

# ECONOMIC REVIEW OF CHEMISTRY

# 2020



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**CHEMISTRY INDUSTRY  
ASSOCIATION OF CANADA**





## CHEMISTRY INDUSTRY ASSOCIATION OF CANADA

The Chemistry Industry Association of Canada (CIAC) is the voice of Canada's \$54 billion chemistry industry and represents more than 50 members and partners across the country. The industry employs 88,600 Canadians and supports 525,000 jobs in Canada.

Members of CIAC are signatories to Responsible Care®—the association's U.N.—recognized sustainability initiative. Responsible Care® inspires its members to take actions that improve the sustainability of their operations and reduce harm throughout the entire life cycle of their products.



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## ► President's Message



I am pleased to present to you the ***Chemistry Industry Association of Canada's (CIAC) 2020 Economic Review of Chemistry.***

Canada's \$54 billion chemical manufacturing industry is a significant contributor to our country's economy. The sector is directly responsible for 88,600 jobs and pays approximately \$6.33 billion in salary and wages. Primarily concentrated in Alberta, Ontario and Quebec, the industry supports 525,000 jobs in the overall economy across the country.

The value of "chemistry" to Canada's economy is not fully appreciated by many. The fact is that more than 95 per cent of all goods manufactured rely on chemistry. It is an integral part of our everyday life – from the homes we live in, to the cars we drive, the food we eat and the electronic devices we so heavily rely on.

This annual review and the accompanying executive summary provide readers with an economic profile of the industry as well as quantitative insight into the industry's importance to our country's economy, and to all Canadians.

Yours sincerely,



Bob Masterson  
President and CEO  
Chemistry Industry Association of Canada

## ➤ Introduction<sup>1</sup>

Using data from Statistics Canada (unless otherwise stated), CIAC's *2020 Economic Review of Chemistry* provides a statistical review of various key industry indicators including shipments, imports, exports, and employment from the year 2019. The report also includes a section on specialty chemicals, statistics for the key provinces of Quebec, Ontario, and Alberta, and for the segments of the industry of primary interest to CIAC members.

This report is prepared by the Association's Business and Economics (B&E) team. The B&E team provides ongoing economic analysis of government policy initiatives, business trends and changing industry dynamics. The team also publishes quarterly statistical reviews for the Industrial Chemical sector and a [Year End Survey of Business Conditions](#), an economic forecast based on CIAC members' sales, trade, and employment indicators.

## Industrial Classification

Industries in Canada are classified according to the 2012 North American Industrial Classification System (NAICS). This classification is maintained by Statistics Canada and its counterpart organizations in the United States and Mexico. The chemical manufacturing subsector is captured in NAICS 325 which comprises establishments primarily engaged in manufacturing chemicals and chemical products, from organic and inorganic raw materials.

NAICS 325 includes the following sub-industry groups:

- Basic chemicals (NAICS 3251)
- Synthetic resins, rubbers, and synthetic fibres (NAICS 3252)
- Pesticides and fertilizers (NAICS 3253)
- Pharmaceuticals (NAICS 3254)
- Paints, coatings and adhesives (NAICS 3255)
- Soaps, cleaning compounds and toilet preparations (NAICS 3256)
- Other chemical products (NAICS 3259)

This report focuses on statistics for the overall chemical industry (NAICS 325), and for the combination of NAICS 3251 and 3252 which are collectively referred to as industrial chemicals.

- NAICS 3251 Basic chemicals - comprises establishments primarily engaged in manufacturing organic and inorganic chemicals, using basic processes such as thermal cracking, distillation, and chemical reaction.

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<sup>1</sup> This publication intends to provide the best information available. However, neither CIAC nor its employees make any warranty, expressed or implied, or assumes any liability or responsibility for any use, or the results of such use, of any information or data disclosed in this report.

- NAICS 3252 Synthetic resins, rubbers, and fibers— comprises establishments primarily engaged in manufacturing polymers such as polyethylene, polypropylene, butyl rubbers, polyamides, and fibers made from these resins. Polymerization of monomers into polymers, for example, ethylene into polyethylene, is the basic process.

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## ► Chemistry Industry at a Glance

Chemical industry<sup>2</sup> shipments in Canada in 2019 were \$54.1 billion, exports were \$37.4 billion, and imports totaled \$61.8 billion.

The industry as a whole employed 88,600 workers in 2019 which constituted six per cent of all manufacturing jobs in Canada. In addition to the direct jobs, other jobs are supported by the purchasing activity of the chemistry industry and by the subsequent expenditure-induced activity. CIAC has estimated that for every job in the chemistry industry, another 5 indirect jobs are created in other parts of the economy, so in total the chemistry industry supports 525,000 jobs in Canada.

Industrial chemicals are a keystone industry within the Canadian economy. It converts and adds value to raw resources such as natural gas, crude oil, minerals, metals and biomass, creating intermediate products that are used as inputs by other parts of the chemistry industry, and by almost all other manufacturing segments. Major consumer industries include: plastic and rubber products (NAICS 326), forest products (NAICS 321 and 322), transportation equipment (NAICS 336), oil and gas extraction (NAICS 211), clothing (NAICS 315), construction (NAICS 23), and pharmaceuticals (NAICS 3254). For industrial chemicals, shipments in 2019 were \$25.5 billion, exports were \$19.0 billion, imports were \$20.8 billion, and employment was 16,000 indirectly supporting 96,000 jobs in the broader Canadian economy.

**Table 1: Principal Statistics for the Chemical Industry**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Shipments, \$ billion</b>	43.4	47.1	48.6	49.7	52.2	51.6	51.3	52.9	56.0	54.1
<b>Employment, 000</b>	81.4	79.8	83.6	83.9	84.3	86.4	84.3	86.6	87.7	88.6
<b>Imports, \$ billion</b>	40.8	43.4	44.4	46.4	50.3	53.7	53.3	55.8	59.8	61.8
<b>Exports, \$ billion</b>	27.8	31.3	29.6	32.0	35.5	36.2	35.9	33.7	38.0	37.4



**Table 2: Principal Statistics for the Industrial Chemical Sector**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Shipments, \$ billion</b>	22.0	25.3	24.7	25.5	26.1	25.4	24.1	26.2	27.3	25.5
<b>Employment, 000</b>	17.2	17.2	17.2	17.4	17.5	17.7	15.7	16.4	16.3	16.0
<b>Imports, \$ billion</b>	15.9	17.1	17.3	17.9	19.3	19.7	18.8	19.8	21.3	20.8
<b>Exports, \$ billion</b>	15.7	18.6	17.0	18.7	19.8	19.2	18.7	18.7	20.6	19.0

<sup>2</sup> Chemical industry and industrial chemicals are defined on page 1.



## ► Manufacturing Shipments (Revenue)

In 2019, Canada's chemical industry manufactured \$54.4 billion worth of products, a decrease of 3.3 per cent compared to 2018.

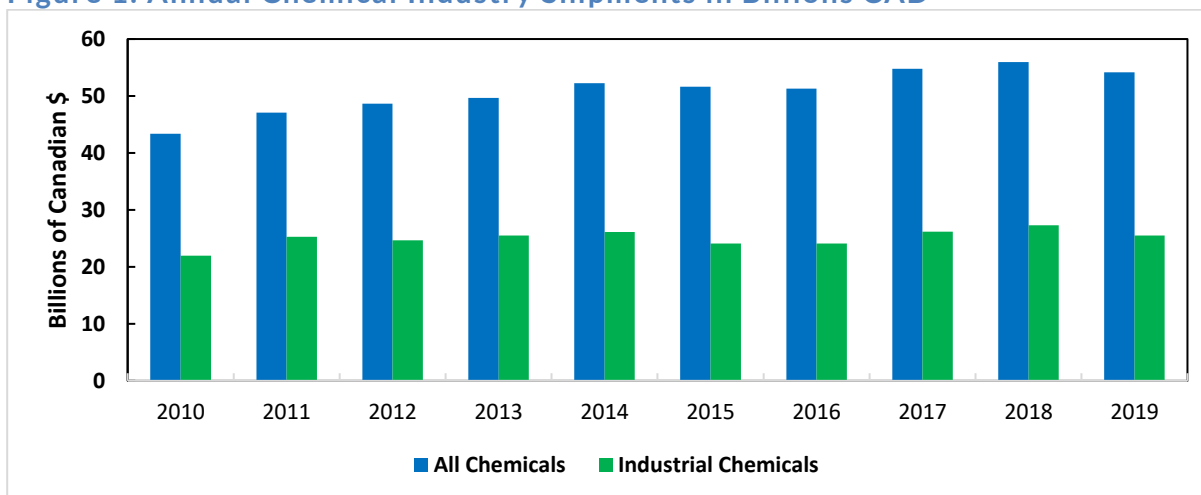
Shipments of industrial chemicals were \$25.5 billion in 2019, representing a decrease of 6.7 per cent compared to 2018 (Table 3, Figure 1). The value of shipments for industrial chemicals have remained relatively consistent within a narrow band largely due to the commoditized nature of the products, prices are set on global markets and can and often fluctuate from year to year.

Table 3: Manufacturing Shipments



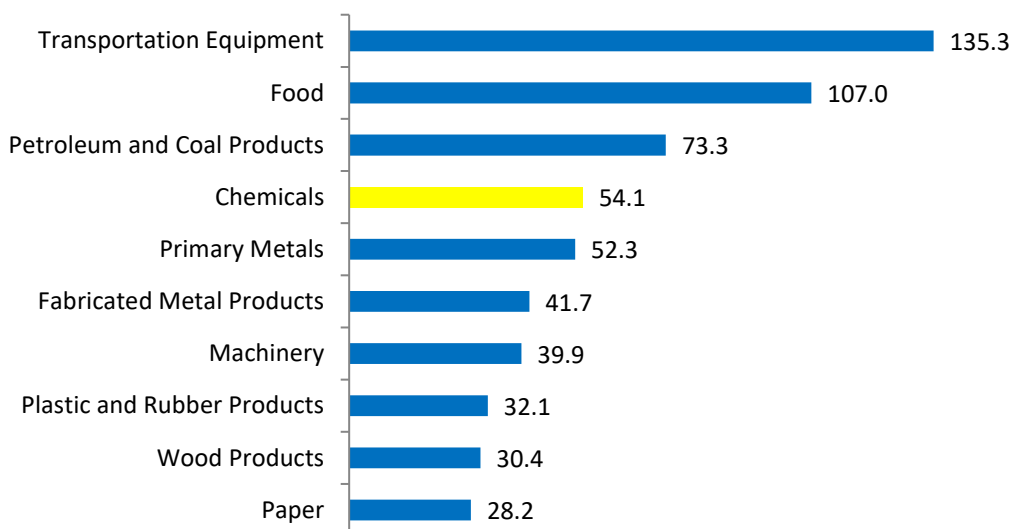
Manufacturing Shipments, \$ Billion	2018	2019	Change 2018-19
All chemicals	56.0	54.4	-3.3%
Industrial chemicals	27.3	25.5	-6.7%

Figure 1: Annual Chemical Industry Shipments in Billions CAD



Within the NAICS system, there are 21 manufacturing industries at the 3-digit level. Among these industries, chemicals (NAICS 325) ranks as the 4<sup>th</sup> largest based on value of shipments (Figure 2).

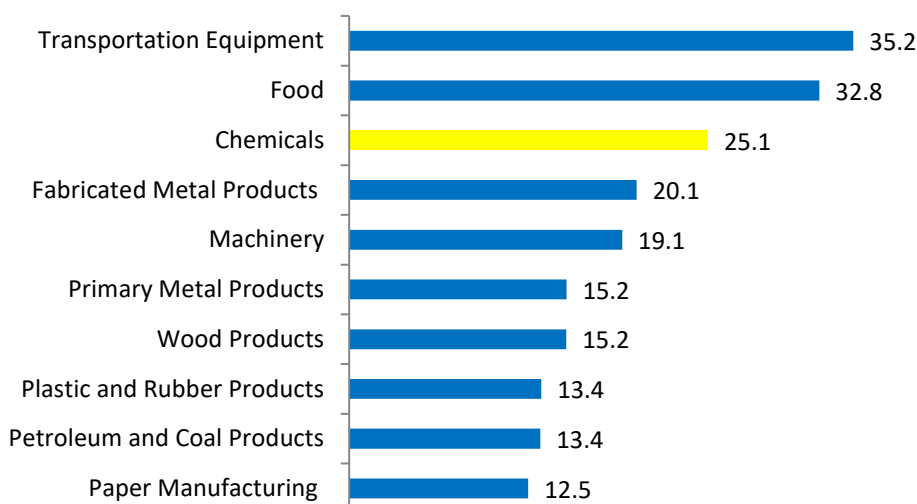
Figure 2: Top 10 Manufacturing Industries by Value of Shipments, \$ Billions



## Value Added

Value added measures the value of output of an industry less the value of intermediate inputs required in the production process. Compared to all manufacturing industries, chemicals ranked 3<sup>rd</sup> based on value added in 2018 (latest available, Figure 3).

