

# **Guide to calculations for ChemTRAC reporting: Cookie and Cracker Manufacturing**

**Version 1.1**

**February 2013**

---

# Contents

## How do I use this guide?

**Part 1 of this guide will help you understand the ChemTRAC program, collect facility information, use the ChemTRAC calculator for Cookie and Cracker Manufacturing facilities, 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 emission calculation information.**

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

Introduction to the ChemTRAC program .....	1
The Cookie and Cracker Manufacturing sector .....	2
Identifying ChemTRAC substances .....	3
Calculating emissions .....	5
Worksheets for collecting information.....	6
Using the calculator .....	10
Interpreting results .....	15
Reporting to ChemTRAC .....	17

### **Part 2: Reducing your facility's environmental impact**

Pollution prevention strategies .....	24
Control technologies for reducing emissions .....	26
More ways to reduce costs and improve performance .....	28
Getting started with pollution prevention .....	29

### **Additional Material**

Appendix A. Printer-friendly worksheets .....	31
Appendix B. Additional material related to the ChemTRAC calculator .....	32
Appendix C. Combining the calculator with other sources .....	36
Appendix D. Reporting Checklist .....	40

*City of Toronto, 2012*

*For more information about ChemTRAC, call 3-1-1 or visit [www.toronto.ca/chemtrac](http://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 38 of this guide.

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. Cookie and cracker manufacturing facilities are covered by this bylaw. **Facilities primarily engaged in retailing to the general public are exempt from reporting to the ChemTRAC program.**

This guide is designed to help you and other cookie and cracker manufacturing 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 Cookie and Cracker Manufacturing sector

The North American Industrial Classification System (NAICS) code 311821 includes establishments primarily engaged in manufacturing cookies, crackers, biscuits and similar products, such as graham wafers and ice cream cones. Establishments primarily engaged in manufacturing flour mixes, dry/fresh pasta and dough are excluded. **Facilities that prepare products for immediate retail sale are exempt from ChemTRAC reporting.**

This guide uses the term “cookie and cracker manufacturing facilities” to refer to all facilities within the Cookie and Cracker Manufacturing Sector.

Cookie and cracker manufacturing facilities are required to report their data every year if they use or release 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 Cookie and Cracker Manufacturing facilities

ChemTRAC priority substances are released from a typical cookie and cracker manufacturing facility only as dry ingredient dust released during the preparation of dried goods and as by-products from the combustion of natural gas in the burners used for baking. Three ChemTRAC priority substances are released in these two processes. They are:

- Particulate Matter 2.5 (PM<sub>2.5</sub>)
- Volatile Organic Compounds (VOCs)
- Combustion by-products from natural gas burners.

**Particulate Matter 2.5 (PM<sub>2.5</sub>).** 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<sub>2.5</sub> and may not be visible to the naked eye. In a cookie and cracker manufacturing facility, PM<sub>2.5</sub> is released into the air during the storage and mixing of dry ingredients such as flour, sugar, salt or other powder.

**Volatile Organic Substances (VOCs).** VOCs are a group of organic chemicals that easily evaporate into the air. You can often smell them. They are created as a by-product of various activities and are released in small quantities when natural gas is burned.

**Combustion by-products from natural gas burners.** Several substances are released when natural gas is burned (i.e. combusted) to heat the baking oven. When natural gas is combusted to generate heat, it releases ChemTRAC priority substances.

Table 1 lists the ChemTRAC substances that a typical cookie and cracker manufacturing facility would release. The ChemTRAC calculator can help you estimate the levels of these substances in your facility.

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

**Table 1. ChemTRAC substances released in a typical cookie and cracker manufacturing facility, and their source of release**

ChemTRAC priority substances	Cookie and cracker manufacturing steps	
	Dry ingredient storage and mixing <i>PM<sub>2.5</sub> is released into the air from flour, sugar, salt or powders</i>	Use of natural gas for baking ovens/burners <i>Substances are released in small quantities as combustion by-products</i>
Benzene		X
Cadmium and its compounds		X
Chromium and its compounds		X
Formaldehyde		X
Lead and its compounds		X
Manganese and its compounds		X
Mercury and its compounds		X
Nickel and its compounds		X
Nitrogen Oxides		X
PM <sub>2.5</sub>	X	X
PAHs		X
VOCs		X

Most of the substances listed in Table 1 are released in very small amounts. It is likely that only **PM<sub>2.5</sub>**, **VOCs** and **NO<sub>x</sub>** would be released in amounts that could appear as non-zero in the ChemTRAC calculator for cookie and cracker manufacturing.

### The health effects of PM<sub>2.5</sub>, VOCs and NO<sub>x</sub>

**PM<sub>2.5</sub>.** Because of their small size, PM<sub>2.5</sub> 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.

**VOCs.** 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.

**NO<sub>x</sub>.** Long-term exposure to NO<sub>x</sub> causes or worsens respiratory disease such as emphysema and bronchitis, and can aggravate existing 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. See <http://www.toronto.ca/health/chemtrac/tools.htm> for a list of alternative methods.

In the next section, we will work through worksheets that can help you use the ChemTRAC calculator for Cookie and Cracker Manufacturing.

## Worksheets for collecting information

The two worksheets found on the following pages are intended to help you collect all the information on natural gas fired equipment and dust collectors at your facility that you will need in order to use the ChemTRAC calculator for Cookie and Cracker Manufacturing.

