

# Chemistry Industry Economic Profile

# 2017



**CHEMISTRY INDUSTRY  
ASSOCIATION OF CANADA**



**Responsible Care®**  
Our commitment to sustainability.





## **CHEMISTRY INDUSTRY ASSOCIATION OF CANADA**

The Chemistry Industry Association of Canada (CIAC) is the voice of Canada's \$52 billion chemistry industry and represents more than 50 members and partners across the country. The industry employs 87,300 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 reduces harm throughout the entire life cycle of their products.



## Contents

<b>President's Message.....</b>	<b>3</b>
<b>Introduction .....</b>	<b>4</b>
<b>Chemical industry at a glance .....</b>	<b>6</b>
<b>Manufacturing shipments (revenue) .....</b>	<b>7</b>
<b>Employment .....</b>	<b>9</b>
<b>Salaries and wages.....</b>	<b>10</b>
<b>International trade .....</b>	<b>12</b>
<b>Profits.....</b>	<b>14</b>
<b>Productivity .....</b>	<b>14</b>
<b>Price Index.....</b>	<b>15</b>
<b>Capacity utilization.....</b>	<b>16</b>
<b>Other chemical manufacturing subsectors .....</b>	<b>17</b>
<b>Provincial statistics.....</b>	<b>20</b>
a. <b>Ontario .....</b>	<b>21</b>
b. <b>Alberta.....</b>	<b>26</b>
c. <b>Quebec .....</b>	<b>31</b>
<b>Industry profiles .....</b>	<b>35</b>
a. <b>Petrochemicals and other organic chemicals .....</b>	<b>35</b>
b. <b>Inorganic chemicals .....</b>	<b>38</b>
c. <b>Synthetic resins, rubbers and fibres.....</b>	<b>40</b>
d. <b>Specialty chemicals.....</b>	<b>42</b>

## ➤ President's Message



I am pleased to present to you the ***Chemistry Industry Association of Canada's*** (CIAC) 2018 ***Chemistry Industry Economic Profile***.

Canada's \$52 billion chemical manufacturing industry is a significant contributor to our country's economy. The sector is directly responsible for 87,300 jobs and pays over \$6 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.

In 2017, the industry saw a four per cent increase in shipments, with growth in all regions of the country.

This annual review and the accompanying executive summary provides 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 Annual Industry Economic Profile provides a statistical review of various key industry indicators including number on shipments, imports, exports, and employment. 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 [national and provincial scorecards](#)<sup>2</sup> that detail the state of policy initiatives and their effects on the industry and a [Year-End Survey of Business Conditions](#),<sup>3</sup> 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.

---

<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.

<sup>2</sup> <http://canadianchemistry.ca/index.php/en/fact-sheets-brochures>

<sup>3</sup> <http://canadianchemistry.ca/index.php/en/publications>

# Industry Economic Profile

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

## For more information about this report:

### David Podruzny

Vice President, Business and Economics

[dpodruzny@canadianchemistry.ca](mailto:dpodruzny@canadianchemistry.ca)

(613) 237-6215 ext. 229

### David Cherniak

Senior Policy Analyst, Business and Economics

[dcherniak@canadianchemistry.ca](mailto:dcherniak@canadianchemistry.ca)

(613) 237-6215 ext. 231

# Industry Economic Profile

## ► Chemistry industry at a glance

Chemical industry<sup>4</sup> shipments in Canada in 2017 were \$52 billion, exports were \$35 billion and imports totaled \$56 billion.

The industry employed 87,300 workers in 2017 which constituted 5.5 per cent of all manufacturing jobs. 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<sup>1</sup> is 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 2017 were \$26 billion, exports were \$19 billion, imports were \$19 billion, and employment was 17,500.

**Table 1: Chemical industry statistics**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Shipments, \$ billion</b>	49.7	40.1	43.4	47.1	48.6	49.7	52.2	51.6	50.2	52.2
<b>Employment, 000</b>	80.9	78.4	81.4	79.8	83.6	83.9	84.3	86.4	83.8	87.3
<b>Imports, \$ billion</b>	42.1	39.9	40.8	43.4	44.4	46.4	50.3	53.7	53.3	55.8
<b>Exports, \$ billion</b>	32.0	26.5	27.8	31.3	29.6	32.0	35.5	38.1	38.7	35.4



**Table 2: Industrial chemical statistics**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Shipments, \$ billion</b>	27.1	18.3	22.0	25.3	24.7	25.5	26.1	25.4	23.8	24.7
<b>Employment, 000</b>	18.1	16.1	17.2	17.2	17.2	17.4	17.5	17.7	16.3	17.0
<b>Imports, \$ billion</b>	17.5	13.8	15.9	17.1	17.3	17.9	19.3	19.7	18.8	19.8
<b>Exports, \$ billion</b>	18.4	13.2	15.7	18.6	17.0	18.7	19.8	19.2	18.7	18.7

<sup>4</sup> Chemical industry and industrial chemicals are defined on page 1.



# Industry Economic Profile

## ➤ Manufacturing shipments (revenue)

In 2017, the value of the Canadian chemical industry manufacturing shipments was \$52.2 billion, an increase of 4 per cent compared to 2016.

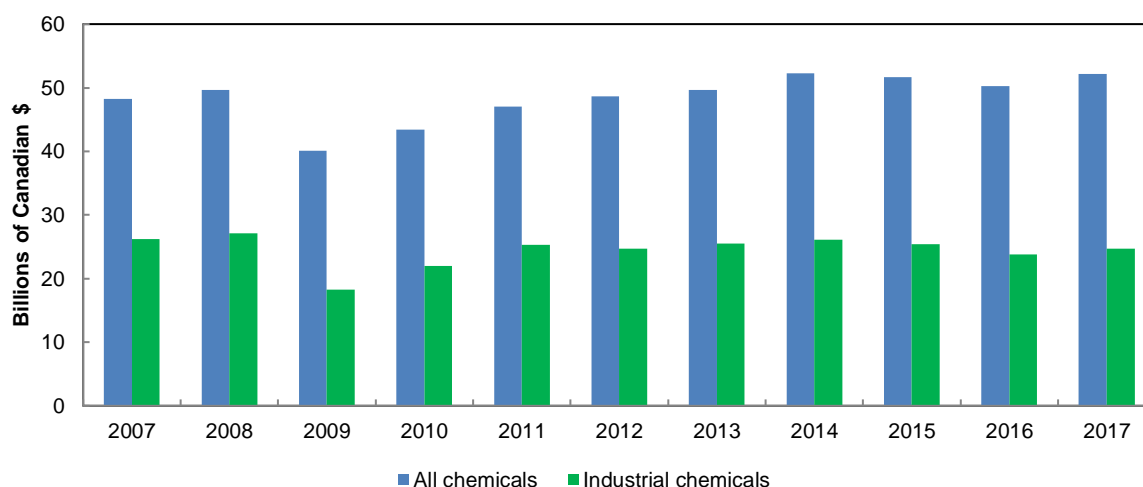
Shipments of industrial chemicals were \$24.7 billion in 2017, representing an increase of 4 per cent compared to 2016 (Table 3, Figure 1). Shipments for industrial chemicals have remained within a narrow band over the past seven years.

