 Environmental Statement

Step 6 Summary Notification

Step 7 Confirmation & Print

15min 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. For wood container and pallet manufacturers,

this will be “32 – Manufacturing”. Then, you can select the appropriate 4-digit code (3219), and finally, the 6 digit code (321920).

NAICS 2-Digit:	32 – Manufacturing
NAICS 4-Digit:	3219 – Other Wood Product Mfg.
NAICS 6-Digit:	321920 – Wood Container & Pallet Mfg.

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. The example below builds off of Table 2 in this guide. Recall that Particulate Matter 2.5 was the only substance that exceeded thresholds.

<input type="checkbox"/>	11104-93-1	Nitrogen Oxides (NO _x)
<input checked="" type="checkbox"/>		Particulate Matter 2.5 (PM 2.5)
<input 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. You will begin by determining whether a substance was used or released, and from where / to where.

For commercial wood container and pallet manufacturers, PM_{2.5} are “manufactured” and “released to air”.

You will then 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.

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

Select “ChemTRAC calculator” if you have used the ChemTRAC calculator.

The example below illustrates how to complete Step 4 for Particulate Matter 2.5 using information from Table 2 of this guide.

Particulate Matter 2.5 (PM 2.5) (Reporting Threshold = 30.0 kg)	
Quantity (kg)	Estimation Method
If you used more than one method to estimate data, please choose the main one	
Manufactured: ⓘ 120	ChemTRAC calculator
Processed: ⓘ	- Select Estimation Method From List -
Otherwise Used: ⓘ	- Select Estimation Method From List -
Total Use: 120	
Release to Air: ⓘ 120	ChemTRAC calculator
Release to Land: ⓘ	- Select Estimation Method From List -
Release to Surface Water: ⓘ	- Select Estimation Method From List -
Total Release: 120	

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 the Pollution prevention strategies section on page 19 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 your facility's environmental impact

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, processes or otherwise used 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 specific to wood container and pallet manufacturers 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: Regularly maintain equipment to improve operation and extend equipment life. Empty / change dust collectors and filters regularly.

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 wet scrubbers, mechanical collectors or fabric filters that capture more particulate matter from sawing and sanding.

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

For example: Use less harmful cleaning products such as water-based biodegradable cleaners. Though not discussed in the guide, solvent-based cleaners emit VOCs.

Control technologies for reducing emissions

Control technologies can reduce the quantity of ChemTRAC substances that are released from commercial wood container and pallet manufacturers. Control technologies can limit emissions from sawing and sanding.

Technology for reducing PM_{2.5} from sawing and sanding

Recall that particulate matter (PM_{2.5}) in the form of sawdust is released into the air during sawing and sanding.

Dust collection systems. Effective dust collection systems can reduce the amount of PM_{2.5} that is released from sawing and sanding. Fabric filters, bag houses and cyclones are examples of dust collection systems. These systems take in air with a high abundance of PM_{2.5}, collect much of the PM_{2.5} within filters or bags, and release the air with a reduced amount of PM_{2.5}. When purchasing a dust collection system, consider what capacity you need. The unit should have

An effective dust collection system can have other economic benefits:

- Sanding belts and other equipment may also last longer as dust will not become embedded in them.
- There may be a market for clean sawdust captured by dust collectors (e.g. for animal bedding or as raw material for particle board manufacturing).

More ways to reduce costs and improve performance

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

1. **Reduce energy use.** By reducing energy use, wood container and pallet manufacturers 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
- Assigning one person to review and track energy usage and to investigate opportunities for energy savings.

2. **Reduce water use.** Working to reduce water use can save money and provide environmental benefits.

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

- Minimizing water use in cleaning procedures
- Posting signs near sinks and hoses to encourage employees to use less water
- Purchasing high pressure, low volume cleaning equipment
- Purchasing water-saving plumbing fixtures
- Regularly checking water-supply equipment for leaks.

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 the 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** and **training workshops** to assist businesses in creating 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>.