Note: if your facility has sources of ChemTRAC priority substances other than the combustion of natural gas and the release of dry ingredient dust as part of the preparation of baked goods, 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 Cookie and Cracker 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.

Printer friendly versions of the two worksheets can be found as Appendix A.



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

### *Worksheet 1: Natural gas fired equipment used for baking*

This worksheet will help you collect information on the quantity of natural gas used for your facility's baking processes and on any control technologies that your facility might use. By filling out [Worksheet Table 1](#) and [Worksheet Table 2](#) on the next page, you will have all the information you need to complete the natural gas usage portion of the ChemTRAC calculator. You should collect data on your facility for the period from January 1 to December 31 of a calendar year. The worksheet tables can be filled in with answers to the two questions below:

**1. What control technologies are installed on your natural gas baking equipment?**

You can find this information in the operating manuals for the heating equipment that your facility uses for baking. Descriptions of control technologies can be found in the Control technologies for reducing emissions section on page 26 of this guide. If you do not know which control technologies are in place, assume that none are. Use this information to fill out [Worksheet Table 1](#) on the next page.

**2. How much natural gas is used for baking?**

This question can be answered using EITHER Option 2A or Option 2B. Use the Option that you have selected to complete [Worksheet Table 2](#) on the next page.

**Option 2A – What is the total amount of natural gas used for baking?**

You can get this information from your annual gas bills. Note that the gas bills might include gas used for other purposes, such as heating the facility itself. You should consider only gas used for baking. One way to know how much gas is used for baking is to compare winter and summer bills. Winter bills will likely include facility heating as well as heating used for baking. Summer months will likely include only heating used for baking.

**OR**

**Option 2B – What is the thermal rating of your baking equipment?** This rating (in BTU/hr) would be found in your heating equipment operating manual. You will also need to estimate the average number of hours per day, days per week, and weeks per year that your facility bakes manufactured goods.

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

### Worksheet Table 1 – Control technologies information

<b>Baking ovens are equipped with (add a checkmark):</b>		
a.	Low NO <sub>x</sub> burners only	_____
b.	Low NO <sub>x</sub> burners with recirculated flue gas	_____
c.	No control technologies	_____

### Worksheet Table 2 – Natural gas usage

<b>Option 2A. Total natural gas used for the baking ovens</b>
Add values in cubic metres <b>OR</b> cubic feet: _____ m <sup>3</sup> (cubic metres) or _____ ft <sup>3</sup> (cubic feet)

**OR**

<b>Option 2B. Thermal rating of the baking ovens</b>
Record value in British Thermal Units per hour _____ BTU/hr
Also estimate the average time that the baking ovens are turned on and heating: _____ hours per day and _____ days per week and _____ weeks per year

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

*Worksheet 2: Dust collectors (for ingredient mixing)*

**Skip this worksheet if no dust collectors are in operation at your facility.**

Dust collectors at your facility help control the amounts of flour, sugar, salt or other dry ingredients released into the air as dust during the mixing of dry ingredients. By completing [Worksheet Table 3](#), you will have all the information that you need to complete the dust collector section of the ChemTRAC calculator for Cookie and Cracker Manufacturing. You should collect data on your facility for the period from January 1 to December 31 of a calendar year.

**3. Are dust collectors in operation at your facility, and if so, what are the details of their use?**

Information is needed on the airflow rate of the dust collector and its hours of operation. 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. When recording the airflow rate, be sure to record the units (cubic feet per minute, cubic metres per hour, etc.). The calculator requires that airflow rates be entered in cubic feet per minute (cfm). However, a unit converter within the calculator can help you convert your units to cfm. See The Input-Output screen section of this guide for details.

If multiple dust collectors are found in the facility, you must enter them as separate entries. You will also need to estimate the amount of time that the dust collectors are removing dry ingredient dust from the air.

Information on a typical dust collector has been filled out as an example.

[Worksheet Table 3 – Dust collector usage](#)

Dust collector identifier:	Air flow rate	Indicate the airflow rate units	For what amount of time are dust collectors operating?		
			Hours per day	Days per week	Weeks per year
<i>Example:</i> <u>Collector 1</u>	<u>1200</u>	<i>Cfm (cubic feet per minute)</i>	<u>12</u>	<u>6</u>	<u>50</u>
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
Etc.					

### 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 three worksheet tables 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 cookie and cracker manufacturing facility.

#### *Getting started*

The ChemTRAC calculator for Cookie and Cracker Manufacturing 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 "Cookie and Cracker" link found under the Food and Beverage Sector.

The calculator consists of five different screens:

- Instructions
- Input-Output
- All Substances
- Calculations
- References

You only have to enter information into the Input-Output screen. The All Substances, Calculations, and References screens are provided in the calculator mainly for reference. No information needs to be entered in these screens.<sup>1</sup> These additional screens are discussed in Appendix B.

---

<sup>1</sup> 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.

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

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:

**Cookie and Cracker Manufacturing**  
Last Updated: Oct 24, 2011 JA, YS & ZI

This page contains necessary instructions that will help you use this calculator to estimate the amount of priority substances and other chemicals that are manufactured, processed, otherwise used (MPO) and/or released during the production of cookies and crackers.