**Table 3: Manufacturing shipments**



Manufacturing shipments, \$ billion	2016	2017	Change 2016-17
All chemicals	50.2	52.2	3.8%
Industrial chemicals	23.8	24.7	3.8%

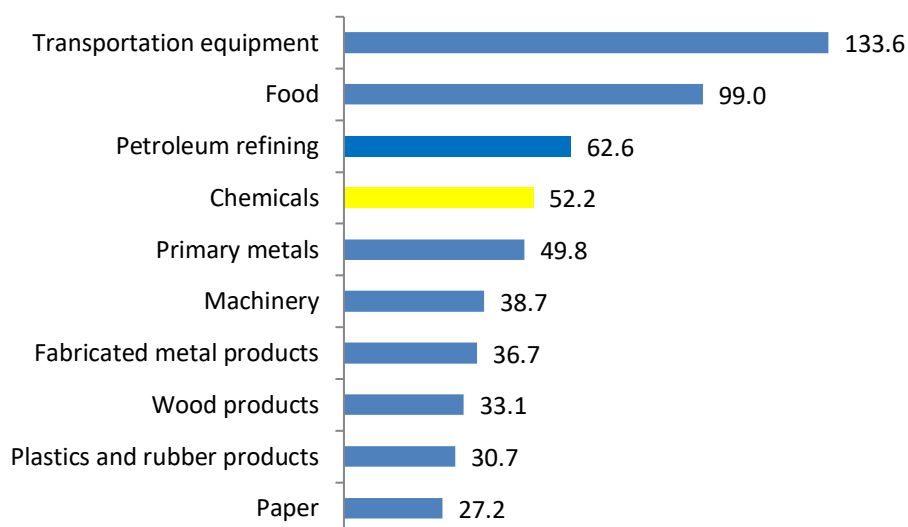
**Figure 1: Chemical industry shipments**



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).

# Industry Economic Profile

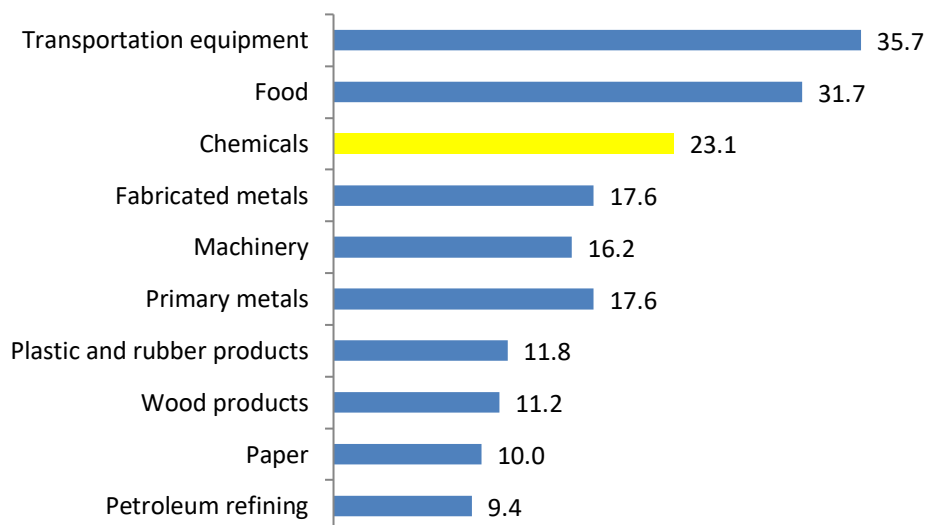
**Figure 2: Top 10 manufacturing industries by value of shipments**



## ➤ 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 2016 (latest available, Figure 3).

**Figure 3: Top 10 manufacturing industries by value added**



# Industry Economic Profile

## ➤ Employment

The chemical industry employed 87,300 workers in 2017. For industrial chemicals, the figure was 17,000. 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).

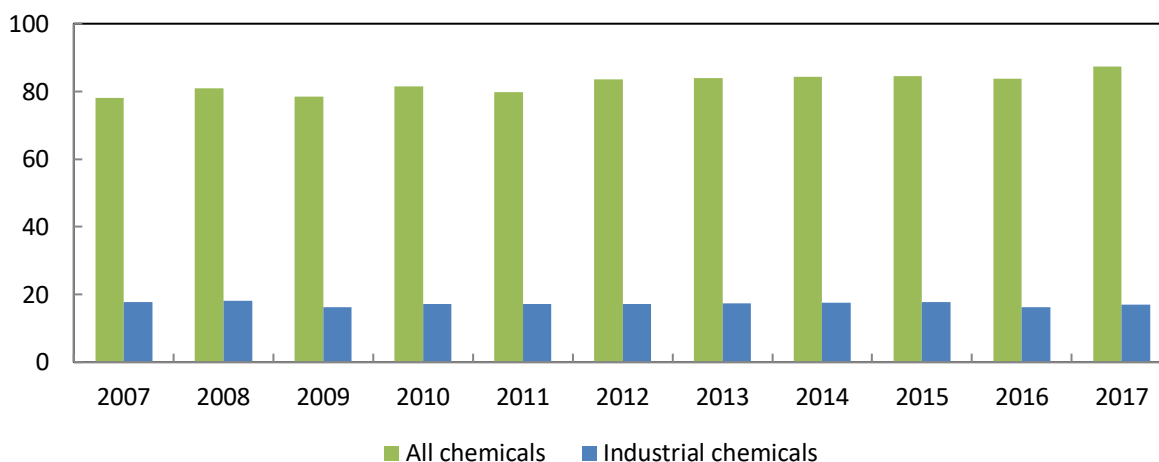
In addition to the direct jobs, additional jobs are supported by the purchasing activity of the chemical industry and by the subsequent expenditure-induced activity. For every job in the chemical industry, it is estimated that another five jobs in other sectors are indirectly linked to the industry.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

**Table 4: Employment in the Canadian chemical industry**



Total employment, thousand	2016	2017	Change 2016-17
All chemicals	83.8	87.3	4.0%
Industrial chemicals	16.3	17.0	4.3%

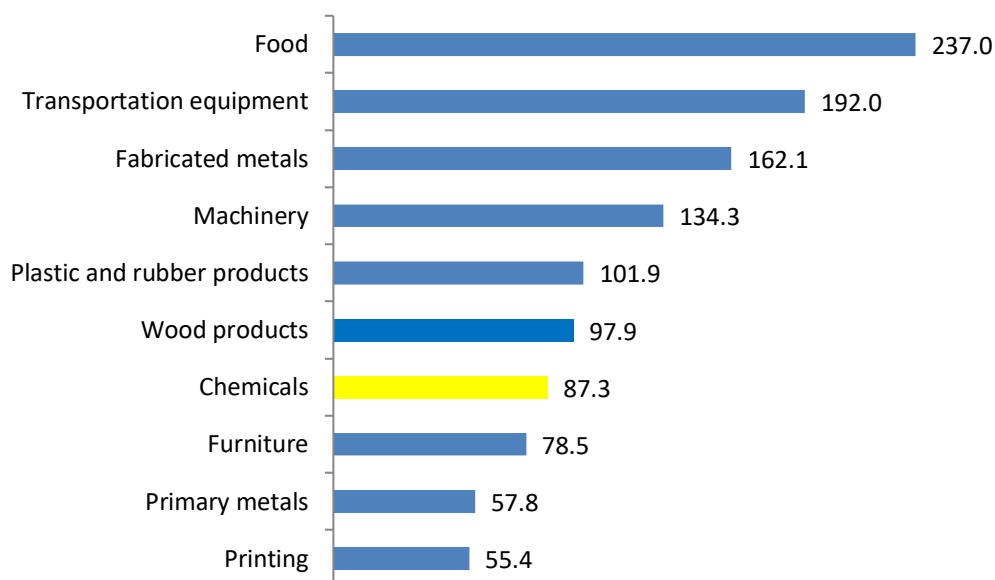
**Figure 4: Chemical industry employment**



On the basis of employment, chemicals rank 7<sup>th</sup> among all manufacturing industries (Figure 5).