Figure 3: Top 10 Manufacturing Industries by Value Added



## ➤ Employment

The chemical industry employed 88,600 workers in 2019. For industrial chemicals, the figure was 16,000. For both groupings, employment peaked in 2003 and has tended to decline since, although levels have been mostly flat in recent years (Table 4 and Figure 4).

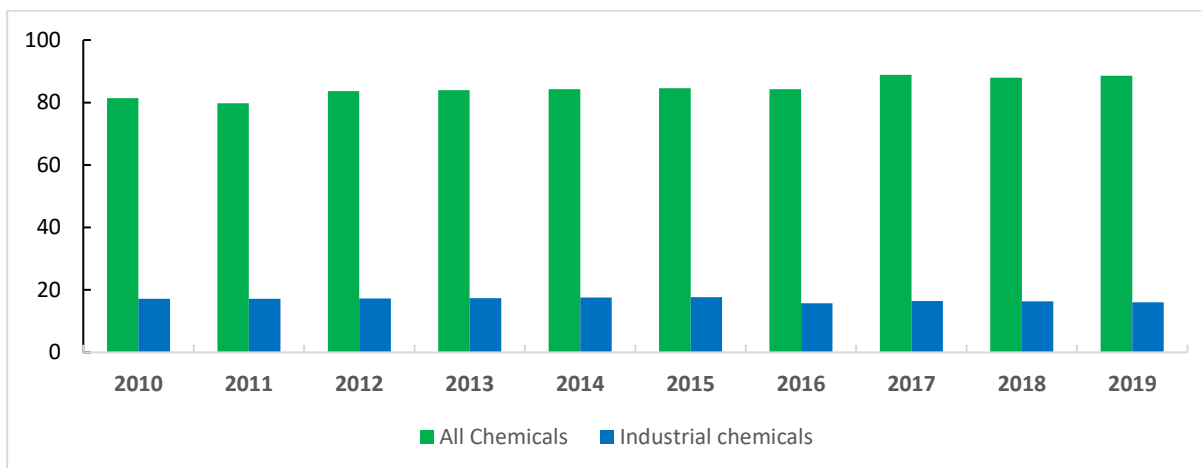
In addition to the direct jobs, additional jobs are supported by the purchasing activity of the chemical industry and by the subsequent expenditure-induced activity. For every job in the chemical industry, it is estimated that another five jobs in other sectors are indirectly linked to the industry. On this basis, the chemical industry supports about 525,000 jobs— industrial chemicals about 96,000 - in the overall Canadian economy.

**Table 4: Employment in the Canadian Chemical Industry**



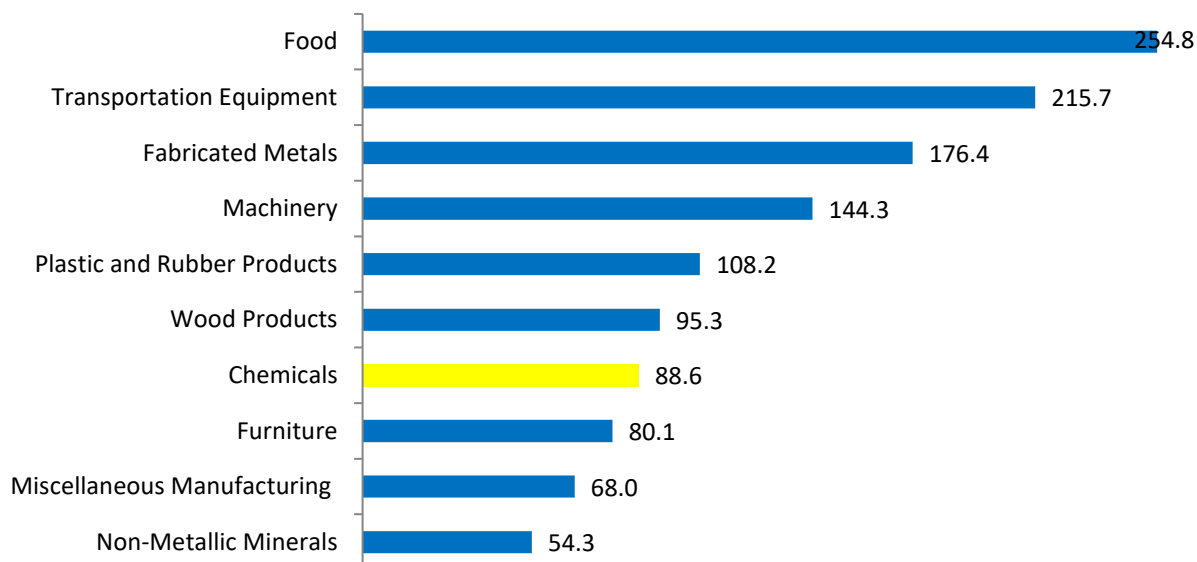
Total Employment, Thousands	2018	2019	Change 2018-2019
All Chemicals	87.7	88.6	1.0%
Industrial Chemicals	16.3	16.0	-1.8%

**Figure 4: Chemical Industry Employment**



Based on employment, chemicals rank 7<sup>th</sup> among all manufacturing industries (Figure 5).

Figure 5: Top 10 Manufacturing Industries by Employment (in Thousands of People)



## Salaries and Wages

Total salaries and wages paid to employees in the chemical industry in 2019 were \$6.33 billion, with \$1.54 billion paid in the industrial chemical segment (Table 5). 2019 saw a small decline in wages and salaries paid in both the overall chemical sector and the Industrial Chemicals sub-sector.

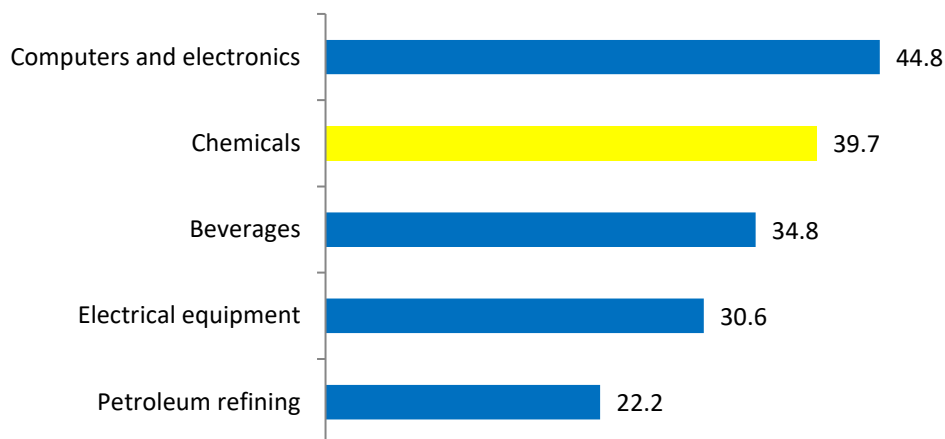
Table 5: Total Salary and Wages Paid by the Chemical Industry



Total Salaries and Wages, \$ Billion	2018	2019	Change 2018-19
All Chemicals	6.40	6.33	-1.1%
Industrial Chemicals	1.60	1.54	-3.8%

Chemical companies operate a variety of types of complex equipment and processes using sophisticated computer control technologies. Employees require specialized education and training to operate these processes safely and efficiently. As a result, the chemical industry's proportion of employees with a university degree (39 per cent) is second only to the computer and electronic products industry (Figure 6), and chemicals has the highest proportion of employees with post-graduate degrees.

Figure 6: Top 5 Manufacturing Industry by Proportion of Employees with a University Degree



Chemicals ranked 5<sup>th</sup> among all manufacturing industries with an average salary of \$71,380 (Figure 7). **Within industrial chemicals the average salary was higher at \$96,110. For overall manufacturing, the average salary in 2019 was \$59,980.**

Figure 7: Top 10 Manufacturing Industries Based on Average Earnings Per Employee in Thousands of CAD

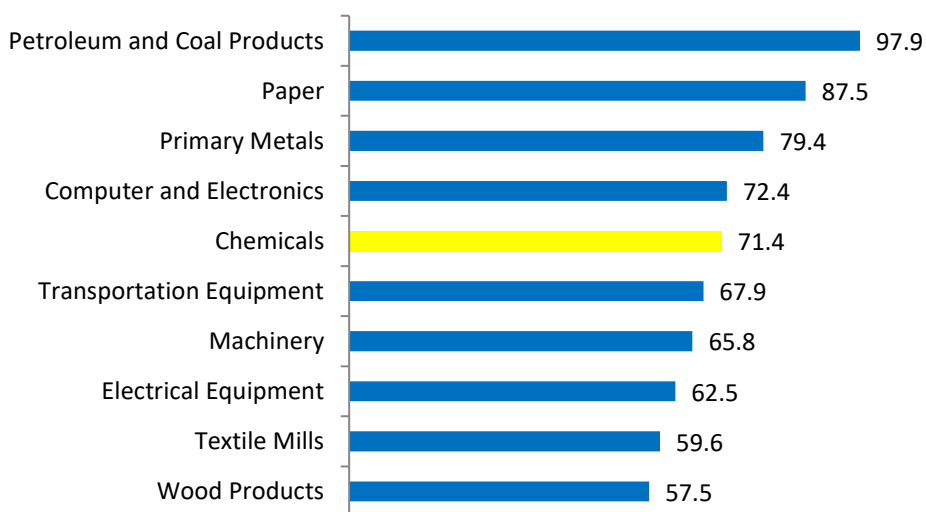


Table 6: Average Salaries in the Chemical Industry



Average Salaries and Wages, \$ Thousand	2018	2019	Change 2018-19
All Chemicals	72.9	71.4	-1.1%
Industrial Chemicals	98.1	96.1	-3.8%

## ➤ International Trade

Canada exported \$37.4 billion worth of chemicals and chemical products to the world in 2019, a decrease of 1.4 per cent compared to 2018. Imports increased by 4.4 per cent to \$61.8 billion (Table 7 and Figure 8) driven primarily by Pharmaceutical products. The United States represents the dominant export market and the dominant source of imports. In 2019, 76 per cent of exports, worth \$28.4 billion went to the United States and 55 per cent of imports worth \$34 billion originated there. The next largest export markets were: China (4 per cent), followed by Italy, Japan, Mexico and Belgium (2 per cent each). The next largest sources of imports were Germany (6 per cent), Switzerland (5 per cent), and followed by China, Belgium and Ireland (2 per cent each).

For industrial chemicals, Canadian exports declined by 8.7 per cent to \$18.4 billion in 2019. Imports also declined, falling by 3.4 per cent to \$20.8 billion (Table 7 and Figure 9). Both imports and exports of industrial chemicals are dominated by bulk commodities like polyethylene, ethylene glycol and styrene.<sup>3</sup> Again the United States is the primary trading partner with 79 per cent of exports worth \$14.5 billion and 66 per cent of imports worth \$13.6 billion. The next largest export markets were: China \$1.2 billion (7 per cent) and Mexico \$380 million (2 per cent). The next largest import source partners were: China \$1.4 billion (7 per cent) Germany \$710 million (3 per cent), Australia \$490 million (4 per cent) and Mexico and India (2 per cent).

**Table 7: Trade in the Chemistry Industry**

Value of Trade, \$ Billion		2018	2019	Change 2018-19
<b>All Chemicals</b>	<b>Imports</b>	59.8	61.8	4.4%
	<b>Exports</b>	38.0	37.4	-1.4%
<b>Industrial Chemicals</b>	<b>Imports</b>	21.3	20.8	-3.4%
	<b>Exports</b>	20.1	18.4	-8.7%

<sup>3</sup> For further analysis of the trade of specific industrial chemicals see the Industry Profiles section beginning on page 37 of this report.