**How to use this calculator:**

1. Click on the "Input-Output" Tab
2. Fill out the appropriate amounts in the yellow boxes
3. Scroll down to view the Output Summary

**Input Summary:**

1. Identify if any emission control technology installed on the oven exhausts
2. Enter the quantity of natural gas purchased for process equipment

**OR**

Maximum thermal input (BTU/h) for all natural gas fired ovens and their operating schedule

3. Enter the airflow rate for process dust collectors (in cubic feet per minute)
4. Enter the operating schedule for process dust collectors

**Navigation buttons**

Instructions Input-Output All Substances Calculations References Process Flow +

### 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 cookie and cracker manufacturing facility. It also provides a brief overview of the contents of the calculator. **You do not need to enter any information on this screen.**

**Cookie and Cracker Manufacturing**  
Last Updated: Oct 24, 2011 JA, YS & ZI

This page contains necessary instructions that will help you use this calculator to estimate the amount of priority substances and other chemicals that are manufactured, processed, otherwise used (MPO) and/or released during the production of cookies and crackers.

**How to use this calculator:**

1. Click on the "Input-Output" Tab
2. Fill out the appropriate amounts in the yellow boxes
3. Scroll down to view the Output Summary

**Input Summary:**

1. Identify if any emission control technology installed on the oven exhausts
2. Enter the quantity of natural gas purchased for process equipment

**OR**

Maximum thermal input (BTU/h) for all natural gas fired ovens and their operating schedule

3. Enter the airflow rate for process dust collectors (in cubic feet per minute)
4. Enter the operating schedule for process dust collectors

**Output summary:** This table gives you the estimated quantity of ChemTRAC priority substances this activity manufactured, processed, otherwise used and/or released for the reporting year.

**Other processes:** If your facility has other activities or sources that MPO and/or release ChemTRAC priority substances (chemicals), you will need to calculate the chemical amounts contributed from these activities as well. Please go to the [ChemTRAC website](#) for other calculators and more information.

**Total MPO and Releases:** Once you have your estimates for all the activities or processes at your facility, enter the chemical amounts from each process into the "Calculation of Totals" calculator (available at [www.toronto.ca/chemtrac](http://www.toronto.ca/chemtrac)) to determine if you are required to report.

**Before you start make sure you have:**

- the quantity of natural gas consumed during the reporting year (in cubic metres)
- the total combined maximum thermal input for natural gas fired ovens (in BTU per hour)
- identify any emissions control equipment installed on natural gas fired equipment
- identify the air flow rate and operating schedule for each dust collector onsite

*Note: some of these may not apply to your facility*

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

### The Input-Output screen

The Input-Output screen is the screen where you will enter all information applicable to your cookie and cracker manufacturing facility. Information is typed in **yellow boxes** only. Any yellow cells that do not apply to your cookie and cracker manufacturing facility can be left as is. A **Dropdown menu** is also used to input the control efficiency of your natural gas heating equipment. The Input-Output screen can be filled out using the [Worksheet Table 1](#), [Worksheet Table 2](#) and [Worksheet Table 3](#) that you have filled out on in the Worksheets for collecting information section of this guide.

**Natural Gas Fired Ovens**

Identify emissions control installed:  ▼

Please complete **ONLY A or B**

**A) the quantity of natural gas**

Total quantity of natural gas used:  m<sup>3</sup>/yr

**OR**

**B) the thermal input and operating schedule**

all natural gas fired cooking equipment:  BTU/h

Operating schedule:

<input type="text"/>	hours/day
<input type="text"/>	days/week
<input type="text"/>	weeks/year

**Dust Collectors - enter the flow rate and operating schedule for each process dust collector**

Dust Collector ID	Flow Rate (cfm)	Operating Schedule		
		Hours/day	Days/week	Weeks/year
Ex. DC001	1000	8	5	50
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**OUTPUT SUMMARY (Only ChemTRAC priority substances)**

ChemTRAC Priority Substances	Quantity (kg/yr)			
	Manufacture	Processed <sup>1</sup>	Otherwise Used <sup>1</sup>	Air <sup>1</sup>
Nitrogen Oxides (NOx)	0.0	0.0	0.0	0.0
Particulate Matter (PM2.5)	0.0	0.0	0.0	0.0
Volatile Organic Compounds (VOCs)	0.0	0.0	0.0	0.0
Benzene	0.0	0.0	0.0	0.0
Formaldehyde	0.0	0.0	0.0	0.0
Total PAHs	0.0	0.0	0.0	0.0
Cadmium and its compounds	0.0	0.0	0.0	0.0
Chromium (non-hexavalent) and its compounds	0.0	0.0	0.0	0.0
Manganese and its compounds	0.0	0.0	0.0	0.0
Mercury and its compounds	0.0	0.0	0.0	0.0
Nickel and its compounds	0.0	0.0	0.0	0.0
Lead and its compounds	0.0	0.0	0.0	0.0

<sup>1</sup> Definitions available in references

Enter data from Worksheet 1 here

Unit Conversion Table		
1 cubic feet (ft <sup>3</sup> )	=	0.0283 m <sup>3</sup>
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

Enter data from Worksheet 2 here

The output values are calculated here

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

The figure below shows an example of information from [Worksheet Table 1](#) and [Worksheet Table 2](#) entered into the Input-Output screen. In this example, a user has indicated that the facility uses Low NO<sub>x</sub> Burners as control technologies on all heating equipment. The user has opted for Option 2B and has indicated that the maximum thermal input for all heating equipment is 100,000 BTU/hr. The facility operates for 12 hours per day, 5 days per week, and 50 weeks per year.