# Industry Economic Profile

Figure 5: Top 10 manufacturing industries by employment



## Salaries and wages

Total salaries and wages paid to employees in the chemical industry in 2017 were \$5.9 billion, with \$1.4 billion paid in the industrial chemical segment (Table 5).

Table 5: Total salary and wages paid by the chemical industry

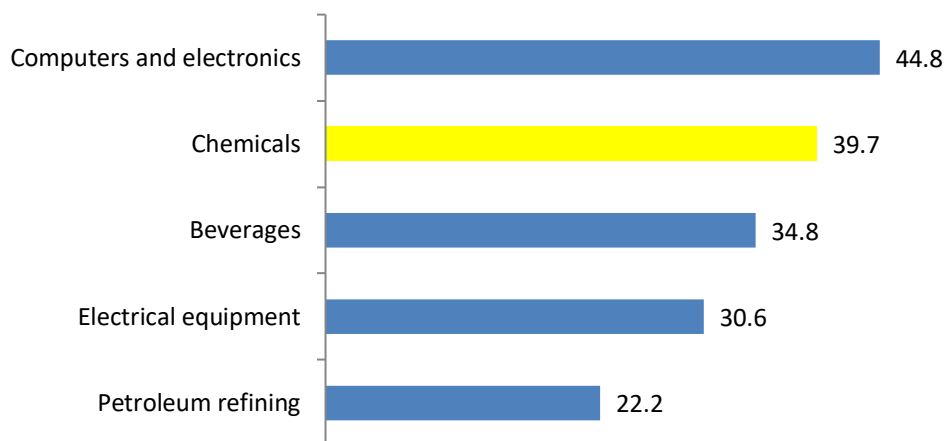


Total salaries and wages, \$ billion	2016	2017	Change 2016-17
All chemicals	5.85	5.93	1.5%
Industrial chemicals	1.41	1.43	1.3%

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.

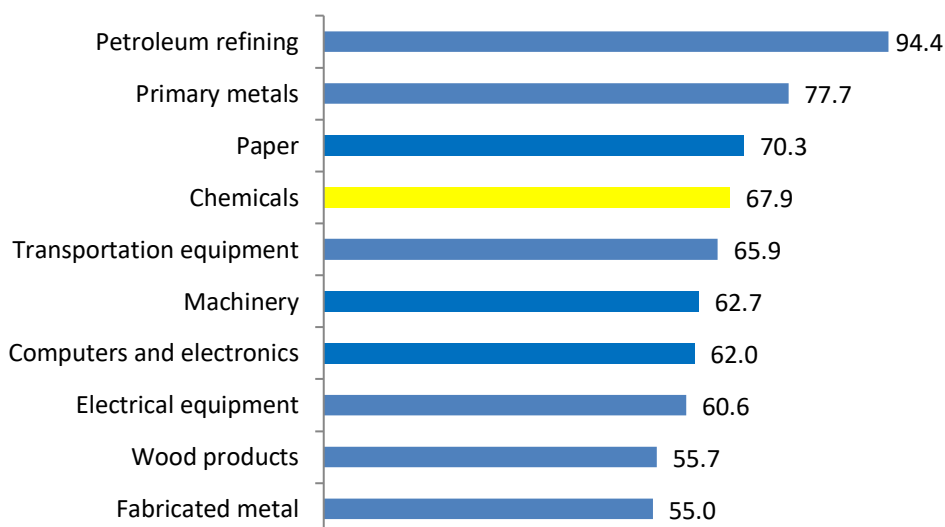
# Industry Economic Profile

**Figure 6: Top 5 manufacturing industry by proportion of employees with university degree**



Chemicals ranked 4<sup>th</sup> among all manufacturing industries with an average salary of \$67,900 (Figure 7). Within industrial chemicals the average salary was higher still at \$84,000. For overall manufacturing, the average salary in 2017 was \$54,700.

**Figure 7: Top 10 manufacturing industries based on average earnings per employee**



**Table 6: Average salaries in the chemical industry**



Average salaries and wages, \$ thousand	2016	2017	Change 2016-17
All chemicals	69.8	67.9	-2.6%
Industrial chemicals	86.5	84.0	-2.9%

## International trade

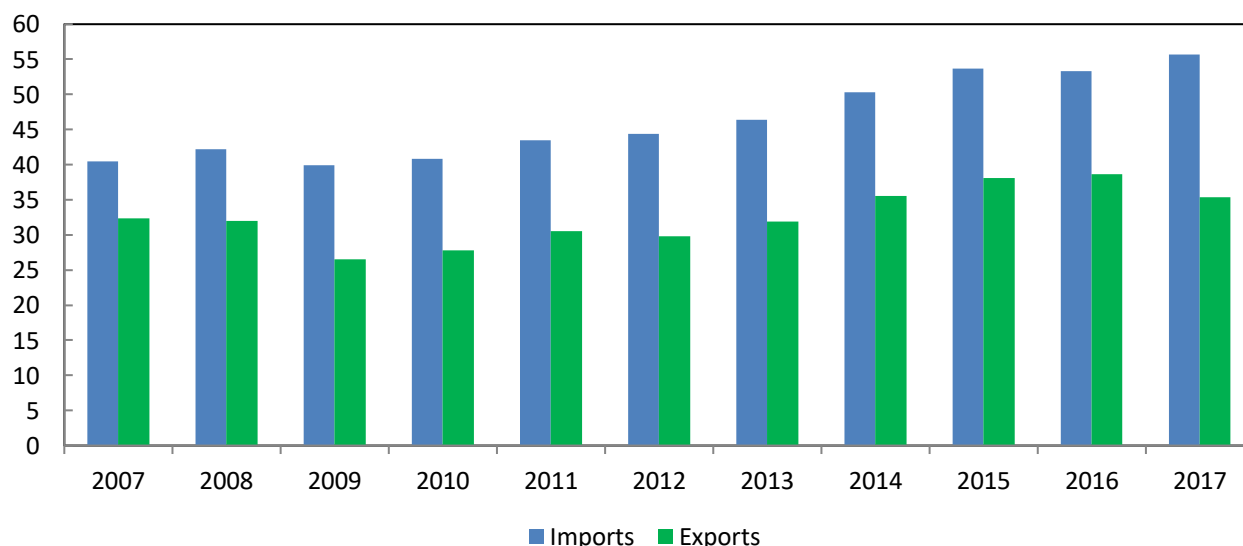
Canada exported \$35.4 billion worth of chemicals and chemical products to the world in 2017, a decrease of 9 per cent compared to 2016. Imports increased by 5 per cent to \$55.7 billion (Table 7 and Figure 8). The United States represents the dominant export market and the dominant source of imports. In 2017, 77 per cent of exports went to the United States and 61 per cent of imports originated there. The next largest export markets were: China (4 per cent), followed by Mexico and Belgium (2 per cent each). The next largest sources of imports were: Germany (6 per cent), Switzerland (4 per cent), and China (3 per cent).