Figure 8: Trade of All Chemicals in Billions of CAD

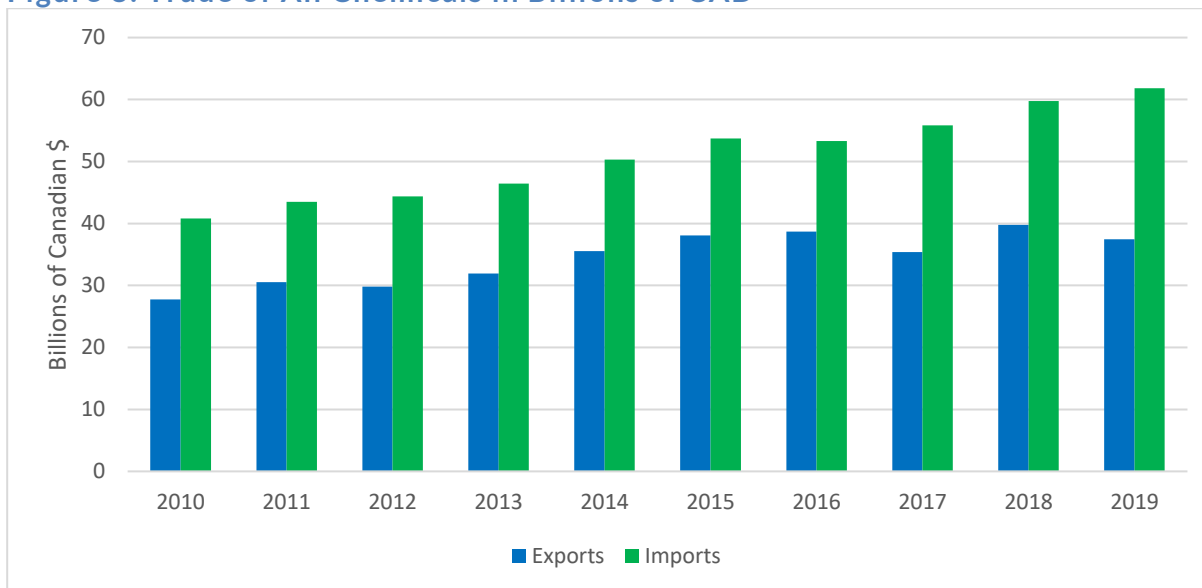


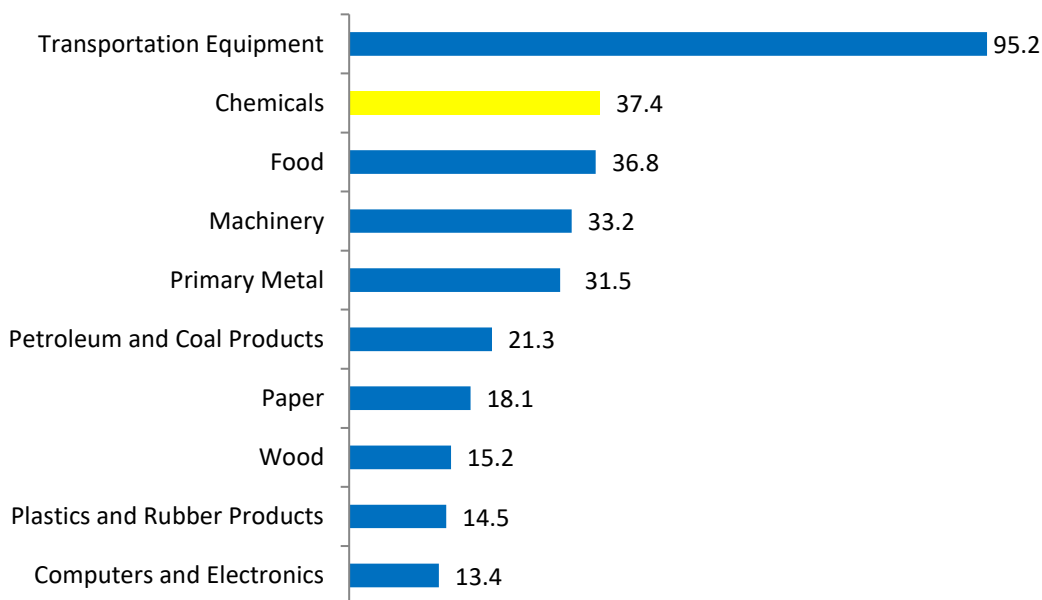
Figure 9: Trade of Industrial Chemicals in Billions of CAD





The chemistry industry was the 2<sup>nd</sup> largest exporter among all manufacturing industries in 2019 (Figure 10)

**Figure 10: Top 10 Manufacturing Industries by Exports in Billions of CAD**



## ➤ Profits

Profits for the chemical sector depend on factors such as capacity utilization, energy and raw material costs, supply-demand balance and competition with foreign producers. Operating profits in 2019 for the industrial chemicals sector was \$4.6 billion (Table 8).

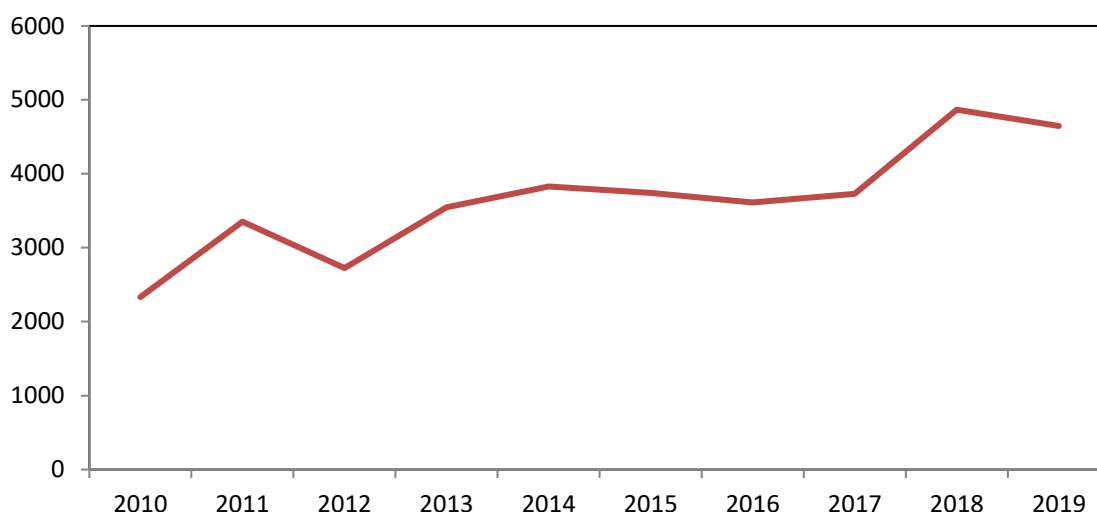
**Table 8: Operating Profits in the Chemical Industry**



Operating profit, \$ billion	2018	2019	Change 2018-19
Industrial chemicals	4.9	4.6	-4.5%

Operating profits for industrial chemicals over the past 10 years show that profits suffered during the great recession, recovered strongly in 2010 and 2011, plateaued and remained strong.

Figure 11: Operating Profits for Industrial Chemicals, in Millions of CAD



## ► Productivity

One measure of manufacturing productivity is the value of revenue per employee. For all chemicals, output per employee in 2019 was \$614,000. For industrial chemicals, it rises to \$1.59 million. Output per employee is much higher for industrial chemicals reflecting the capital-intensive nature of the industry compared to chemicals overall. Both numbers have remained largely flat over the past decade.

Table 9: Productivity

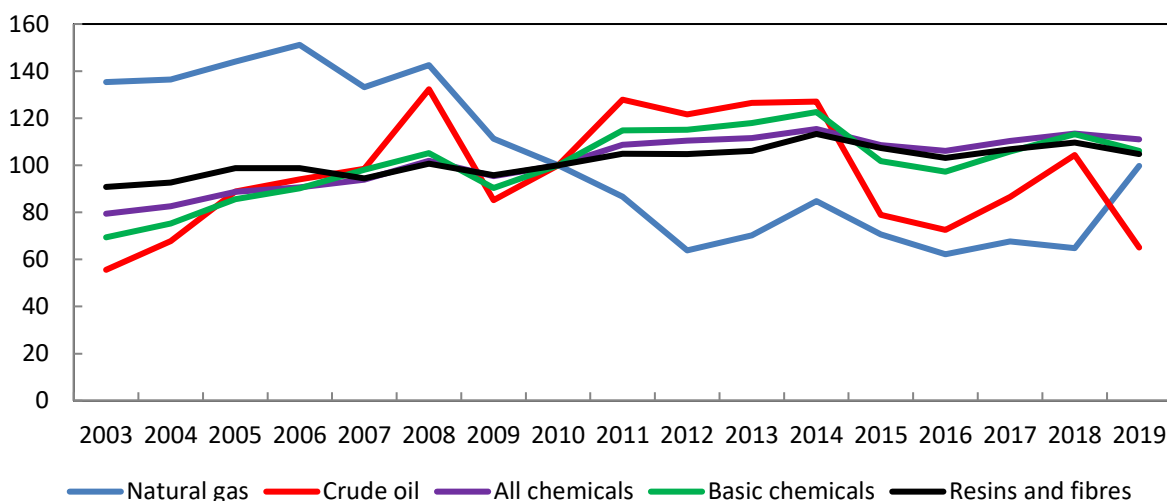


Output per employee, \$ thousand	2018	2019
All chemicals	640	614
Industrial chemicals	1,675	1,594

## ► Price Index

The Industrial Product Price Index (IPPI) reflects the prices that producers in Canada receive as the goods leave the plant. Natural gas and crude oil are two important sources of feedstocks for the chemical industry (see Figure 12) and have shown very different price behaviour in recent years. Natural gas prices rose dramatically until 2008 and have been trending mostly downward since then. The decline in gas prices has been driven primarily by substantial increases in North American supply coming from shale gas formations. However, heavy maintenance schedules on the Alberta natural gas system created more volatility in pricing than has been normal over the last few years. Crude oil has been volatile since 2008, showing sharp swings both upward and downward which continued in 2019.

Figure 12: Price Index, 2010=100

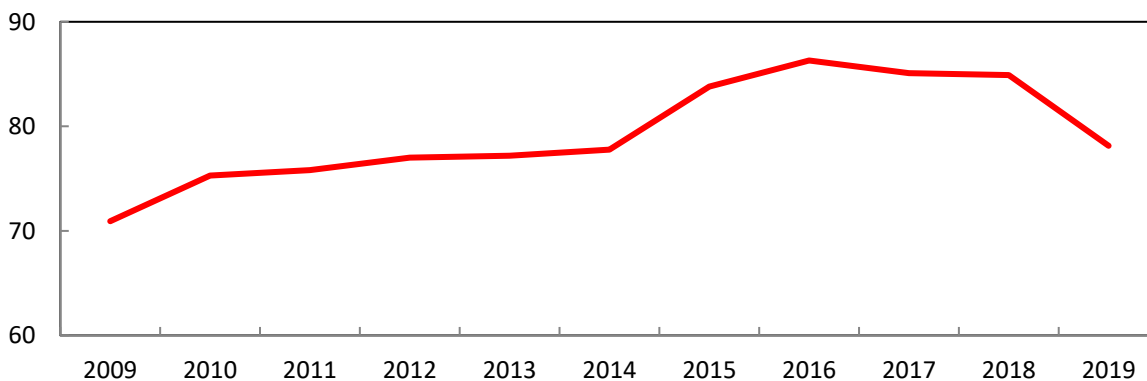


## ► Capacity Utilization

Capacity utilization refers to the extent to which an industry uses its installed productive capacity (Figure 13). Thus, it compares actual output with the maximum potential output that could be achieved if all capacity was fully used.

Capacity utilization for the overall chemical industry hit an all-time low of 68 per cent in the 1<sup>st</sup> quarter of 2009. Since then it has trended steadily upward, and averaged 85 per cent in 2018, approximately the same as the averages in 2016 and 2017. In 2019, we saw a dip in utilization that brought sector performance to a level last seen in 2014/2015. While separate data is not available for industrial chemicals, it would be expected to have utilization rates higher than the industry average since continuous production processes are employed, whereas the segment of the industry producing formulated products relies on batch processes.