**Worksheet Table 1** Natural Gas Fired Ovens

Identify emissions control installed:

**Worksheet Table 2** Please complete **ONLY A or B**

**Option 2A** A) the quantity of natural gas

Total quantity of natural gas used:		m <sup>3</sup> /yr
-------------------------------------	--	--------------------

OR

**Option 2B** B) the thermal input and operating schedule

all natural gas fired cooking equipment:	1000000	BTU/h
Operating schedule:	12	hours/day
	5	days/week
	50	weeks/year

The figure below shows an example of information from [Worksheet Table 3](#) entered into the Input-Output screen. In this example, a user has indicated that the facility uses one dust collector (DC002), which has a flow rate of 1,200 cfm and operates 9 hours per day, 5 days per week and 50 weeks per year. Note that examples in grey boxes do not contribute to totals calculated by the ChemTRAC calculator.

Dust Collectors - enter the flow rate and operating schedule for each process dust collector				
Dust Collector ID	Flow Rate (cfm)	Operating Schedule		
		Hours/day	Days/week	Weeks/year
<i>Ex. DC001</i>	<i>1000</i>	<i>8</i>	<i>5</i>	<i>50</i>
DC002	1200	9	5	50

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

If you do not have a flowrate in cubic feet per minute (cfm), you can use the unit conversion box to the right of the Input-Output screen to convert units into cfm. In the example unit conversion box below, a user has entered a flowrate of 0.566 cubic metres per second, which is converted by the calculator into 1,200 cfm.

Unit Conversion Table			
1	cubic feet (ft <sup>3</sup> )	=	0.0283 m <sup>3</sup>
0.566	cubic metres per second	=	1200 cfm
1	litres per minute	=	0.035315 cfm
1	litres per second	=	2.11888 cfm
1	cubic metres per hour	=	0.588578 cfm

Once you have input the information from [Worksheet Table 1](#), [Worksheet Table 2](#) and [Worksheet Table 3](#), the Output Summary found at the bottom of the screen indicates the ChemTRAC substances in kilograms that are manufactured, processed, otherwise used and released to air from your facility.<sup>2</sup> You should compare these values to the ChemTRAC reporting thresholds to see if you are required to report ChemTRAC substances. See Interpreting Results on page 15 for more details.

Using our examples, a total of 42.7 kg of NO<sub>x</sub>, 7.3 kg of VOCs, and 0.1 kg of formaldehyde are manufactured and released to air per year. These substances are all created as combustion by-products from the natural gas used in baking ovens. A total of 10.1 kg of PM<sub>2.5</sub> are manufactured per year (from combustion by-products) and a total of 48.7 kg of PM<sub>2.5</sub> are released to air per year. The amount of PM<sub>2.5</sub> released to air is a combination of the 10.1 kg produced as combustion by-products and 38.6 kg released from the dust collectors as dry ingredient dust.

OUTPUT SUMMARY (Only ChemTRAC priority substances)				
ChemTRAC Priority Substances	Quantity (kg/yr)			
	Manufactured <sup>1</sup>	Processed <sup>1</sup>	Otherwise Used <sup>1</sup>	Released to Air <sup>1</sup>
Nitrogen Oxides (NO <sub>x</sub> )	42.7	0	0	42.7
Particulate Matter (PM <sub>2.5</sub> )	48.7	0	0	48.7
Volatile Organic Compounds (VOCs)	7.3	0	0	7.3
Benzene	0	0	0	0
Formaldehyde	0.1	0	0	0.1
Total PAHs	0	0	0	0
Cadmium and its compounds	0	0	0	0
Chromium (non-hexavalent) and its compounds	0	0	0	0
Manganese and its compounds	0	0	0	0
Mercury and its compounds	0	0	0	0
Nickel and its compounds	0	0	0	0
Lead and its compounds	0	0	0	0

<sup>1</sup> Definitions available in references

<sup>2</sup> The definitions for 'Manufactured', 'Processed', 'Otherwise Used', and 'Released to Air' can be found on the References screen of the ChemTRAC calculator.



## 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.<sup>3</sup> These thresholds are also listed in Appendix C of this guide.

**Combining multiple calculation methods.** Some facilities may need to add results of the ChemTRAC calculator for Cookie and Cracker Manufacturing with emissions from other processes that happen in the facility. This is discussed further 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. Comparison of results 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?
Benzene	0.0	0.0	0.0	0.0	100	No
Cadmium and its compounds	0.0	0.0	0.0	0.0	1	No
Chromium (non-hexavalent) and its compounds	0.0	0.0	0.0	0.0	100	No
Formaldehyde	0.0	0.0	0.0	0.0	100	No
Lead and its compounds	0.0	0.0	0.0	0.0	10	No
Manganese and its compounds	0.0	0.0	0.0	0.0	10	No
Mercury and its compounds	0.0	0.0	0.0	0.0	1	No
Nickel and its compounds	0.0	0.0	0.0	0.0	100	No
<b>Nitrogen Oxides</b>	<b>218</b>	0.0	0.0	<b>218</b>	<b>200</b>	<b>YES</b>
PM <sub>2.5</sub>	4	0.0	0.0	4	30	No
Total PAHs	0.0	0.0	0.0	0.0	10	No
VOC	12	0.0	0.0	12	100	No

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

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

**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.

In the Table 2 example, nitrogen oxides, PM<sub>2.5</sub> and VOCs are manufactured, processed, or otherwise used in quantities large enough to appear as greater than zero in the calculator. When comparing quantities to the ChemTRAC reporting thresholds, only nitrogen oxides are greater than its reporting threshold. Therefore, in the Table 2 example, the manufacturing of nitrogen oxides and its release to air would need to be reported to the ChemTRAC program.