For industrial chemicals, Canadian exports in 2017 were \$18.7 billion, the same as in 2016. Imports were \$19.8 billion, up 5 per cent (Table 7 and Figure 9). The United States is the primary trading partner, receiving 80 per cent of exports and responsible for 71 per cent of imports. The next largest export markets were: China (7 per cent) and Mexico (3 per cent). The next largest sources of imports were: China (6 per cent), Germany (3 per cent), and India (2 per cent).

**Table 7: Trade in the chemistry industry**

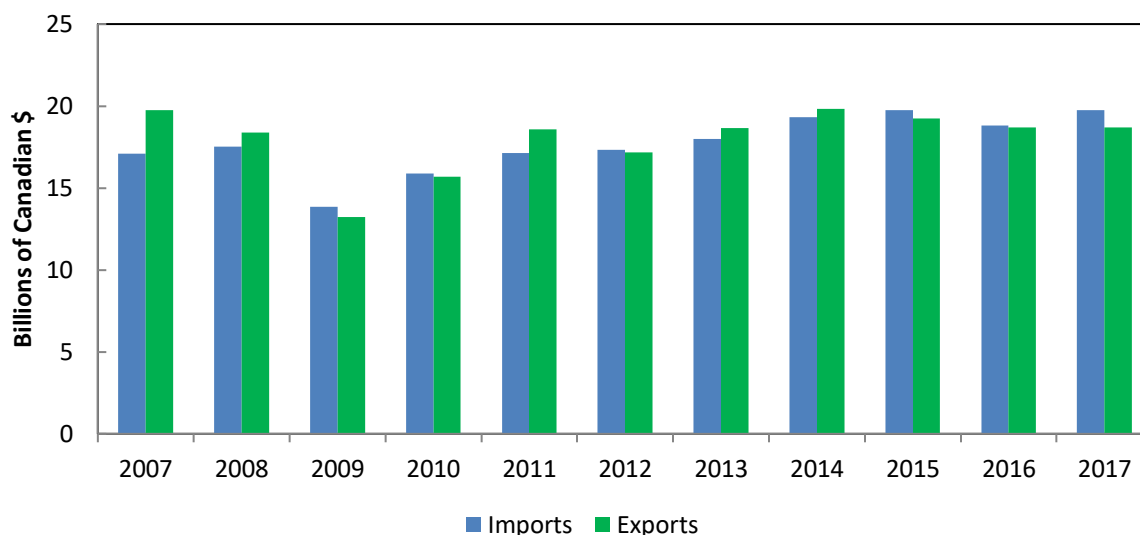
Value of trade, \$ billion		2016	2017	Change 2016-17
All chemicals	Imports	53.3	55.7	4.6%
	Exports	38.7	35.4	-8.5%
Industrial chemicals	Imports	18.8	19.8	5.1%
	Exports	18.7	18.7	no chg

**Figure 8: Trade of all chemicals**



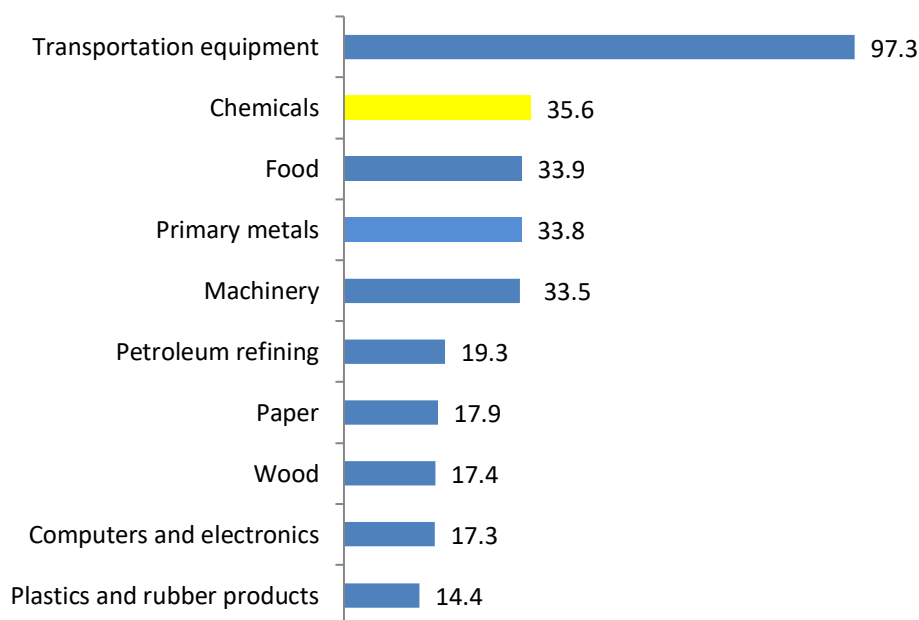
# Industry Economic Profile

Figure 9: Trade of industrial chemicals



The chemistry industry was the 2<sup>nd</sup> largest exporter among all manufacturing industries in 2017 (Figure 10)

Figure 10: Top 10 manufacturing industries by exports



# Industry Economic Profile

## ► 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 for the chemical industry were \$7.5 billion in 2017, and \$3.5 billion for industrial chemicals (Table 8).

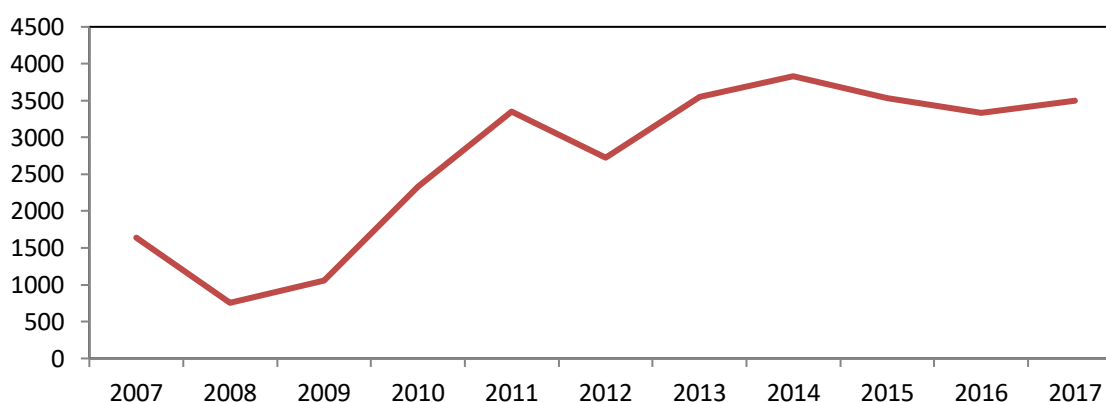
**Table 8: Operating profits in the chemical industry**



Operating profit, \$ billion	2016	2017	Change 2016-17
<b>Total chemicals</b>	7.3	7.5	1.9%
<b>Industrial chemicals</b>	3.3	3.5	4.8%

Operating profits for industrial chemicals over the past 10 years show that profits suffered during the great recession, recovered strongly in 2010 and 2011, and have remained solid since then (Figure 11).