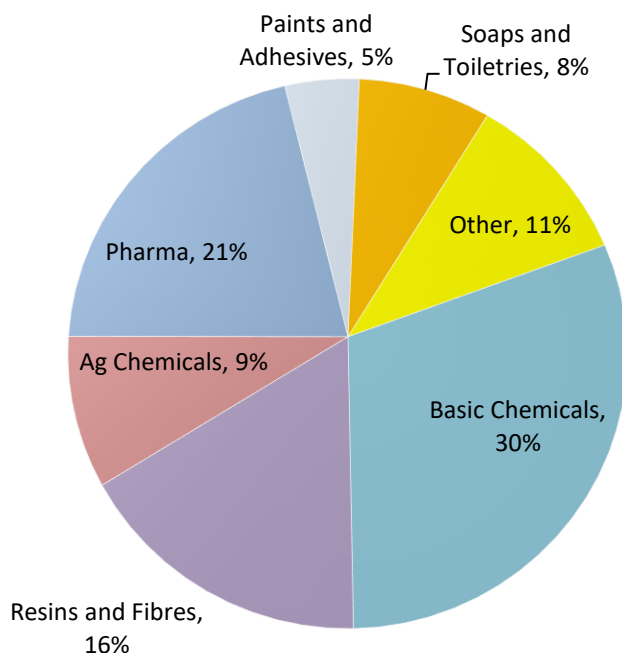
Figure 13: Capacity Utilization in the Chemical Industry, %



## Other Chemical Manufacturing Subsectors

As mentioned previously, the Canadian chemical industry is comprised of seven sub-industries. Figure 14 shows the relative size of these industries by shipment value in 2019. Industrial chemicals accounted for almost half of the total industry.

Figure 14: Distribution by Chemical Sub-Industries Based on Shipments



While NAICS 3251 and 3252 are the focus of this report, the following tables provide some data on the other sub-industries.

Table 10: Principal Statistics for Pesticides, Fertilizers and Other Agricultural Chemicals (NAICS 3253)

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2013	4,783	5,247	3,101	1,951
2014	5,279	5,259	3,358	1,715
2015	5,406	5,271	3,576	2,057
2016	5,413	5,722	3,398	1,891
2017	4,927	6,282	3,991	1,485
2018	5,596	6,820	3,969	1,327
2019	4,802	7,010	4,034	1,393

Table 11: Principal Statistics for Pharmaceuticals (NAICS 3254)

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2013	8,549	31,325	13,706	6,054
2014	10,055	30,833	15,387	8,301
2015	9,834	30,356	16,852	10,468
2016	10,298	29,917	17,228	11,759
2017	10,781	32,070	17,630	8,890
2018	11,041	32,000	19,502	11,003
2019	11,507	32,700	19,502	11,221

Table 12: Principal Statistics for Paints, Coatings and Adhesives (NAICS 3255)

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2013	2,672	7,788	1,902	528
2014	2,778	8,196	2,055	596
2015	2,619	8,593	2,322	694
2016	2,623	8,216	2,434	763
2017	2,667	7,773	2,373	769
2018	2,704	7,498	2,459	835
2019	2,479	7,059	2,563	864

Table 13: Principal Statistics for Soaps, Cleaning Compounds and Toilet Preparations (NAICS 3256)

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2013	3,439	11,412	4,934	2,665
2014	3,200	11,503	5,312	2,907
2015	3,433	11,769	6,072	3,334
2016	3,903	13,946	6,400	3,063
2017	3,751	13,366	6,581	3,065
2018	4,379	13,127	6,820	3,439
2019	4,428	13,127	6,820	3,365

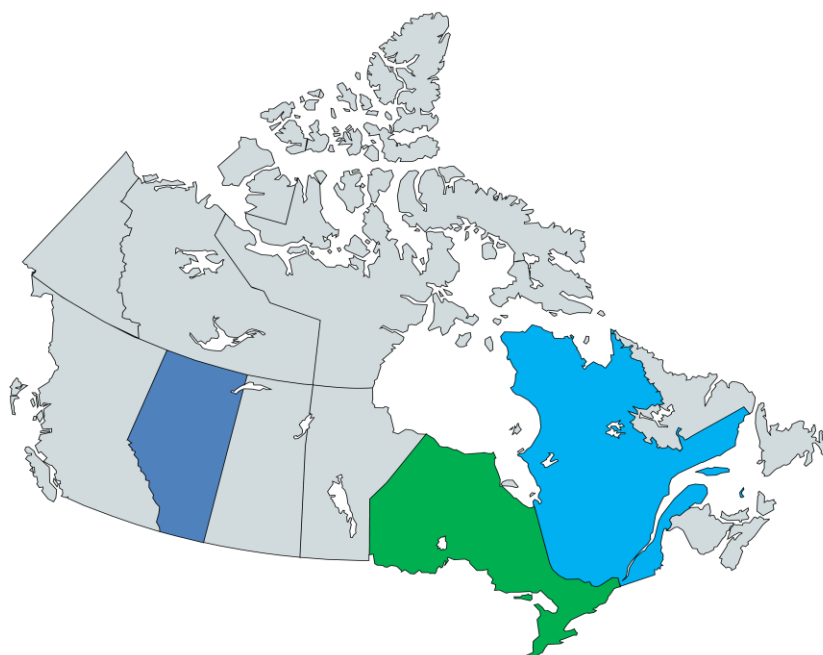
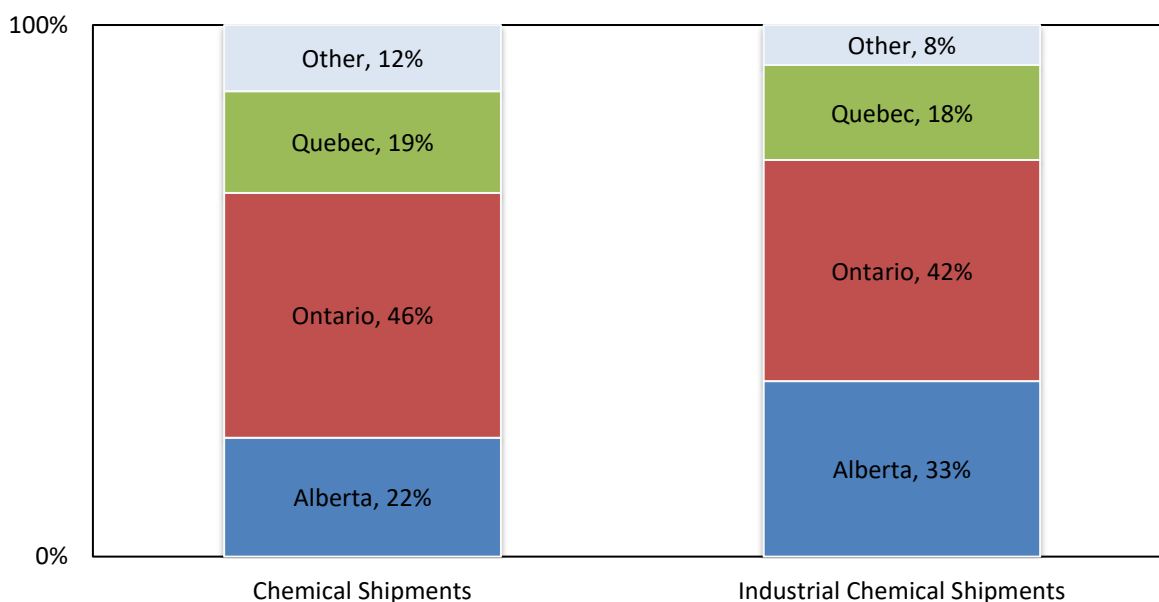
Table 14: Principal Statistics for Other Chemical Products (NAICS 3259)

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2013	4,698	10,800	4,798	2,055
2014	4,813	10,854	4,889	2,179
2015	4,932	10,905	5,147	2,161
2016	4,946	10,837	5,016	1,983
2017	5,042	10,660	5,410	1,965
2018	5,473	10,515	5,710	2,076
2019	5,793	11,100	5,894	2,147

## Provincial Statistics

Both the overall chemical industry and the industrial chemicals segment are concentrated in the provinces of Ontario, Alberta and Quebec (Figure 15). Further information about these three main provinces is contained in the following portions of the analysis.

**Figure 15: Provincial Distribution of the Chemical Industry, by Value of Shipments**

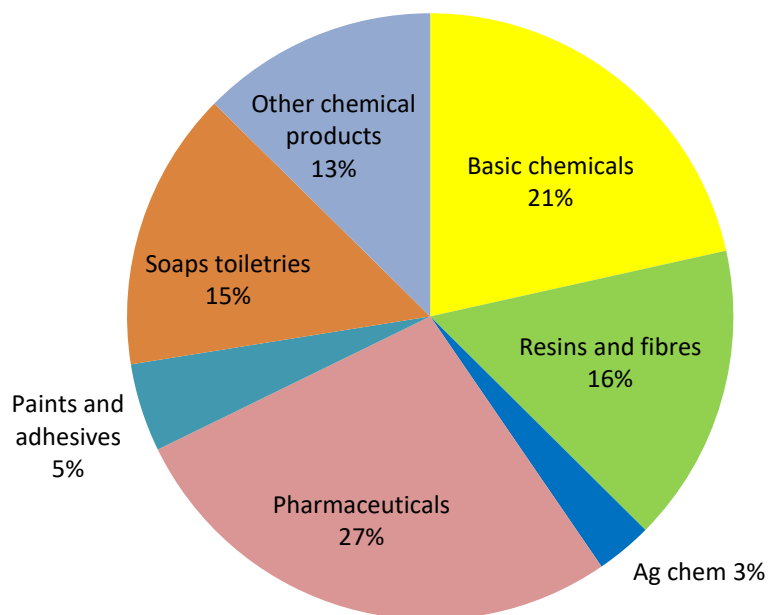




### a. Ontario

In 2019, Ontario's chemical industry had shipments of \$24.7 billion a decrease of 0.7 per cent from 2018. Industrial chemical shipments totaled 10.5 billion in 2019 a decrease of 1.2% from 2018 (Figure 16).

Figure 16: Composition of the Ontario Chemical Industry



The largest cluster for the industrial chemical industry is in the Sarnia region, with the next largest concentrations in the Golden Horseshoe and along the St. Lawrence Seaway.

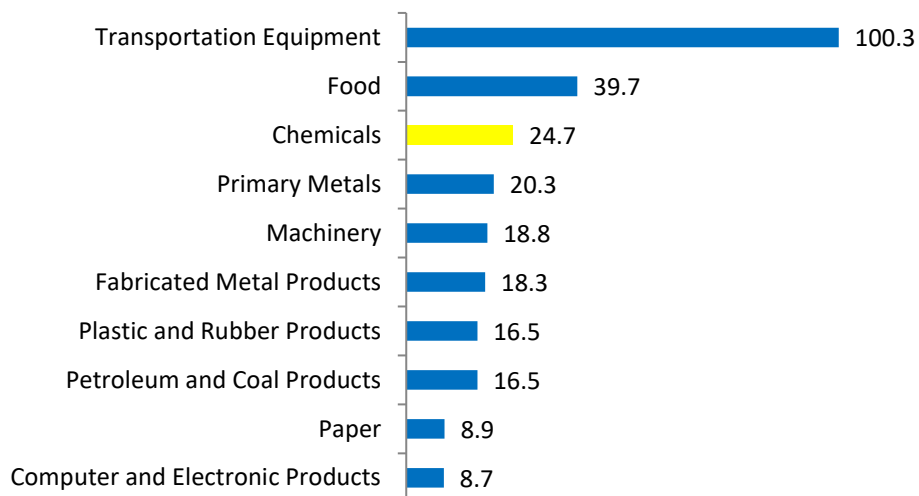
Table 15: Ontario Chemical Industry Shipments



Shipments, \$ billion	2018	2019	Change 2018-19
All chemicals	24.9	24.7	-0.7%
Industrial chemicals	10.6	10.5	-1.2%

On the basis of shipments, Chemicals was the 3<sup>rd</sup> largest of all manufacturing industries in the province in 2019 (Figure 17).