Additional resources on reducing the environmental impact of commercial wood container and pallet manufacturers include:

- Missouri Department of Natural Resources. June 2005. Preventing Pollution in Wood Furniture Manufacturing. <http://dnr.mo.gov/pubs/pub1183.pdf>
- Oklahoma Department of Environmental Quality. Pollution Prevention & Waste Reduction for Wood Furniture Manufactures. <http://www.deq.state.ok.us/factsheets/customer/woodmanf.pdf>
- Small Business Environmental Homepage. October 2004. Environmental Best Management Practices – Furniture Finishing. http://www.smallbiz-enviroweb.org/Industry/bmpfiles/BMP_FurnitureFinishing-3.pdf
- Toronto Public Health, ChemTRAC. December 2010. Resource for Greening Upholstered Household Furniture Manufacturing: Pollution Prevention Information. <http://www.toronto.ca/health/chemtrac/pdf/GreenUpholsteredFurniture.pdf>
- US EPA. 2003. Profile of the Wood Furniture and Fixtures Industry, Chapter V – Pollution Prevention Opportunities. <http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/wood.html>

Appendices

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

Appendix A. Printer-friendly versions of the worksheets.

Appendix B. Additional material related to the ChemTRAC calculator.

- *Descriptions of the remaining calculator screen*
- *How the calculator uses emission factors to calculate quantities of ChemTRAC substances*
- *How emission factors can be changed to site-specific values.*

Appendix C. Combining the ChemTRAC calculator with other sources:

How to combine the ChemTRAC calculator for Commercial Wood container and pallet manufacturers with emissions data from other sources.

Appendix A. Printer-friendly worksheets

These worksheets can be printed and completed by hand so that all information can be readily available for entry into the ChemTRAC calculator.

Worksheet 1 – Dust collectors (for sawing and sanding)

Skip this worksheet if no dust collectors, baghouses, fabric filters or cyclones are in operation at your facility.

- If dust collectors are in operation at your facility, what are the details of their use?**

Air flow rate	Airflow rate units	Process	How often are dust collectors operating?		
			Hours per day	Days per week	Weeks per year
<i>example:</i> <u>2,000</u>	<i>x cfm</i> <input type="checkbox"/> m^3/s <input type="checkbox"/> L/m <input type="checkbox"/> L/s <input type="checkbox"/> m^3/h	<u>Sanding</u>	<u>8</u>	<u>5</u>	<u>50</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Appendix B. Additional material related to the ChemTRAC calculator

This appendix describes the remaining screens of the ChemTRAC calculator. You do not need to enter any information into these screens.

This appendix also describes emission factors and how the ChemTRAC calculator makes use of them.

The ChemTRAC calculator Calculations screen

The Calculations screen lists your facility’s emissions of substances other than ChemTRAC priority substances. Under “Other Substances”, commercial wood container and pallet manufacturers can see their emissions of all particulate matter (PM) and of larger particulate matter (PM10).

The Calculations screen also includes the formulas and assumptions to calculate emissions based on the information provided in the Input-Output screen. You do not need to enter any information on this screen.

While you do not need to enter any information on this screen, some variables can be modified if site-specific information is available. For example, if you have site-specific data on the emissions factors of PM and PM_{2.5} from sanding and sawing in your facility, you can enter them in the table entitled “Dust Collectors”. Only emission factors should be modified. All other data, sample calculations and information in the Calculations screen should not be modified.

Instructions

Input-Output

Calculations

References

- This page provides detailed calculations based on the information provided in the Input table. It also provides sample calculations and an assessment of emission factor data quality.
- If you have site specific emission factors you may use them in the table below. If you choose to insert your own emission factor ensure that the units have been converted accordingly.