**Figure 11: Operating profits for industrial chemicals**



## ► Productivity

One measure of manufacturing productivity is the value of revenue per employee. For all chemicals, output per employee in 2017 was \$597,000. For industrial chemicals, it rises to \$1.46 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	2007	2017
All chemicals	617	597
Industrial chemicals	1472	1454

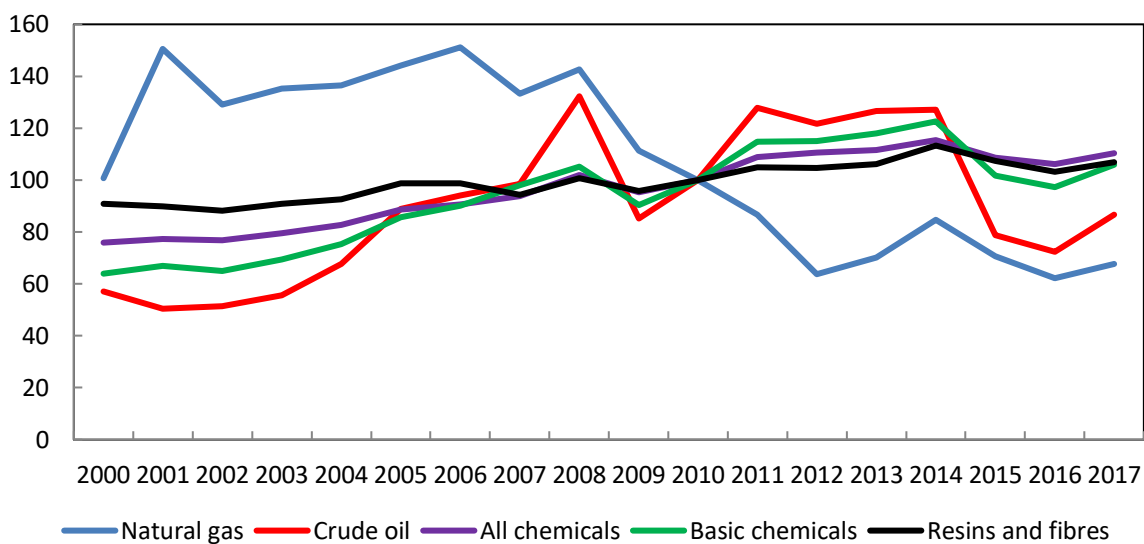


## ➤ Price Index

The Industrial Product Price Index (IPPI) reflects the prices that producers in Canada receive as the goods leave the plant gate.

Natural gas and crude oil are two important sources of feedstocks for the chemical industry. They have shown very different price behaviour in recent years. Natural gas prices rose dramatically until 2008, and have trended mostly downward since then. The decline in gas prices has been driven primarily by the huge increases in North American supply coming from shale gas formations. By contrast, the crude oil price index trended upward until 2008, declined in 2009 due to the recession, climbed steeply again in 2010 and 2011, leveled off in 2012 and 2013, fell sharply in 2014 and 2015, before leveling off in 2016 and rising somewhat in 2017 (Figure 12). All of the chemical indices showed gains in 2017.

Figure 12: Price index, 2010=100

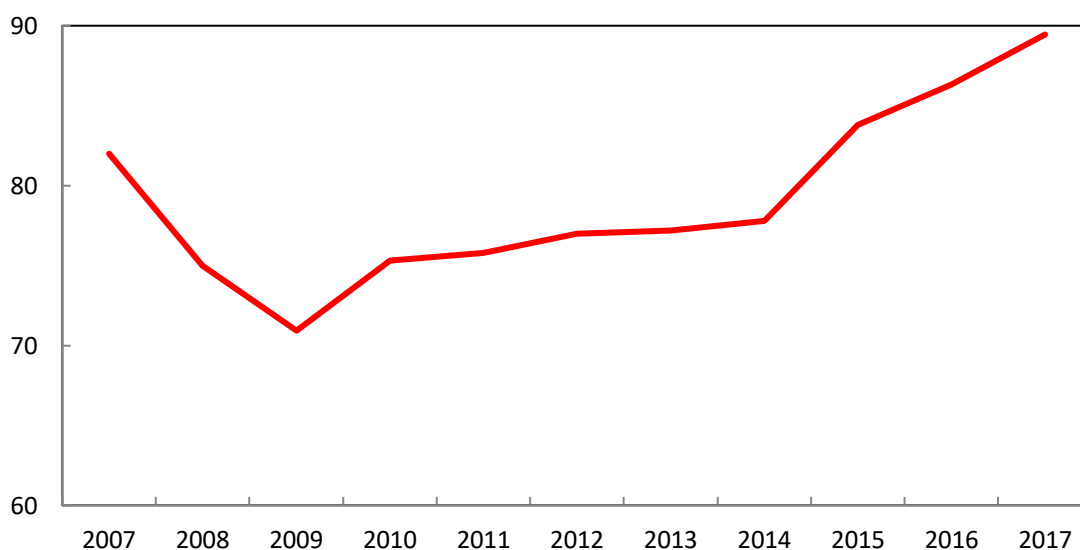


## ► Capacity utilization

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 89 per cent in 2017, the highest annual average since the 1970s. 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.

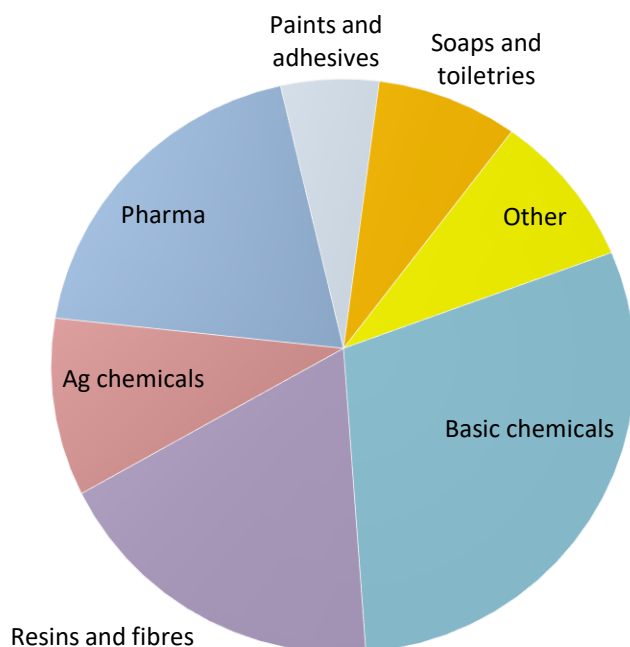
**Figure 13: Capacity utilization in the overall chemical industry, %**