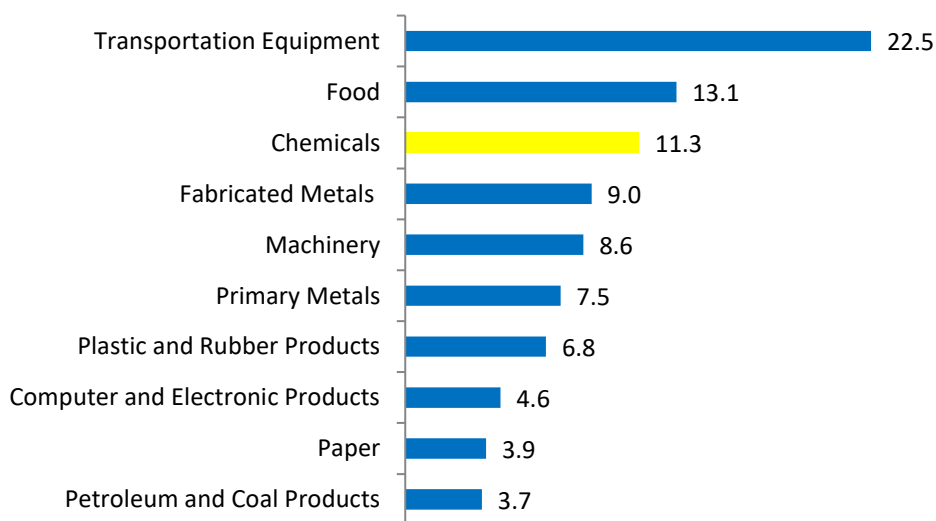
Figure 17: Top 10 Manufacturing Industries in Ontario by Value of Shipments, \$ Billion



### • Value Added

On the basis of value added, chemicals also ranked 3<sup>rd</sup> among all manufacturing industries in 2018 (latest data available) (Figure 18).

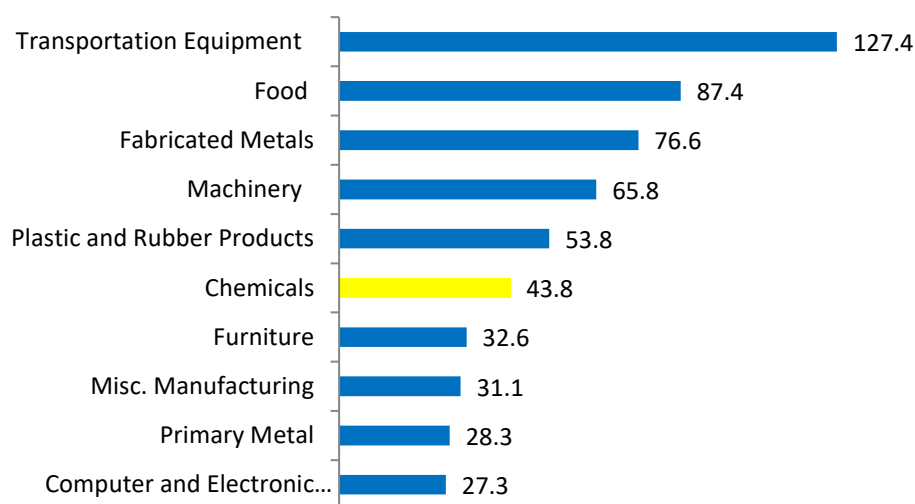
Figure 18: Top 10 Industries by Value Added in Ontario, \$ Billion



## • Employment Ranking

The chemical industry directly employed 43,800 people in Ontario in 2019, a decline of 2.6 per cent from 2018. When indirect employment is included, it is estimated that the chemical industry supports almost 260,000 jobs in the province. The number of employees working in industrial chemicals was 7,119 a 7.4 per cent decrease from 2018 when 7,691 people were employed. The industrial chemical sector supports almost 41,000 jobs in the province. When compared to other manufacturing industries, chemicals ranked 6<sup>th</sup> on the basis of employment (Figure 19).

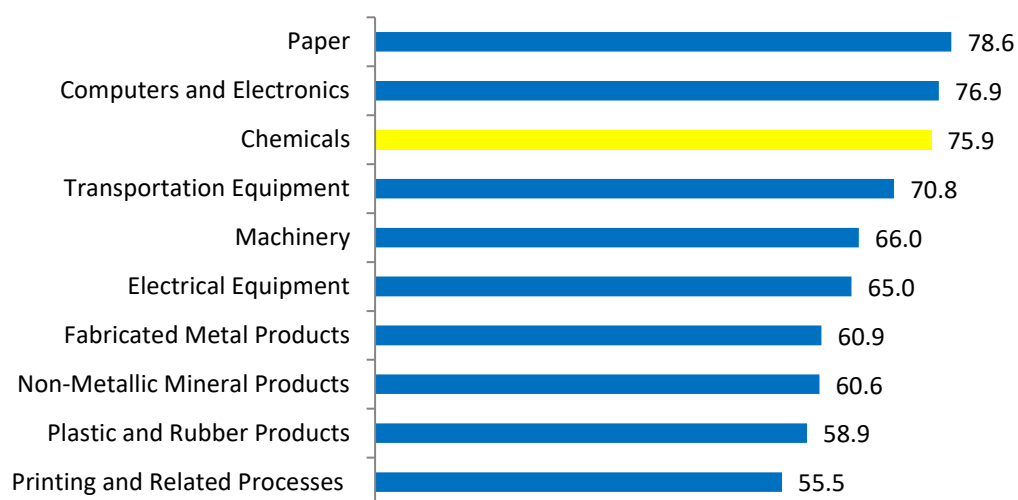
**Figure 19: Top 10 Manufacturing Industries by Number of Employees in Ontario in Thousands**



- Salaries and Wages

The chemical industry paid a total of \$3.32 billion in salaries and wages in the province in 2019. With an average annual salary of \$75,900, the industry ranked 3rd among all manufacturing industries in Ontario (Figure 20). **The average salary within industrial chemicals was much higher at \$100,900. The average salary across all manufacturing industries in Ontario was \$56,900.**

Figure 20: Top 10 Manufacturing Industries by Average Salary in Ontario in \$ Thousands




## • Trade

The value of exports by the chemical industry from Ontario in 2019 was \$18.8 billion, while imports were \$41.8 billion (Table 16). The United States was the destination for 71 per cent of exports, followed by Italy (5 per cent) Japan (3 per cent) and China, Germany and the U.K (2 per cent each). The United States was also the source for most of the imports (56 per cent), followed by Switzerland and Germany (6.7 per cent each).

For industrial chemicals, exports from the province in 2019 were \$7.7 billion, while imports were \$12.8 billion. The United States was the destination for 77 per cent of exports, followed by Germany (3.6 per cent), the U.K. (3.2 per cent) and China (2.4 per cent). The United States was also the source of most of the imports (73 per cent), followed by China (5 per cent).

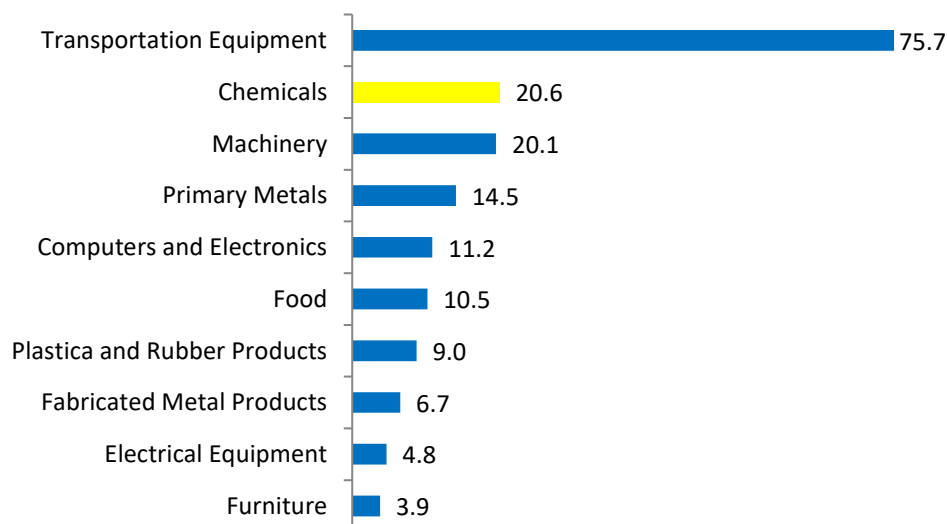
**Table 16: Trade by the Chemical Industry in Ontario**



Value of trade, \$ billion		2018	2019	Change 2018-19
<b>All chemicals</b>	<b>Imports</b>	40.0	41.8	4.5%
	<b>Exports</b>	18.8	18.8	0%
<b>Industrial chemicals</b>	<b>Imports</b>	13.1	12.8	-2.2%
	<b>Exports</b>	7.5	7.7	1.9%

Chemicals is the 2<sup>nd</sup> largest exporter among all manufacturing industries (Figure 21).

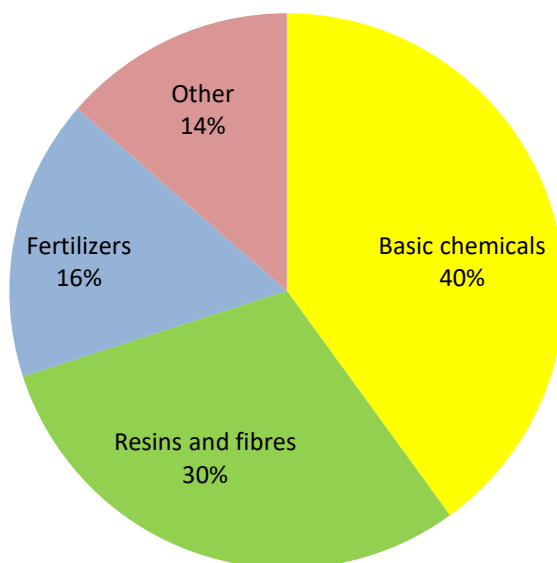
**Figure 21: Top 10 Manufacturing Industries by Value of Exports from Ontario, \$Billions**



## b. Alberta

In 2019, Alberta's chemical industry had shipments of \$12.1 billion (Table 17). Seventy per cent of the total was comprised of industrial chemicals, where shipments totaled \$8.4 billion (Figure 22).

**Figure 22: Composition of the Alberta Chemical Industry**



The industrial chemical industry in Alberta is concentrated in the Industrial Heartland region northeast of Edmonton, in central Alberta, near Red Deer, in Medicine Hat, and growing in size and scope near Grande Prairie.

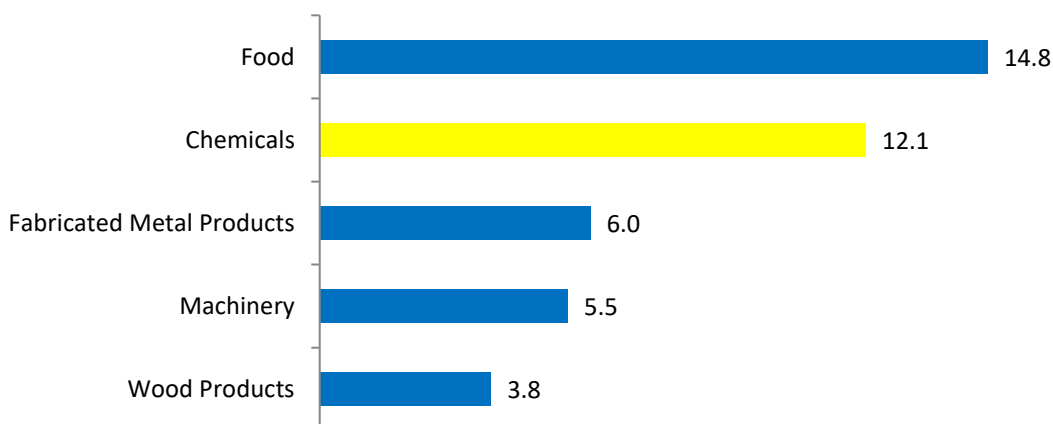
**Table 17: Alberta Chemical Industry Shipments**



Shipments, \$billion	2018	2019	Change 2018-19
All chemicals	14.1	12.1	-14.3%
Industrial chemicals	10.7	8.4	-21.7%

Based on value of shipments Chemicals ranked 2<sup>nd</sup> among all manufacturing industries in the province in 2019 (Figure 23).

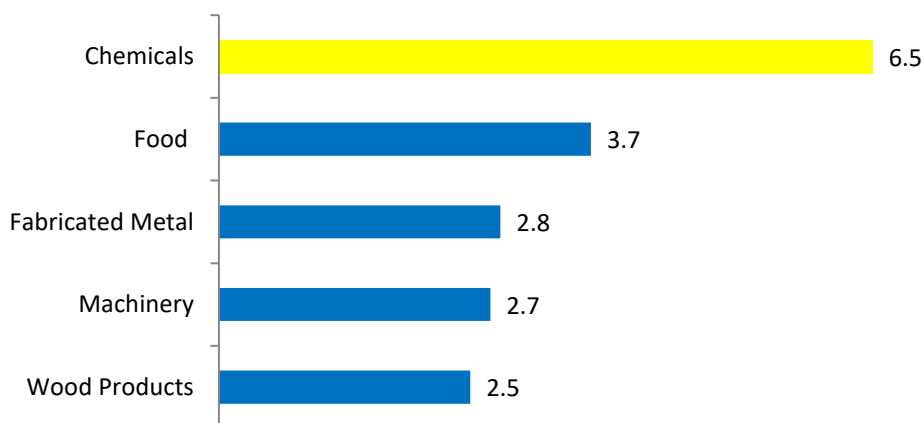
**Figure 23: Top 5 Manufacturing Industries in Alberta by Value of Shipments, \$Billion <sup>4</sup>**



### • Value Added

Based on value added, chemicals ranked 1<sup>st</sup> among all manufacturing industries (Figure 24) based on 2018 data (latest available).