ChemTRAC Priority Substances	CAS #	Quantity (kg/yr)			
		Manufactured ^{1,3}	Processed ^{1,2}	Otherwise Used ^{1,2}	Released to Air ¹
PM2.5	n/a	120	0	0	120
Other Substances					
PM	n/a	136	0	0	136
PM10	n/a	125	0	0	125

n/a - not applicable

¹ Definitions available in the References tab

² No priority substances are expected to be processed or otherwise used during the operation of dust collectors

³ For all PM emissions (PM, PM10, PM2.5), it was assumed that the quantity manufactured is equal to the quantity released, and the mass reporting threshold (where appropriate) was compared against this number

Dust Collectors

Flow Rate (cfm)	Process	Operation (h/yr)	PM Emission Factor (mg/m ³)	PM Emission Rate (kg/yr)	PM10 Emission Rate (kg/yr) ⁽²⁾	PM2.5 Emission Rate (kg/yr) ⁽²⁾	Data Quality
2000	2	2000	20	135.92	125.0	120.3	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
0	1	0	20	0.00	0.0	0.0	C
Total				136	125	120	

Note (2) - PM conversion factors for sanding and sawing provided by South Coast Air Quality Management District

Additional Material

The ChemTRAC calculator References screen

The Reference screen describes the sourced of the assumptions used on the Calculations screen. Source documents can be viewed by clicking on the links. The Reference screen also provides the definitions for 'Manufactured', 'Processed', 'Otherwise Used', and 'Released to Air'. No information needs to be entered on this screen.

Note that this tool is provided solely as an aid, and the City of Toronto makes no representation or warranty as to its applicability to your facility or to your obligation to comply with the Environmental Reporting and Disclosure Bylaw (Municipal Code Chapter 423). It is the responsibility of each facility owner or operator to take the necessary steps to ensure compliance with the bylaw.



References

Version 3.0 Last Updated: Oct 21, 2011 JA, YS & ZI

Instructions

Input-Output

Calculations

References

This page provides all the reference information for the emission factors and assumptions used in the Calculations spreadsheet. Click on the links below to view the source documents.

Dust Collector emission factors are provided in the Ontario Ministry of the Environment publication "Procedure for Preparing and ESDM Report" PIBS #3614e03, March 2009

<http://www.ene.gov.on.ca/envision/gp/3614e03.pdf>

Particulate matter size fractions are estimated using South Coast Air Quality Management District "Final –Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds", 2006

http://www.aqmd.gov/ceqa/handbook/PM2_5/finalAppA.doc

Definitions¹

Manufacture - To produce, prepare or compound a priority substance and includes the coincidental production of a priority substance as a by-product.

Process - The preparation of a priority substance, after its manufacture, for commercial distribution and includes the preparation of a substance in the same physical state or chemical form as that received by the facility, or preparation which produces a change in physical state or chemical form.

Otherwise Use - Any use, disposal or release of a priority substance at a facility that does not fall under the definitions of "manufacture" or "process." This includes the use of the priority substance as a chemical processing aid, manufacturing aid or some other use.

Release - The emission or discharge of a priority substance, whether intentional, accidental or coincidental, from a facility into the environment.

¹For details refer to the Environmental Reporting and Disclosure Bylaw available at the [ChemTRAC website](#)

Additional Material

Emission factors for commercial wood container and pallet manufacturers

The ChemTRAC calculators are based on published estimates of the emissions associated with different industrial processes. These estimates are called “emission factors”. Emission factors indicate the amount of a specific substance (e.g. particulate matter 2.5) emitted by a specific activity (e.g. collecting a cubic metre of air from sanding).

Table 3 presents the emission factor estimates used in the wood container and pallet manufacturing calculator. Note that sawing and sanding emit the same total quantity of particulate matter per cubic metre of air, but that they emit different quantities of PM_{2.5}. For sanding, an estimated 88.5% of PM emissions are PM_{2.5}. For sawing, most of the PM emissions are larger, so only 28.3% of PM emissions are PM_{2.5}.

If site-specific emission factors are available for the facility or processes, they can be entered in the Calculations sheet of the calculator.