## ► 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 2017. 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
2011	4,530	4,645	2,405	2,015
2012	4,819	5,235	2,700	2,141
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	5,079	5,200	3,398	1,891
2017	5,160	4,440	3,991	1,485

# Industry Economic Profile

**Table 11: Principal statistics for pharmaceuticals (NAICS 3254)**

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2011	7,742	30,249	13,597	5,895
2012	8,589	31,802	13,517	5,549
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	10,158	29,136	17,228	11,759
2017	10,230	30,620	17,630	8,890

**Table 12: Principal statistics for paints, coatings and adhesives (NAICS 3255)**

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2011	2,145	6,111	1,633	474
2012	2,736	7,391	1,825	535
2013	2,672	7,788	1,902	528
2014	2,778	8,196	2,055	596
2015	2,619	8,593	2,322	725
2016	2,640	8,301	2,434	792
2017	3,010	8,210	2,361	804

**Table 13: Principal statistics for soaps, cleaning compounds and toilet preparations (NAICS 3256)**

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2011	2,859	10,803	4,274	2,334
2012	3,133	11,236	4,566	2,447
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	3,987	14,106	6,400	3,460
2017	4,320	15,120	6,579	3,463

# Industry Economic Profile

**Table 14: Principal statistics for other chemical products (NAICS 3259)**

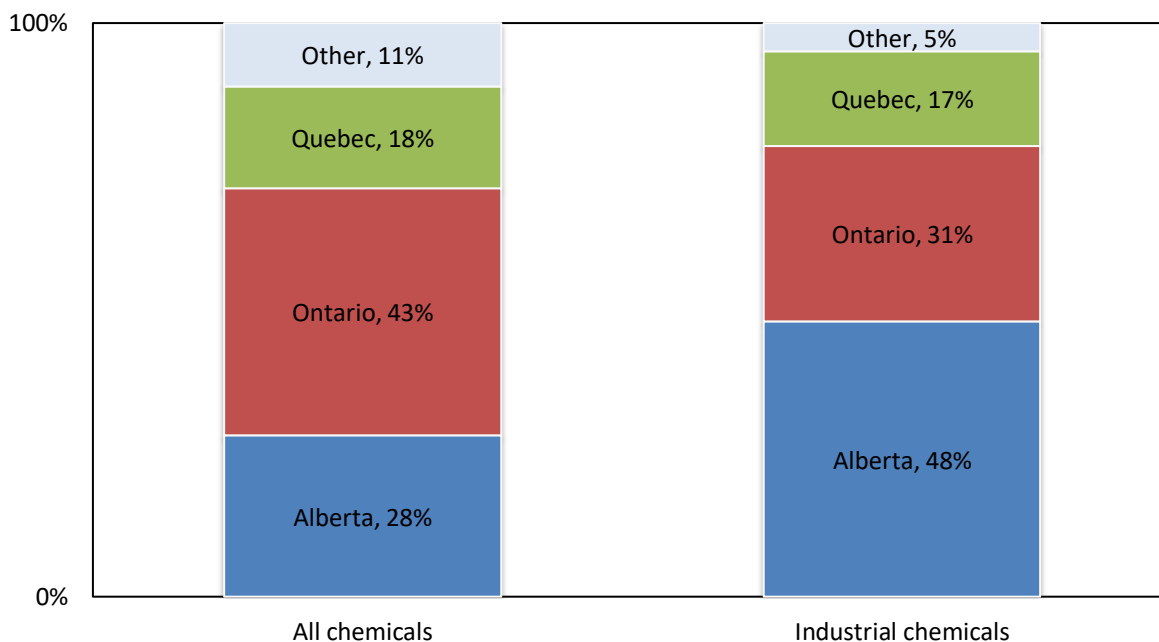
	<b>Shipments, \$ million</b>	<b>Employment</b>	<b>Imports, \$ million</b>	<b>Exports, \$ million</b>
2011	4,521	10,759	4,363	1,913
2012	4,701	10,749	4,460	1,966
2013	4,698	10,800	4,798	2,055
2014	4,813	10,854	4,889	2,179
2015	4,932	10,905	5,147	2,254
2016	4,591	10,588	5,012	2,078
2017	4,740	10,890	5,418	2,053

# Industry Economic Profile

## ► 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**

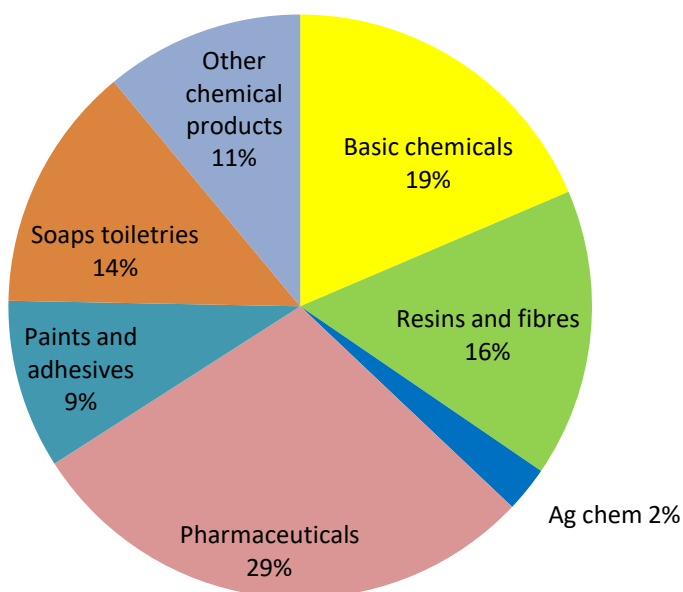


# Industry Economic Profile

## a. Ontario

In 2017, Ontario's chemical industry had shipments of \$21.8 billion. Just over one-third of the total was comprised of industrial chemicals (Figure 16).

Figure 16: Composition of the Ontario chemical industry



The value of industrial chemical shipments in 2017 was \$7.6 billion (Table 15). The largest cluster for the industrial chemical industry is located 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

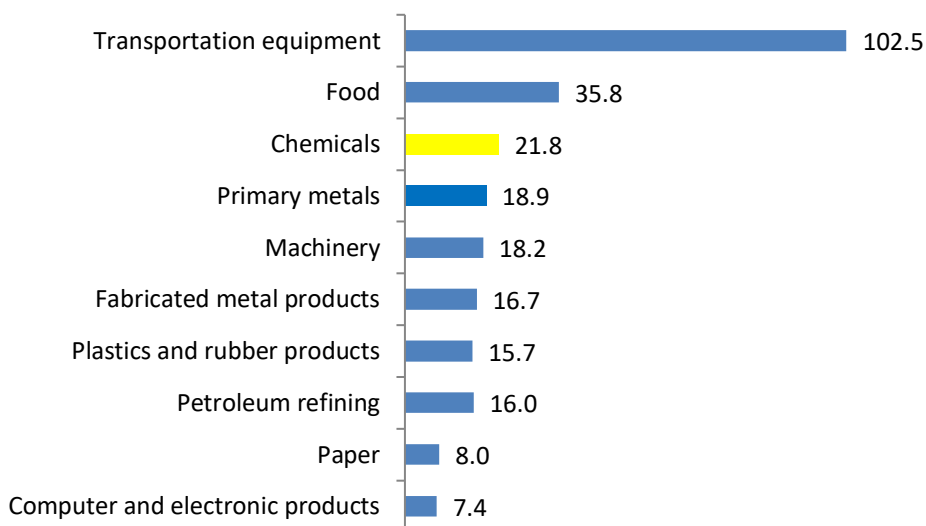


Shipments, \$ billion	2016	2017	Change 2016-17
All chemicals	21.6	21.8	1.0%
Industrial chemicals	7.8	7.6	-2.9

Chemicals was the 3<sup>rd</sup> largest of all manufacturing industries in the province in 2017, on the basis of shipments (Figure 17).