**Figure 24: Top 5 Industries by Value Added in Alberta, \$ Billion**



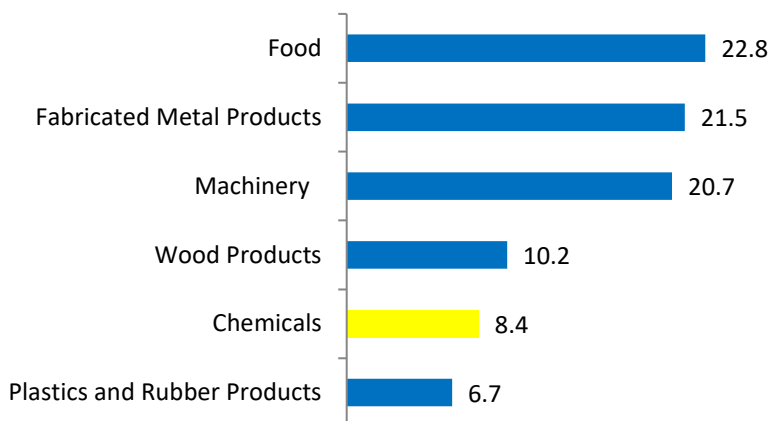
<sup>4</sup> The top 10 industries cannot be ranked because data for many industries has been suppressed by Statistics Canada.



### • Employment Ranking

The chemical industry employed 8,430 people in Alberta in 2019, an increase of 3 per cent compared to 2018. When indirect employment is included, it is estimated that the chemical industry supports about 50,000 jobs in the province. The number of employees working in industrial chemicals in 2019 was 3,725 indirectly supporting over 21,000 jobs in the province. When compared to other manufacturing industries in the province, chemicals ranked 5<sup>th</sup> (Figure 25).

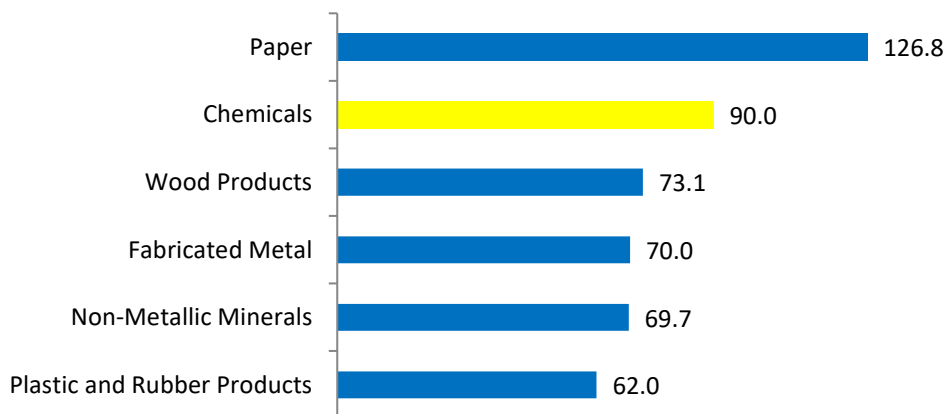
Figure 25: Top 5 Manufacturing Industries by Employment in Alberta



### • Salaries and Wages

The chemical industry paid a total of \$759 million in salaries and wages in the province in 2019. The average salary paid to employees in the chemical industry was \$90,000, which ranked 2<sup>nd</sup> among all manufacturing industries (Figure 26). The average salary within industrial chemicals was \$114,200.

Figure 26: Top 5 Manufacturing Industries by Average Salary in Alberta, \$ Thousands



## • Trade

The value of exports by the chemical industry from Alberta in 2019 was \$7.9 billion, while imports were \$2.9 billion (Table 18). The United States was the destination for 86 per cent of exports, followed by China (12 per cent) and Mexico (2 per cent). The United States was also the source of most imports (82 per cent), followed by China (6 per cent), and Germany (2 per cent).

For industrial chemicals, exports from the province in 2019 were \$6.9 billion, while imports were \$1.5 billion. The United States was the destination for 80 per cent of exports, followed by China (11 per cent) and Mexico (2.5 per cent). The United States was the source of most imports (80 per cent), followed by China (9 per cent), and Italy (2 per cent).

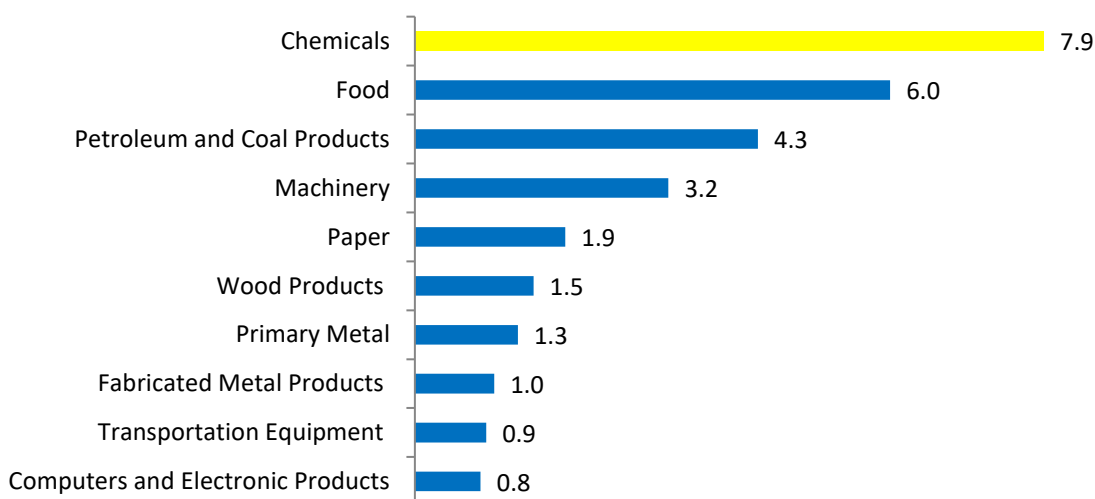
**Table 18: Trade by the Chemical Industry in Alberta**



Value of trade, \$ billion		2018	2019	Change 2018-19
<b>All chemicals</b>	<b>Imports</b>	3.0	2.9	-4.3%
	<b>Exports</b>	9.1	7.9	-13.2%
<b>Industrial chemicals</b>	<b>Imports</b>	1.7	1.5	-11.8%
	<b>Exports</b>	8.2	6.9	-15.9%

Chemicals ranks 1<sup>st</sup> among manufacturing industries in terms of exports from Alberta (Figure 27). Considering all commodities, chemicals ranked 3<sup>rd</sup> behind only crude oil and natural gas.

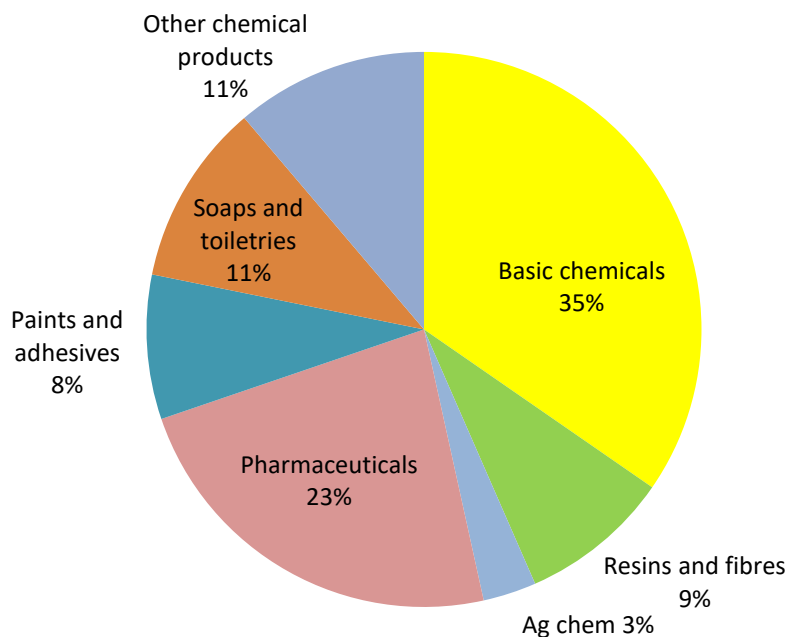
**Figure 27: Top 10 Manufacturing Industries by Value of Exports from Alberta, \$ Billion**



### c. Quebec

In 2019, Quebec's chemical industry had shipments of \$11.2 billion and, of that, 45 per cent is comprised of industrial chemicals (Figure 28).

**Figure 28: Composition of the Quebec Chemical Industry**



In 2019, shipments of industrial chemicals were \$4.5 billion (Table 19). The industrial chemical industry in Quebec is concentrated in the eastern end of Montreal and along the south shore of the St. Lawrence River.

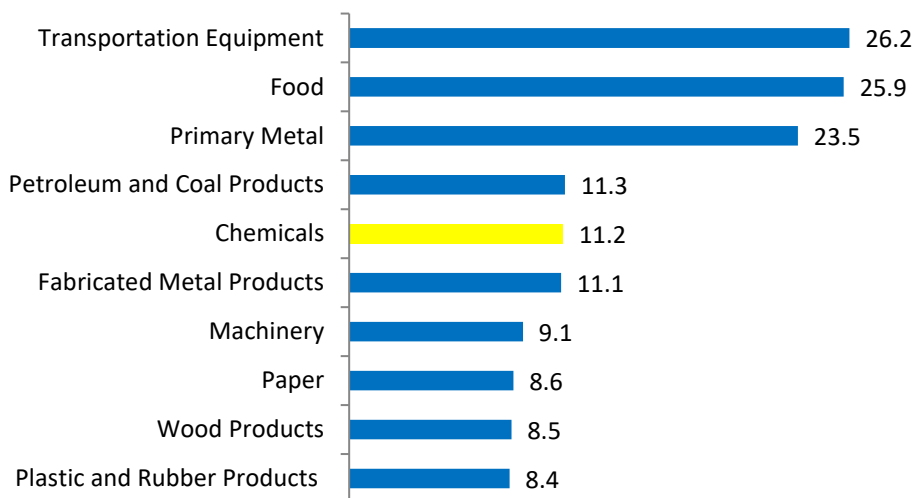
**Table 19: Quebec Chemical Industry Shipments**



Shipments, \$billion	2018	2019	Change 2018-19
All chemicals	10.3	11.2	8.6%
Industrial chemicals	4.6	4.5	-1.0%

Based on shipments Chemicals was the 5<sup>th</sup> largest manufacturing industry (Figure 29).

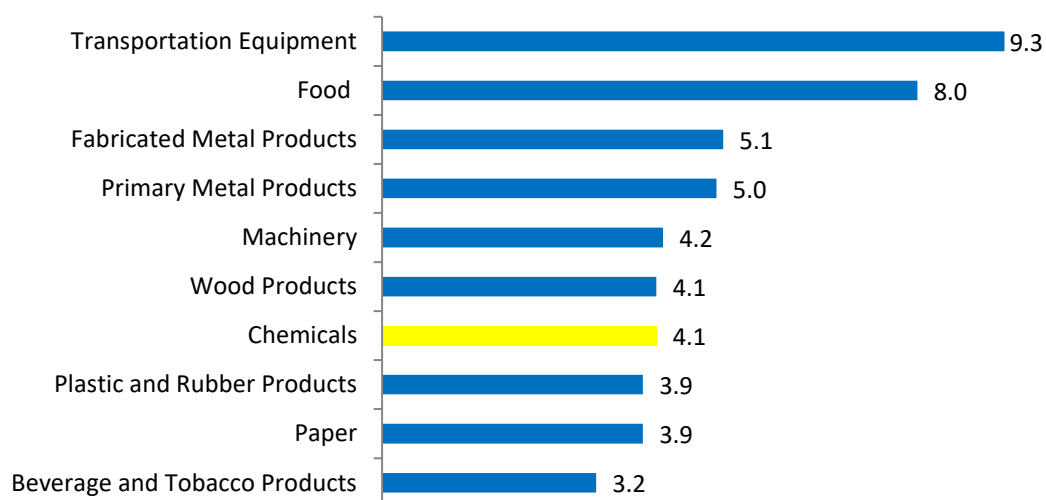
**Figure 29: Top 10 Manufacturing Industries in Quebec by Value of Shipments, \$ Billion**



### • Value Added

Based on value added, chemicals ranked 7<sup>th</sup> among all manufacturing industries in Quebec in 2018 (Figure 30).