## 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 ChemTRAC reporting page. At the top, there is a navigation bar with links for HOME, CONTACT US, HOW DO I...?, and a search box. Below this is a secondary navigation bar with categories: 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 red box highlights a link that says 'Ready to report? ChemTRAC Online Reporting System'. An arrow points from a callout box that says 'Click here to access the system' to this link. Below the link, there is a paragraph of text and a four-step process diagram.

Public Health Home  
A - Z Index  
Contact us

**ChemTRAC**  
Background  
Info for businesses  
4 steps to reporting  
Info for communities  
Links  
Contact ChemTRAC

**ChemTRAC - 4 Steps to Reporting**

Reporting to the Environmental Reporting and Disclosure Bylaw  
(Municipal Code Chapter 423)

Ready to report?  
[ChemTRAC Online Reporting System](#)

Click here to access the system

It is the responsibility of each facility owner or operator to take the necessary steps to ensure compliance with the Bylaw. Read our [Frequently Asked Questions about Reporting](#).

The following steps are provided as a guide to help you report:

**Step 1**  
Determine if the Bylaw applies to

**Step 2**  
Determine if you need to report in a

**Step 3**  
Prepare your data for reporting

**Step 4**  
Submit your data online by June 30th

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

[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 3-1-1.

## 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

© City of Toronto 1998-2011

### *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 cookie and cracker manufacturing facilities, this will be “31 – Manufacturing”. Then, you can select the appropriate 4-digit code (3118), and finally, the 6-digit code (311821).

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

**Type of Facility**

Please indicate your main type of business by providing the North American Industry Classification System (NAICS) code that best applies to your facility. If more than one code applies to your facility, select one and proceed.

Not sure of your NAICS Code? Click this link, [NAICS Code Help](#), to search for your code.

**NAICS 2-Digit:** 31 - Manufacturing

**NAICS 4-Digit:** 3118 - Bakeries & Tortilla Mfg.

**NAICS 6-Digit:** 311821 - Cookie & Cracker 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 Nitrogen Oxides (NO<sub>x</sub>) was the only substance that exceeded thresholds.

<input type="checkbox"/>		Polycyclic Aromatic Hydrocarbons (PAHs)
<input checked="" type="checkbox"/>	11104-93-1	Nitrogen Oxides (NO <sub>x</sub> )
<input 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 cookie and cracker manufacturing facilities, all substances are “manufactured” and “released to air”.**

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

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 below illustrates how to complete Step 4 for NO<sub>x</sub> using information from Table 2 of this guide.

Nitrogen Oxides (NO <sub>x</sub> ) (Reporting Threshold = 200.0 kg)	
Quantity (kg)	Estimation Method
If you used more than one method to estimate data, please choose the main one	
Manufactured: ⓘ 218	ChemTRAC calculator
Processed: ⓘ	- Select Estimation Method From List -
Otherwise Used: ⓘ	- Select Estimation Method From List -
<b>Total Use:</b> 218	
Release to Air: ⓘ 218	ChemTRAC calculator
Release to Land: ⓘ	- Select Estimation Method From List -
Release to Surface Water: ⓘ	- Select Estimation Method From List -
<b>Total Release:</b> 218	

### 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 24 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.

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

### *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, processed 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 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 information needed 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 cookie and cracker manufacturing facilities 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: Keep baking ovens in good operating condition. Well-maintained equipment uses less gas, saves money, and reduces NO<sub>x</sub> 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 low NO<sub>x</sub> burners on gas-fired baking ovens. These burners cut the nitrogen oxide emissions released as combustion by-products in half.*

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

## **Part 2: Reducing your facility's environmental impact**

*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 ChemTRAC substances that are released from cookie and cracker manufacturing facilities. Control technologies can be used to reduce the quantity of substances released during the preparation of dry ingredients, and during the baking process.

#### *Dry ingredient preparation control technologies: Dust collectors*

Recall that particulate matter (PM<sub>2.5</sub>) in the form of flour, sugar, salt, or other powdery material, is released into the air during the mixing of dry materials.

**Dust collectors.** A dust collector (also known as a baghouse) is a control technology that can help reduce the amount of PM<sub>2.5</sub> that is released during the mixing of dry materials. A dust collector takes in air with a high abundance of PM<sub>2.5</sub>, collects much of the PM<sub>2.5</sub> within filter bags, and releases the air with a reduced amount of PM<sub>2.5</sub>. No matter what amount of PM<sub>2.5</sub> is entering the dust collector, the dust collector can reduce PM<sub>2.5</sub> quantities down to about one particle per three cubic metres of air.

#### *Baking process control technologies: Low NO<sub>x</sub> burners, recirculated flue gas*

There are two common control technologies that can help decrease the amount of combustion by-products released from natural gas used for baking. They are known as low NO<sub>x</sub> burners and recirculated flue gas. Both technologies specifically reduce the amount of NO<sub>x</sub> that is released as a combustion by-product. These control technologies generally do not reduce the amounts of other combustion by-products.