Table 3. Emission factors for PM_{2.5}

Source	Substance	Emission Factor
Dust collectors – sanding	All particulate matter (PM)	20 mg/m ³
	% PM _{2.5}	88.5%
	Particulate matter 2.5 (PM _{2.5})	17.7 mg/m³
Dust collectors – sawing	All particulate matter (PM)	20 mg/m ³
	% PM _{2.5}	28.3%
	Particulate matter 2.5 (PM _{2.5})	5.66 mg/m³

The box below illustrates how to calculate PM_{2.5} emissions from the sample dust collector in Worksheet 1.

Example: Using emission factors to estimate PM_{2.5} emissions from sanding

In Part 1, we use a sample dust collector with an airflow rate of 2000 cubic feet per minute (cfm). This amounts to an airflow rate of 0.914 cubic metres per second (cms).

The dust collector is in operation 8 hours per day, 5 days per week, 50 weeks per year. This amounts to 7,200,000 seconds of operation per year.

The emissions factor for sanding of 17.7 mg per m³ amounts to 0.0177 kg per m³.

Total emissions of PM_{2.5} for 2011 from sanding

$$= \text{Flow (m}^3 \text{ per second)} * \text{Seconds of operation} * \text{Emissions factor (kg per m}^3 \text{)}$$

$$= \mathbf{0.914 \text{ m}^3 \text{ per second} * 7,200,000 \text{ seconds per year} * 0.0177 \text{ kg per m}^3}$$

$$= \mathbf{120.3 \text{ kg of PM}_{2.5}}$$

Appendix C. Combining the wood container and pallet manufacturing calculator with other sources

Depending on your business, you may need to use more than one calculator to calculate the use and release from all processes at your facility. The "Calculation of Totals" calculator can be used to compile your data.⁴ 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 for the facility, by substance, and then compares it to the corresponding reporting threshold.

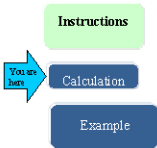
⁴ The Calculation of Totals calculator can be found under the Totals bullet at <http://www.toronto.ca/health/chemtrac/tools.htm>.

Additional Material



Calculation of Totals

Last Update: October 21, 2011 by YS, JA, & ZI



- 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" columns, 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 Examples 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.

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

Group	Substance	Quantity				Quantity				Total Reported	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)		
		Process#1:				Process#2:												
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 (non-hexavalent) ¹									0	100	No	---	---	---	---		
	1,2-Dibromoethane (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 ¹									0	10	No	---	---	---	---		
	Nickel ¹									0	100	No	---	---	---	---		
	Tetrachloroethylene (Perchloroethylene)									0	100	No	---	---	---	---		
Trichloroethylene*									0	100	No	---	---	---	---			
Vinyl chloride									0	100	No	---	---	---	---			
Cadmium ¹									0	1	No	---	---	---	---			
Chromium (hexavalent) ¹									0	10	No	---	---	---	---			
Lead ¹									0	10	No	---	---	---	---			
Mercury ¹									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) ²									0	100	No	---	---	---	---		

Enter values from the Output Summary table of your first calculator here

Enter values from the Output Summary table of your second calculator here

Etc...

Additional Material

The total combined release of substances (whether from the ChemTRAC Wood container and pallet Manufacturing 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 4 below.

Table 4. 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
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
Nitrogen Oxides (NO _x)	200	N/A
Particulate Matter 2.5 (PM _{2.5})	30	N/A
Polycyclic Aromatic Hydrocarbons (PAHs)	10	N/A ^b
Tetrachloroethylene (Perchloroethylene)	100	1
Trichloroethylene	100	1
Vinyl chloride	100	1
Volatile Organic Compounds (VOCs) total	100	N/A

Notes:

- a. N/A = not applicable
- b. The concentration threshold % w/w is not relevant to the emissions quantified using the ChemTRAC calculator for Commercial Wood container and pallet manufacturers

Appendix D. 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.