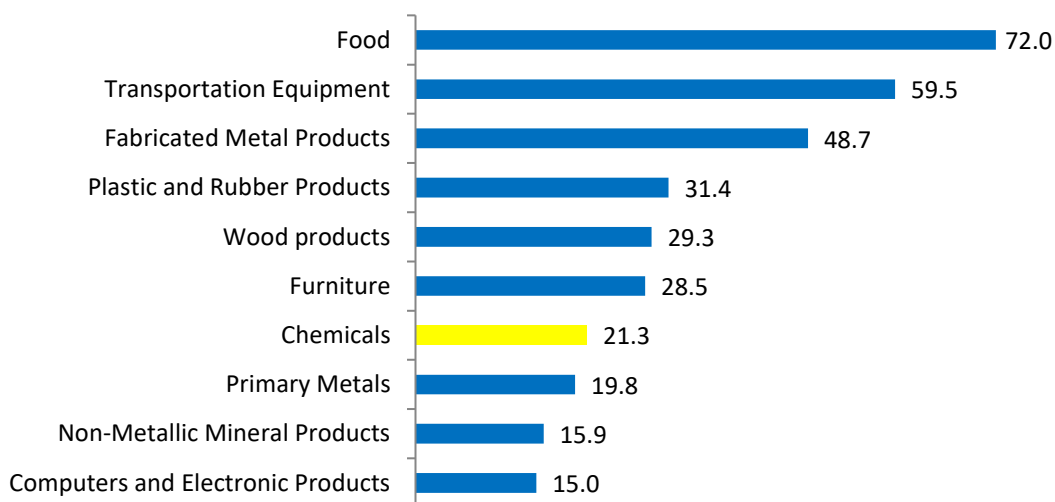
**Figure 30: Top 10 Manufacturing Industries by Value Added in Quebec**



## • Employment Ranking

The chemical industry employed 21,300 people in Quebec in 2019. When indirect employment is included, it is estimated that the chemical industry supports 125,000 jobs in the province. The industrial chemical industry employs 4,030 and supports an additional 21,000 jobs in the province. When compared to all manufacturing industries in the province, chemicals ranked 7<sup>th</sup> (Figure 31).

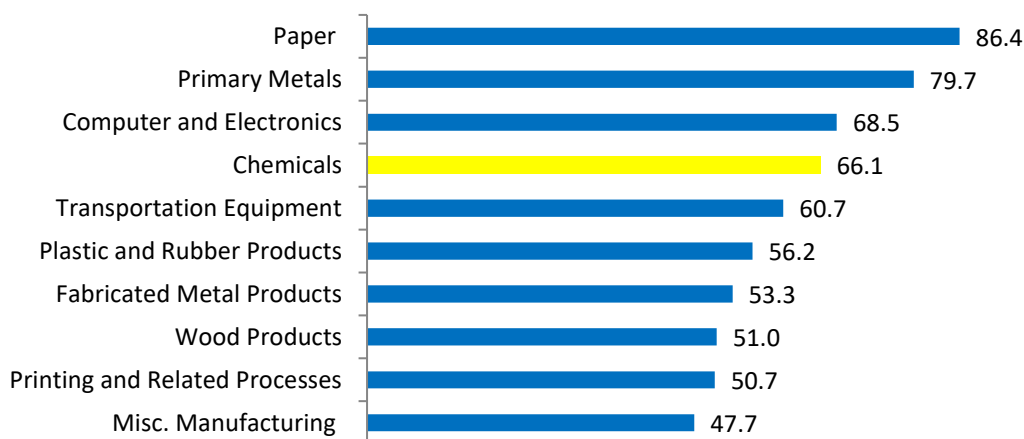
Figure 31: Top 10 Manufacturing Industries by Employment in Quebec



## • Salaries and Wages

The chemical industry paid a total of \$1.4 billion in salaries and wages in the province in 2019, corresponding to an average annual salary of \$66,100, which placed the industry 4<sup>th</sup> in Quebec (Figure 32). **For all manufacturing, the average salary in the province was \$55,790.**

Figure 32: Top 10 Industries by Average Salary in Quebec, \$ Thousands



## • Trade

The value of exports by the chemical industry from Quebec in 2019 was \$6.2 billion and imports were \$8.9 billion (Table 20). The United States was the destination for 76 per cent of exports, followed by Mexico (3 per cent) and Belgium (2.5 per cent). Quebec is different from the other provinces in that a much lower proportion of its imports come from the United States (38 per cent), followed by Germany (11 per cent), France (8 per cent) and China (6 per cent).

For industrial chemicals, exports from the province in 2019 were \$2.9 billion, and imports were \$3.2 billion. The United States was the destination for 81 per cent of exports, followed by Mexico (4 per cent) and China (4 per cent). The United States was the source of 35 per cent of imports, followed by China (11 per cent), and Germany (7 per cent).

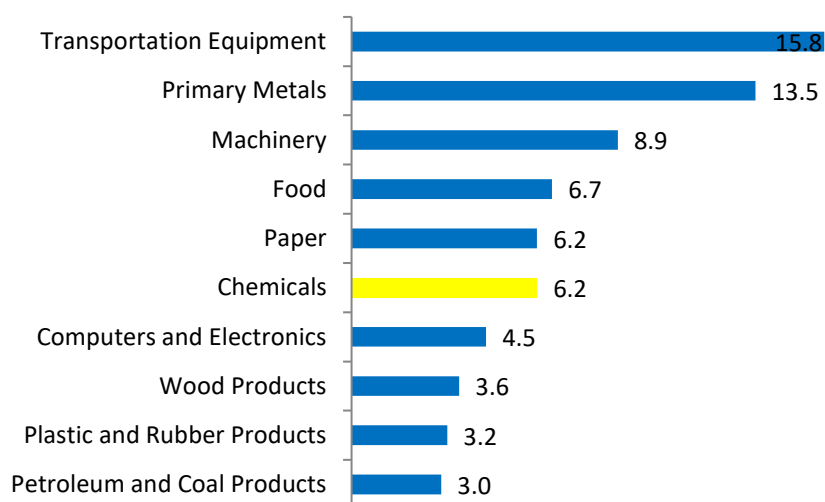
**Table 20: Trade by the Chemical Industry in Quebec**



Value of trade, \$ billion		2018	2019	Change 2018-19
<b>All chemicals</b>	<b>Imports</b>	8.6	8.9	6.2%
	<b>Exports</b>	6.2	6.2	10.7%
<b>Industrial chemicals</b>	<b>Imports</b>	3.2	3.2	0.1%
	<b>Exports</b>	2.9	2.9	-0.1%

Compared to all other manufacturing industries, chemicals were the 6<sup>th</sup> largest export industry (Figure 33).

**Figure 33: Top 10 industries by Value of Exports from Quebec, \$ Billion**



## Industry Profiles

The segments of the chemical industry of primary interest to CIAC members are profiled according to the following categories:



- Petrochemicals and other organic chemicals
- Inorganic chemicals
- Synthetic resins, rubbers and fibres
- Specialty chemicals

### a. Petrochemicals and Other Organic Chemicals

Statistics Canada reports data on organic chemicals in two industry groups:

- NAICS 32511 – Petrochemicals
- NAICS 32519 – Other organic chemicals.

The petrochemicals industry only includes hydrocarbons. The main petrochemicals produced by CIAC members in Canada are ethylene, propylene, butylenes, butadiene, higher olefins, alkanes, benzene, toluene, xylenes, and styrene. Ethylene is the largest-volume petrochemical; it is always consumed very close to the point of production so almost none is traded.

Organic chemicals that contain atoms other than hydrogen and carbon are captured in the other organic chemicals industry. CIAC members produce all of the largest-volume chemicals in this category in Canada: methanol, isopropyl alcohol, and ethylene glycol.

**Table 21: Principal Statistics for Petrochemicals and Other Organic Chemicals**

	2015	2016	2017	2018	2019
<b>Establishments</b>					
Petrochemicals	27	28	27	16	29
Other organic chemicals	140	133	150	92	145
<b>Shipments \$M</b>					
Petrochemicals	5,596	5,597	6,747	6,587	6,587
Other organic chemicals	4,622	3,402	4,820	6,328	6,328
<b>Employment</b>					
Petrochemicals	1,859	1,859	2,205	2,010	2,068
Other organic chemicals	3,603	2,367	3,543	3,537	3,640
<b>Exports \$M</b>					
Petrochemicals	1,829	1,556	1,880	2,488	2,061
Other organic chemicals	3,804	3,924	4,138	4,241	3,865
<b>Imports \$M</b>					
Petrochemicals	985	894	966	1,067	817
Other organic chemicals	6,750	6,022	6,292	6,609	6,473



## Commodity Data

Statistics Canada reports production data for a limited number of organic chemicals (Table 22).

**Table 22: Canadian Production of Specific Organic Chemicals, Kilotonnes**

	2014	2015	2016	2017	2018
Benzene	670	585	597	807	852
Toluene	229	175	128	477	484
Xylenes	381	350	307	646	634
Butadiene	216	219	237	215	235
Propylene	550	532	515	563	588
Formaldehyde	165	150	149	154	151

More data exists for imports and exports than for domestic production. Table 23 shows the exports for a select range of organic chemicals, in both tonnage and dollar value terms.

**Table 23: Canadian Exports of Select Organic Chemicals, Kilotonnes**

	Value, \$M	Quantity, kt	Top Markets
Benzene	108	96	USA 66% France 12% Slovakia 11% Netherlands 10%
Butadiene	91	76	USA 99%
Ethylene glycol	1,007	1,513	China 53% USA 45% Singapore 2%
Higher olefins	220	172	USA 95% China 3%
Isopropyl alcohol	87	75	USA 99%
Methanol	156	355	USA 99%
Propylene	253	187	USA 99%
Styrene	651	562	USA 100%

**Table 24: Canadian Imports of Select Organic Chemicals, Kilotonnes**

	Value, \$M	Quantity, kt	Top Markets
Benzene	21	12	USA 84% Japan 9% China 7%
Butadiene	5.5	4.7	USA 94% Germany 5%
Ethylene glycol	11.5	10	USA 98%

Higher olefins	108	75	USA 80% South Africa 12% Saudi Arabia 7%
Isopropyl alcohol	44	22	USA 88% China 5%
Methanol	120	285	Trinidad and Tobago 80% Venezuela 7% USA 6%
Propylene	39	70	USA 97%
Styrene	2.1	1.5	USA 99%

### • CIAC Members Producing Petrochemicals and Organic Chemicals in Canada

- › ARLANXEO Canada Inc.
- › BASF Canada
- › Canada-Kuwait Petrochemical Corporation<sup>5</sup>
- › Dow Chemical Canada ULC
- › Evonik Oil Additives Canada Inc.
- › H.L. Blachford Ltd.
- › Imperial Oil
- › INEOS Canada Partnership
- › Inter-Pipeline Ltd.<sup>6</sup>
- › Lanxess Canada Co./Cie
- › Jungbunzlauer Canada Inc.
- › MEGlobal Canada ULC
- › Methanex Corporation
- › Nouryon
- › NOVA Chemicals Corporation
- › SEQENS
- › Shell Chemicals Canada Ltd.
- › Stepan Canada Inc.
- › W.R. Grace Canada Corp

### b. Industrial Gases

Statistics Canada reports data on Industrial gases as part of basic chemicals within NAICS 32512.

Under this category there is a single sub-category – Industrial Gas Manufacturing

Industrial Gas manufacturers produce organic and inorganic gases in compressed - liquid and solid forms. Some of the most used industrial gases include acetylene, carbon dioxide, helium, hydrogen, nitrogen, dry ice and oxygen. Manufacturing processes also include industrial gas separation and air separation configurations.