**Low NO<sub>x</sub> burners.** When natural gas is used to create heat, the gas passes over a flame, gets combusted, and produces combustion by-products, including NO<sub>x</sub>. A low NO<sub>x</sub> burner combusts the gas in several stages. This allows the flame to burn at a cooler temperature, which reduces the amount of NO<sub>x</sub> that is created as a by-product. A low NO<sub>x</sub> burner can reduce NO<sub>x</sub> creation by about 50%.

**Recirculated flue gas.** When natural gas gets combusted to produce heat, the resulting air containing the combustion by-products is called flue gas. If the flue gas is mixed back into the natural gas being fed to the flame (i.e. recirculated), this changes the combustion process and results in less NO<sub>x</sub> being produced. Recirculated flue gas is often used with low NO<sub>x</sub> burners. Recirculated flue gas with low NO<sub>x</sub> burners can reduce NO<sub>x</sub> emissions by about 70%.

## Part 2: Reducing your facility's environmental impact

Figure 1 summarizes control technologies in cookie and cracker manufacturing facilities.

**Figure 1. Control technologies found in cookie and cracker manufacturing facilities**

<b>Cookie and Cracker Manufacturing step</b>	<b>Control technology</b>	<b>ChemTRAC substance being controlled</b>	<b>Reduction ability of the control technology</b>
Mixing of dry ingredients (flour, sugar, salt, other)	Dust Collector	Particulate matter (PM <sub>2.5</sub> )	Reduces the release of PM <sub>2.5</sub> down to about 1 grain of PM <sub>2.5</sub> dust per 3 cubic metres of air
Baking	Low NO <sub>x</sub> burners	Nitrogen oxides (NO <sub>x</sub> )	Reduces NO <sub>x</sub> creation by about 50%
Baking	Recirculated flue gas with low NO <sub>x</sub> burners	Nitrogen oxides (NO <sub>x</sub> )	Reduces NO <sub>x</sub> creation by about 70%

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

Without changing any other values entered in the Input-Output screen, select "low NO<sub>x</sub> burner" as a control for natural gas heating equipment. Check the new level of NO<sub>x</sub> in the output table. It should be half the original number.

### More ways to reduce costs and improve performance

Minimizing the use and release of harmful substances is one aspect of improving environmental performance. Cookie and cracker manufacturing facilities can also take other steps to improve their economic and environmental sustainability. One such step is to reduce energy use. By reducing energy use, cookie and cracker manufacturing 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 motors and heating units with more efficient equipment;
- installing a programmable thermostat to control heating and cooling; and
- purchasing a heat exchanger system to recycle wasted burner heat.

### 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:

- evaluating actions to reduce use and release of energy, water and ChemTRAC substances;
- identifying funding for upgrades to facilities and equipment;
- implementing all cost-effective upgrades; and
- 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](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 cookie and cracker manufacturing facilities include:

- Australia Government. 2007. Emission Estimation Technique by Industry. [http://www.npi.gov.au/handbooks/approved\\_handbooks/sector-manuals.html](http://www.npi.gov.au/handbooks/approved_handbooks/sector-manuals.html)
- Capital Regional District. Codes of Practice by Industry. <http://www.crd.bc.ca/wastewater/sourcecontrol/codespractice.htm>
- Toronto Public Health, ChemTRAC. December 2010. Resource for Greening Food and Beverage Manufacturing: Pollution Prevention Information. [www.toronto.ca/health/chemtrac/pdf/GreenFoodBev.pdf](http://www.toronto.ca/health/chemtrac/pdf/GreenFoodBev.pdf)
- University of Queensland Australia. Eco-Efficiency Toolkits and Fact Sheets. <http://www.gpa.uq.edu.au/CleanProd/toolkits/toolkits.htm>
- U.S. EPA. 1999. Environmental Compliance Guide for Food Processors. <http://www.epa.gov/compliance/resources/publications/assistance/sectors/multifood.pdf>

## Appendices

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

**Appendix A. Printer-friendly versions of the three worksheet tables**

**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 Cookie and Cracker Manufacturing 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 Table 1 – Control technologies information

<b>Baking ovens are equipped with (add a checkmark):</b>		
d.	Low NO <sub>x</sub> burners only	_____
e.	Low NO <sub>x</sub> burners with recirculated flue gas	_____
f.	No control technologies	_____

### Worksheet Table 2 – Natural gas usage

<b>Option 2A. Total natural gas used for the baking ovens</b>
Add values in cubic metres <b>OR</b> cubic feet: _____ m <sup>3</sup> (cubic metres) or _____ ft <sup>3</sup> (cubic feet)

OR

<b>Option 2B. Thermal rating of the baking ovens</b>
Record value in British Thermal Units per hour _____ BTU/hr
Also estimate the average time that the baking ovens are turned on and heating: _____ hours per day and _____ days per week and _____ weeks per year

### Worksheet Table 3 – Dust collector usage

Dust collector identifier:	Air flow rate	Indicate the airflow rate units	For what amount of time are dust collectors operating?		
			Hours per day	Days per week	Weeks per year
<u>Example:</u> <u>Collector 1</u>	<u>1200</u>	Cf m (cubic feet per minute)	<u>12</u>	<u>6</u>	<u>50</u>
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____
_____	_____		_____	_____	_____

## Appendix B. Additional material related to the ChemTRAC calculator

This appendix describes the remaining three screens of the ChemTRAC calculator. You do not need to enter any information into these screens. However, if site-specific emission factors are known, they can be entered manually in the Calculations screen.