# Industry Economic Profile

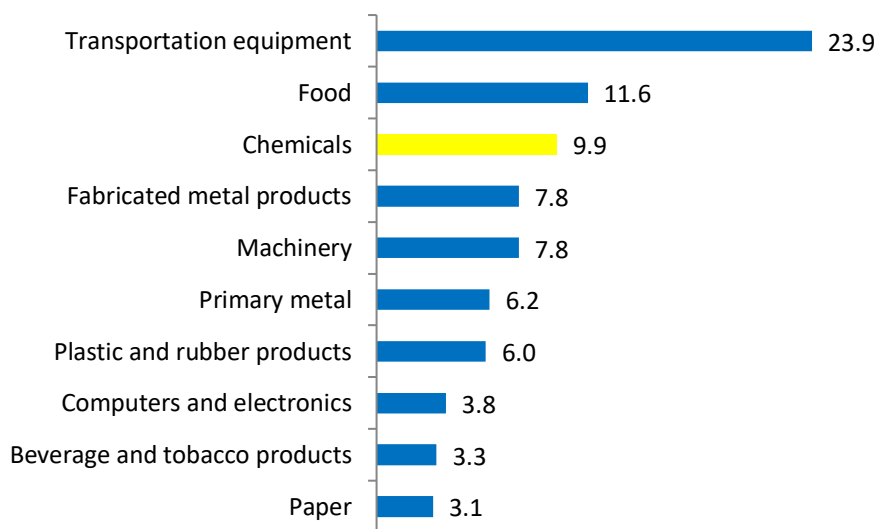
Figure 17: Top 10 manufacturing industries in Ontario by value of shipments



- **Value added**

On the basis of value added, chemicals also ranked 3<sup>rd</sup> among all manufacturing industries in 2016 (latest data available) (Figure 18).

Figure 18: Top 10 industries by value added in Ontario



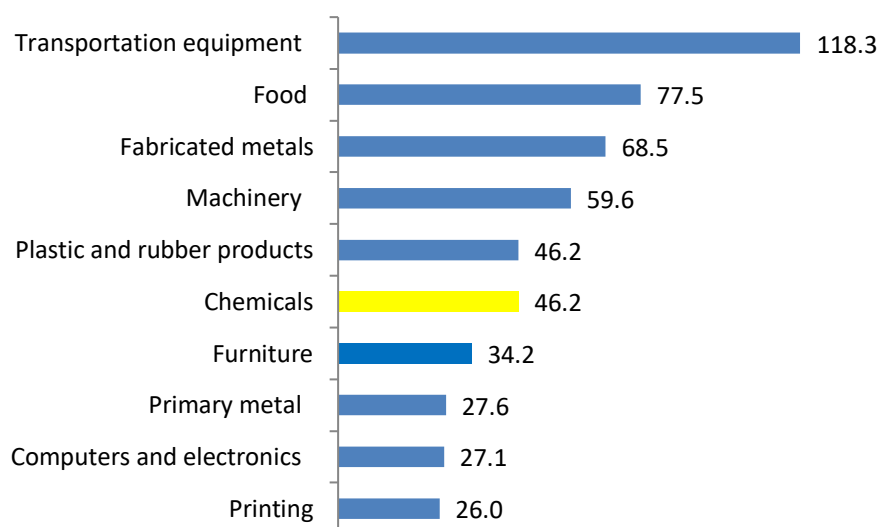


# Industry Economic Profile

- **Employment ranking**

The chemical industry directly employed 46,200 people in Ontario in 2017, up 4.7 per cent from 2016. When indirect employment is included, it is estimated that the chemical industry supports almost 280,000 jobs in the province. The number of employees working in industrial chemicals was 8,120, up 9.5 per cent compared to 2016, and representing 48 per cent of the national total. 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 employment in Ontario**

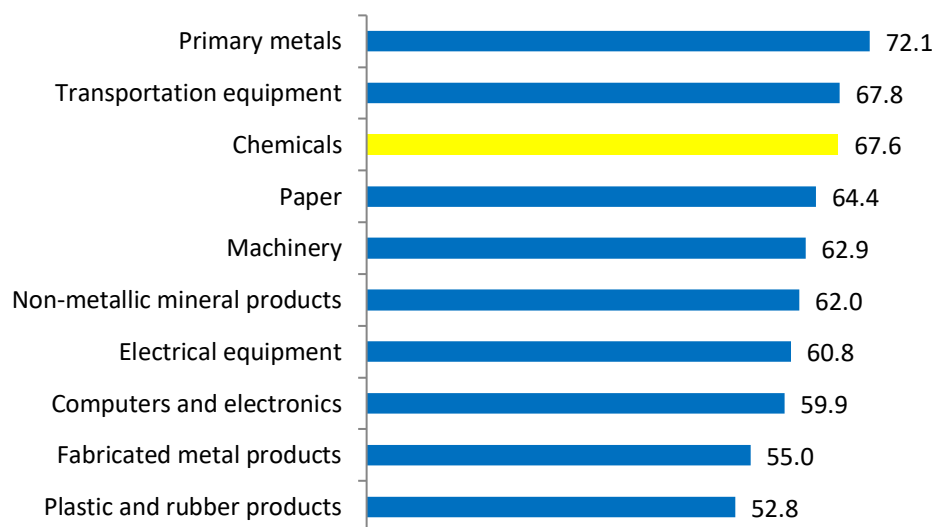


# Industry Economic Profile

- Salaries and wages

The chemical industry paid a total of \$3.0 billion in salaries and wages in the province in 2017. With an average annual salary of \$67,600, the industry ranked 3<sup>rd</sup> among all manufacturing industries in Ontario (Figure 20). The average salary within industrial chemicals was much higher at \$88,200. The average salary across all manufacturing industries in Ontario was \$58,700.

Figure 20: Top 10 manufacturing industries by average salary in Ontario



# Industry Economic Profile

## • Trade

The value of exports by the chemical industry from Ontario in 2017 was \$18.0 billion, while imports were \$36.8 billion (Table 16). The United States was the destination for 76 per cent of exports, followed by Italy (3 per cent) and Japan and Belgium (2 per cent each). The United States was also the source for most of the imports (62 per cent), followed by Switzerland and Germany (6 per cent each).

For industrial chemicals, exports from the province in 2016 were \$6.9 billion, while imports were \$12.4 billion. The United States was the destination for 80 per cent of exports, followed by China (3 per cent). The United States was also the source of most of the imports (77 per cent), followed by China (4 per cent).