Often Industrial Gas manufacturers will co-locate on larger manufacturing sites utilize feedstock streams produced as co-products from the larger facility. However, this is not a hard rule, with diverse customer markets and a relatively small physical footprint industrial gas manufacturers can also locate closer to demand in light industrial areas.

<sup>5</sup> Currently pre-production facility is under construction

<sup>6</sup> Currently pre-production facility is under construction

**Table 25: Principal Statistics for Industrial Gases**

	2015	2016	2017	2018	2019
<b>Establishments</b>	*	*	*	145	145
<b>Shipments \$M</b>	1,084	1,060	1,053	1,196	4,649
<b>Employment</b>	1,683	1,683	1,059	1,295	1,296
<b>Exports \$M<sup>7</sup></b>	151	166	147	138	120
<b>Imports \$M</b>	151	191	192	217	187

### ● CIAC Members Producing Industrial Gases

- Praxair Canada Inc.

### c. Inorganic Chemicals

Statistics Canada reports data on inorganic chemicals as part of basic chemicals within NAICS 32518. Under this category there are two sub-industry classifications:

- NAICS 325811 – Alkali and chlorine
- NAICS 325819 – Other inorganic chemicals.

Since 2010, shipment and employment data have been suppressed at the 6-digit NAICS level and only reported at the 5-digit level.

The main inorganic chemicals produced by CIAC members in Canada are: chlorine, sodium hydroxide, hydrochloric acid, hydrogen peroxide, sodium chlorate, sodium silicates, sulphuric acid, and titanium dioxide.

**Table 26: Principal Statistics for Inorganic Chemicals**

	2015	2016	2017	2018	2019
<b>Establishments</b>					
Chlor-alkali	6	7	7	5	5
Other inorganic chemicals	129	132	128	104	104
<b>Shipments \$M</b>	4,147	4,303	4,585	4,649	4,649
<b>Employment</b>	5,308	5,042	4,588	4,897	4,897
<b>Exports \$M<sup>8</sup></b>					
Chlor-alkali	68	66	64	69	88

<sup>7</sup> Exports and Imports sometimes exceed shipments due to different databases used to collect the two sets of data.

<sup>8</sup> Exports and Imports sometimes exceed shipments due to different databases used to collect the two sets of data.

Other inorganic chemicals	3,800	3,704	3,512	3,724	3,701
<b>Imports \$M</b>					
Chlor-alkali	377	402	435	522	456
Other inorganic chemicals	2,112	1,971	1,847	2,187	2,852

## • Commodity Data

Statistics Canada reports production data for a limited number of inorganic chemicals (Table 25).

**Table 27: Canadian Production of Specific Inorganic Chemicals, Kilotonnes**

	2014	2015	2016	2017	2018
Carbon black	241	219	215	241	243
Chlorine	510	442	411	894	269
Hydrogen peroxide	240	247	221	239	243
Sodium hydroxide*	560	487	453	453	445

\*estimated

More data exists for imports and exports than for domestic production.

**Table 28: Canadian Exports of Select Inorganic Chemicals, Kilotonnes**

	Value, \$M	Quantity, kt	Top markets
Carbon black	254	152	USA 79% China 3% Belgium 3%
Chlorine	50	175	USA 100%
Hydrochloric Acid	49	291	USA 99%
Hydrogen Peroxide	54	100	USA 99%
Sodium Chlorate	378	507	USA 84% Japan 9%
Sodium Hydroxide	26	46	USA 99%
Sodium Silicate	22	43	USA 99%
Sulphuric Acid	244	2,045	USA 99%
Titanium Dioxide	15	3	Germany 67% India 10% Brazil 8% USA 6%

**Table 29: Canadian Imports of Select Inorganic Chemicals**

	Value, \$M	Quantity, kt	Top Markets
Carbon black	128	78	USA 83% Russia 12%

Chlorine	2.0	3.1	USA 98%
Hydrochloric Acid	7.1	31	USA 99%
Hydrogen Peroxide	23	25	USA 92%
			Switzerland 5%
Sodium Chlorate	5.2	4.6	USA 61%
			U.K. 32%
Sodium Hydroxide	275	447	USA 75%
			Taiwan 12%
			China 11%
Sodium Silicates	8	15	USA 89%
			Netherlands 4%
			China 4%
Sulphuric Acid	18.6	94	USA 99%
			China 67%
Titanium Dioxide	19.3	6.2	France 15%
			USA 7%
			Germany 3%

### • CIAC Members Producing Inorganic Chemicals in Canada

- › Arkema Canada Inc.
- › CCC Sulphur Products
- › Chemtrade
- › ERCO Worldwide
- › Evonik Canada Inc.
- › KRONOS Canada Inc.
- › National Silicates Limited
- › Cabot Canada Ltd.
- › NorFalco Sales Inc., GLENCORE Canada Corporation
- › Nouryon
- › Olin Canada ULC
- › Praxair Canada Inc.
- › Solvay Canada Inc.
- › W.R. Grace Canada Corp
- › United Initiators Canada Ltd

### c. Synthetic Resins, Rubbers and Fibres

There are two industry sub-groups within this classification:

- NAICS 32521 – Synthetic resins and rubbers
- NAICS 32522 – Synthetic fibres.

Since 2013, shipment and employment data have been suppressed at the 5-digit NAICS level and only reported at the 4-digit level.

The main synthetic resins and rubbers produced in Canada are polyethylene, ethylene vinyl acetate, polystyrene, PVC, polyacrylamides, PET, nylons, urea and phenol formaldehydes, latex emulsions, unsaturated polyesters, silicones, and butyl and halobutyl rubbers. Synthetic fibres are produced in Canada using a variety of domestically-produced and imported resins.

**Table 30: Principal Statistics for Synthetic Resins Rubbers and Fibres**

	2015	2016	2017	2018	2019
<b>Establishments</b>					
Synthetic resins and rubbers	121	117	119	91	112
Synthetic fibres	30	25	28	17	32
<b>Shipments \$M</b>	9,599	9,710	9,161	9,736	8,996
<b>Employment, 000</b>	4,705	4,920	4,484	5,423	4,812
<b>Exports \$M</b>					
Synthetic resins and rubbers	8,143	7,932	7,626	8,515	7,712
Synthetic fibres	391	370	316	301	307
<b>Imports \$M</b>					
Synthetic resins and rubbers	8,045	8,033	8,734	9,249	8,624
Synthetic fibres	608	583	601	597	528

## Commodity Data

Within these industries, Statistics Canada reports production data only for polyethylene (Table 28).

**Table 31: Canadian Production of Synthetic Resins, Kilotonnes**

	2014	2015	2016	2017	2018
Polyethylene	3,641	3,854	3,854	3,599	4,020

**Table 32: Canadian Exports of Select Synthetic Resins and Rubbers**

	Value, \$M	Quantity, kt	Top Markets
Butyl and halobutyl rubbers	272	81	USA 37% China 39% Mexico 7% South Korea 2%
Polyethylene	4,988	3,275	USA 86% Mexico 4%

**Table 33: Canadian Imports of Select Synthetic Resins and Rubbers**

	Value, \$M	Quantity, kt	Top Markets
Butyl and Halobutyl Rubbers	30	10	Russia 49% Belgium 27% USA 21%
Polyethylene	1,905	892	USA 96%

## CIAC Members Producing Synthetic Resins, Rubbers and Fibres in Canada

- › ARLANXEO Canada Inc.
- › BASF Canada
- › Dow Chemical Canada ULC
- › DuPont Canada Company
- › Imperial Oil
- › NOVA Chemicals Corporation



## d. Specialty Chemicals

This profile is different from the others in the series. There is no Statistics Canada aggregation that provides data for an industry called specialty chemicals. Therefore, a number of assumptions have been made to derive an approximation for the size of this industry grouping.

Examples of the types of specialty chemicals produced by CIAC members include: fatty acids, maleic anhydride, plasticizers, citric acid, photochemicals, and additives for lubricants, plastics and rubber.

- Assumption #1: Specialty chemicals are a subset of NAICS 32519 – Other organic chemicals. Very little, if any, specialty chemicals fall within the petrochemical industry as it is comprised primarily of commodity products. For this analysis it is assumed that inorganic chemicals and synthetic resins and rubbers can also be excluded.
- Assumption #2: The ratio of specialty chemical to commodity chemical exports can be used to estimate the value of shipments and employment attributable to specialty chemicals. This assumption allows the use of relatively-detailed trade data to gain a measure of the level of specialty chemical production in Canada. However, deciding which products are commodity versus which are specialty remains subjective.

There are approx. 15 facilities in Canada producing ethanol that are captured within the other organic chemical industry. Since ethanol is primarily used for fuel, these facilities are not considered part of specialty chemicals.

Estimated statistics for the total other organic chemicals industry and the specialty component are shown in Table 30. The data for the other organic chemicals industry includes both commodity and specialty chemicals, and is repeated from the Petrochemicals profile. It is presented again to provide an indication of the relative size of the commodity versus specialty element of the industry.

**Table 34: Estimated Principal Statistics for Specialty Chemicals**

	2015	2016	2017	2018	2019
<b>Establishments</b>					
Other organic chemicals	140	133	150	92	145
Specialty chemicals	120	115	130	72	113
<b>Shipments \$M</b>					
Other organic chemicals	4,622	3,262	3,780	6,328	6,328
Specialty chemicals	1,940	1,370	1,620	2,660	2,660
<b>Employment, 000</b>					
Other organic chemicals	3,603	2,367	3,543	3,537	3,640
Specialty chemicals	1,450	994	1,760	1,880	1,880
<b>Exports \$M</b>					
Other organic chemicals	3,804	3,924	4,138	4,399	3,865
Specialty chemicals	1,600	1,650	1,740	1,850	1,620
<b>Imports \$M</b>					
Other organic chemicals	6,750	6,021	6,290	6,603	6,473
Specialty chemicals	2,840	2,530	2,640	2,770	2,720



## Commodity Data

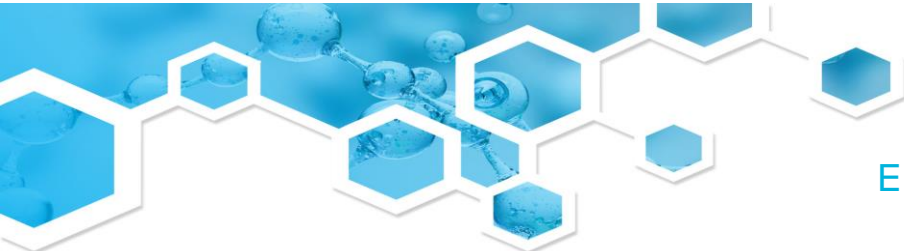
Table 34 shows the exports for a select range of specialty chemicals, in both tonnage and dollar value terms in 2014.

**Table 35: Canadian Exports of Select Specialty Chemicals, Tonnes**

	Value, \$M	Quantity, kt	Top Markets
Palmitates and stearates	7.8	3.74	USA 83% Hong Kong 3% China 3%
Dinonyl or didecyl orthophthalates	3.1	1.08	USA 100%
Azo compounds	2.8	0.002	USA 83% Japan 10%
Cyanine dyes	40	2.5	USA 100%
Azo dyes	4.06	0.12	USA 92% Spain 2% China 2%
Other fatty acids	3.7	7.08	USA 61% China 22% Germany 13%

**Table 36: Canadian Imports of Select Specialty Chemicals. Kilotonnes**

	Value, \$M	Quantity, kt	Top Markets
Palmitates and stearates	38.8	18.7	USA 52% Malaysia 27% India 4% Indonesia 2%
Dinonyl or didecyl orthophthalates	13.0	6.9	Germany 37% Sweden 32% USA 25%
Azo compounds	6.36	0.43	Mexico 89% USA 4% Japan 3%
Cyanine dyes	102.9	7.68	USA 50% China 19% Germany 12% India 9%
Azo dyes	30.3	1.99	USA 39% India 29% France 14% China 6% Germany 5%
Other fatty acids	37.1	30.5	Malaysia 66%



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USA 21%  
India 9%

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- **CIAC Members Producing Specialty Chemicals in Canada**

- › BASF Canada
- › Evonik Oil Additives Canada Inc.
- › H.L. Blachford Ltd.
- › Imperial Oil
- › Jungbunzlauer Canada Inc.
- › Lanxess Canada Co./Cie
- › Nouryon
- › Procter and Gamble, Inc.
- › SEQENS
- › Stepan Canada Inc.
- › W.R. Grace Canada Corp

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