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

### *The ChemTRAC calculator All Substances screen*


The All Substances screen provides a summary of the estimated quantities in kilograms per year of all ChemTRAC priority substances used and/or released by your facility that have been calculated by the ChemTRAC calculator. It also provides a summary of other substances used and/or released by your facility. You do not need to enter any information on this screen.

Refer to Table 1 of this guide to see which processes are responsible for the release of each substance.

Note that the CAS# refers to a unique identifier for the substance as given by the Chemical Abstracts Society. The CAS# is provided for reference only.

This page provides a summary of the estimated quantities of all substances that are manufactured, processed, otherwise used and/or released.

ChemTRAC Priority Substances	CAS #	Quantity (kg/yr)			
		Manufactured	Processed	Otherwise Used	Released to Air
Nitrogen Oxides (NOx)	11104-93-1	0.0	0.0	0.0	0.0
Particulate Matter (PM2.5)	n/a	0.0	0.0	0.0	0.0
Volatile Organic Compounds (VOCs)	n/a	0.0	0.0	0.0	0.0
Benzene	71-43-2	0.0	0.0	0.0	0.0
Formaldehyde	50-00-0	0.0	0.0	0.0	0.0
Total PAHs	n/a	0.0	0.0	0.0	0.0
Cadmium and its compounds	n/a	0.0	0.0	0.0	0.0
Chromium (non-hexavalent) and its compounds	n/a	0.0	0.0	0.0	0.0
Manganese and its compounds	n/a	0.0	0.0	0.0	0.0
Mercury and its compounds	n/a	0.0	0.0	0.0	0.0
Nickel and its compounds	n/a	0.0	0.0	0.0	0.0
Lead and its compounds	n/a	0.0	0.0	0.0	0.0
<b>Other Substances</b>					
Sulphur Dioxide	7446-09-5	0.0	0.0	0.0	0.0
Carbon Monoxide	630-08-0	0.0	0.0	0.0	0.0
Nitrous Oxide	10024-97-2	0.0	0.0	0.0	0.0
Particulate Matter (Total PM)	n/a	0.0	0.0	0.0	0.0
Carbon Dioxide	124-38-9	0.0	0.0	0.0	0.0
TOC	n/a	0.0	0.0	0.0	0.0
Methane	74-82-8	0.0	0.0	0.0	0.0


  
Etc.

## Additional Material

### The ChemTRAC calculator Calculations screen

The Calculations screen provides the calculations based on the information provided in the Input-Output screen. It also lists details on the emission factors used to calculate the release of substances and an indication of emission factor data quality. You do not need to enter any information on this screen.

While you do not need to enter any information on this screen, emission factors can be modified if site-specific information is available. All other data, sample calculations and information presented in the Calculations screen are for reference only. They should not be modified in any way.

You can modify the emission factors for any of the substances listed in the Contaminant table on the Calculation screen, and for any of uncontrolled, low NO<sub>x</sub> and low NO<sub>x</sub> with recirculated flue gas scenarios. If emission factors are modified be sure that they are entered in pounds per million cubic feet (lbs/1,000,000 ft<sup>3</sup>).

- 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.

Consumption :                      0 m<sup>3</sup>/yr                      3,000,000 BTU/h  
    0 ft<sup>3</sup>/yr                      OR                      8,823,529 ft<sup>3</sup>/yr

Contaminant	CAS #	Emission Factor (lb/1000000 ft <sup>3</sup> )			Emission Rate (kg/yr)	Data Quality	Comments
		Uncontrolled (None)	Low NO <sub>x</sub>	Low NO <sub>x</sub> Recirc.			
Sulphur Dioxide	7446-09-5	0.6	0.6	0.6	2.4	A	
Nitrogen Oxides	11104-93-1	100	50	32	200.1	C	
Carbon Monoxide	630-08-0	84	84	84	336.2	B	
Nitrous Oxide	10024-97-2	2.2	2.2	0.64	8.8	E	
Particulate Matter (PM2.5)	n/a	1.9	1.9	1.9	7.6	D	
Carbon Dioxide	124-38-9	120,000	120,000	120,000	480,282.4	A	
TOC	n/a	11	11	11	44.0	B	
Lead	7439-92-1	0.0005	0.0005	0.0005	0.0	D	
Methane	74-82-8	2.3	2.3	2.3	9.2	B	
VOC	n/a	5.5	5.5	5.5	22.0	C	
2-Methylnaphthalene	91-57-6	0.000024	0.000024	0.000024	9.61E-05	D	
3-Methylchloranthrene	56-49-5	< 0.000018	< 0.000018	< 0.000018	7.20E-06	E	PAH
7,12-Dimethylbenz(a)anthracene	57-97-6	< 0.000016	< 0.000016	< 0.000016	6.40E-05	E	PAH
Acenaphthene	83-32-9	< 0.000018	< 0.000018	< 0.000018	7.20E-06	E	PAH
Acenaphthylene	208-96-8	< 0.000018	< 0.000018	< 0.000018	7.20E-06	E	PAH
Anthracene	120-12-7	< 0.000024	< 0.000024	< 0.000024	9.61E-06	E	
Benzo(a)anthracene	56-55-3	< 0.000018	< 0.000018	< 0.000018	7.20E-06	E	PAH

Etc.                      Emission factors in these columns can be modified by the user

## Additional Material

### *The ChemTRAC calculator Reference screen*

The Reference screen describes from where the emission factors and assumptions used on the Calculations screen were taken. 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.

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.

Emission factors and an assessment of their data quality are provided in the US EPA AP-42 "Natural Gas Combustion", Section 1.4, 1998

<http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf>

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

### Definitions<sup>1</sup>

**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.

## Additional Material

### *Emission factors for Cookie and Cracker Manufacturing facilities*

The ChemTRAC calculators are all 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. nitrogen oxides) emitted by a specific activity (e.g. burning one cubic metre of natural gas).

The ChemTRAC calculator uses the emission factors listed in Table 3 to estimate emissions of nitrogen oxides from cookie and cracker manufacturing facilities. If site-specific emission factors are available for the facility or processes, they can be entered in the Calculations sheet of the calculator. This is detailed in the discussion of the calculator’s Calculations screen.

**Table 3. Emission factors for nitrogen oxides**

<b>Source</b>	<b>Substance</b>	<b>Emission Factor</b>
Baking ovens – no control	Nitrogen oxides	160.18 kg / 100,000 m <sup>3</sup>
Baking ovens – low NO <sub>x</sub> burner	Nitrogen oxides	80.09 kg / 100,000 m <sup>3</sup>
Baking ovens – low NO <sub>x</sub> burner & recirc. flue gas	Nitrogen oxides	51.26 kg / 100,000 m <sup>3</sup>

#### **Example: Using emission factors to estimate NO<sub>x</sub> emissions from baking ovens**

Table 3 shows that 160.18 kg of NO<sub>x</sub> is emitted for every 100,000 m<sup>3</sup> of natural gas burned by baking ovens without any control technologies.

Assume the facility used 1,000,000 m<sup>3</sup> of natural gas in 2011.

#### **Total emissions of NO<sub>x</sub> for 2011 from natural gas-fired baking ovens**

= Emissions per unit of natural gas \* Volume of natural gas used in 2011

= 160.18 kg / 100,000 m<sup>3</sup> \* 1,000,000 m<sup>3</sup>

= **1601.80 kg of NO<sub>x</sub>**

## Appendix C. Combining the 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.<sup>4</sup> 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. The figure on the following page shows the main screen of the Calculation of Totals calculator.

---

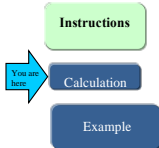
<sup>4</sup> The Calculation of Totals calculator can be found under the Totals bullet at <http://www.toronto.ca/health/chemtrac/tools.htm>.

# 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](http://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 (kg/yr)				Quantity (kg/yr)			
		Manufactured	Processed	Otherwise Used	Released to Air	Manufactured	Processed	Otherwise Used	Released to Air
		Process#1:				Process#2:			
A	Acetaldehyde*								
	Acrolein*								
	Benzene*								
	1,3-Butadiene*								
	Carbon tetrachloride*								
	Chloroform (Trichloromethane)*								
	Chromium (non-hexavalent) <sup>1</sup>								
	1,2-Dibromoethane (Ethylene dibromide)								
	1,4-Dichlorobenzene*								
	1,2-Dichloroethane (Ethylene dichloride)*								
	Dichloromethane (Methylene chloride)								
	Formaldehyde*								
	Manganese <sup>1</sup>								
	Nickel <sup>1</sup>								
	Tetrachloroethylene (Perchloroethylene)								
	Trichloroethylene*								
	Vinyl chloride								
Cadmium <sup>1</sup>									
Chromium (hexavalent) <sup>1</sup>									
Lead <sup>1</sup>									
Mercury <sup>1</sup>									
B	Total polycyclic aromatic hydrocarbons (PAHs)*								
	Nitrogen oxides (NOx)								
C	Particulate matter 2.5 (PM2.5)								
	Total Volatile organic compounds (VOCs) <sup>2</sup>								

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...

Totals to be compared with the threshold (kg/yr)	Mass Reporting Threshold (kg/yr)	Reportable?	To be reported			
			Total Manufactured (kg/yr)	Total Processed (kg/yr)	Total Otherwise Used (kg/yr)	Total Released to Air (kg/yr)
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	10	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	100	No	---	---	---	---
0	1	No	---	---	---	---
0	10	No	---	---	---	---
0	10	No	---	---	---	---
0	1	No	---	---	---	---
0	10	No	---	---	---	---
0	200	No	---	---	---	---
0	30	No	---	---	---	---
0	100	No	---	---	---	---

## Additional Material

The total combined release of substances (whether from the ChemTRAC Cookie and Cracker 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 <sup>c</sup> % 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 <sub>x</sub> )	200	N/A
Particulate Matter 2.5 (PM <sub>2.5</sub> )	30	N/A
Polycyclic Aromatic Hydrocarbons (PAHs)	10	N/A <sup>b</sup>
Tetrachloroethylene (Perchloroethylene)	100	1
Trichloroethylene	100	1
Vinyl chloride	100	1
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 Cookie and Cracker Manufacturing facilities



## 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 raw materials	year-end inventory Certificate of Approval or Environmental Compliance Approval	Material Safety Data Sheets (MSDS) 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](http://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.