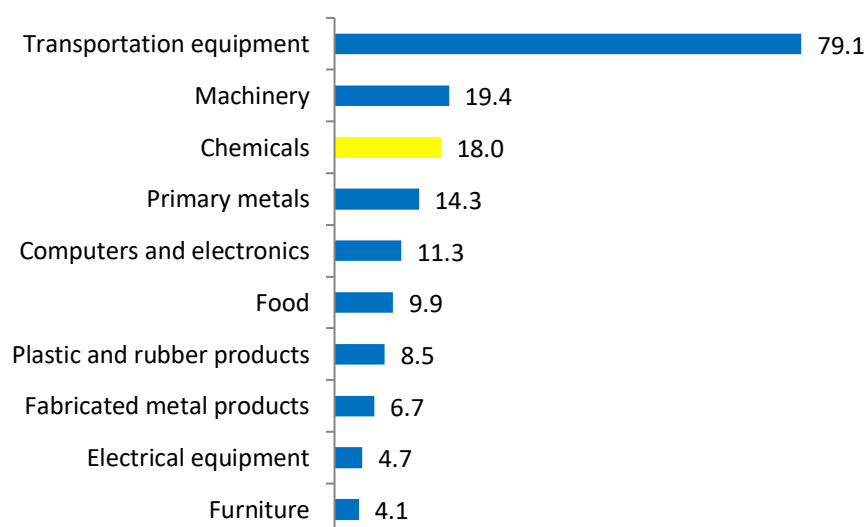
**Table 16: Trade by the chemical industry in Ontario**



Value of trade, \$ billion		2016	2017	Change 2016-17
<b>All chemicals</b>	<b>Imports</b>	36.5	36.8	1.0%
	<b>Exports</b>	21.1	18.0	-14.5%
<b>Industrial chemicals</b>	<b>Imports</b>	12.0	12.4	3.2%
	<b>Exports</b>	7.5	6.9	-7.2%

Chemicals is the 3<sup>rd</sup> largest exporter among all manufacturing industries (Figure 21).

**Figure 21: Top 10 manufacturing industries by value of exports from Ontario**

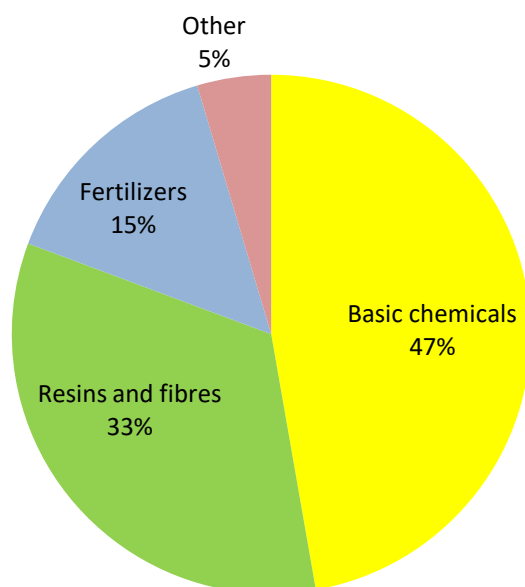


# Industry Economic Profile

## b. Alberta


In 2017, Alberta's chemical industry had shipments of \$14.7 billion (Table 17). Eighty per cent of the total was comprised of industrial chemicals (Figure 22).

**Figure 22: Composition of the Alberta chemical industry**



The value of industrial chemical shipments in 2017 was \$11.9 billion. There are two main clusters for the industrial chemical industry in Alberta. One is the region to the northeast of Edmonton, and the second is situated in central Alberta, near Red Deer.

**Table 17: Alberta chemical industry shipments**

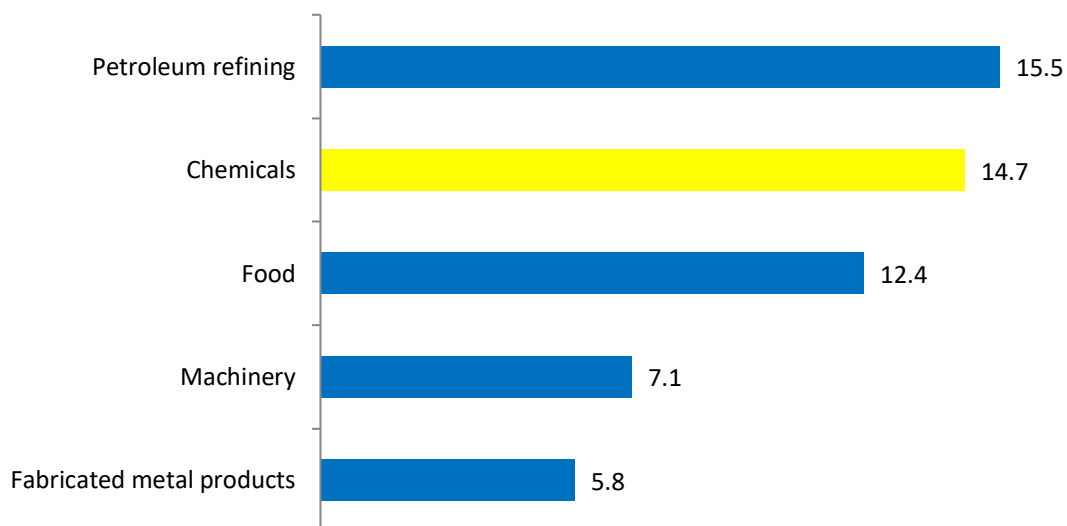


Shipments, \$billion	2016	2017	Change 2016-17
All chemicals	14.1	14.7	4.1%
Industrial chemicals	11.0	11.9	7.5%

Chemicals ranked 2<sup>nd</sup> among all manufacturing industries in the province in 2017, on the basis of value of shipments (Figure 23).

# Industry Economic Profile

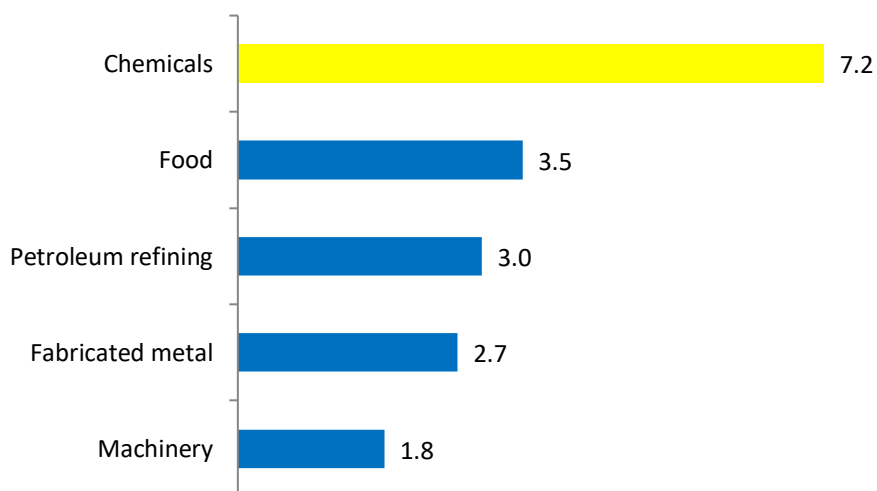
Figure 23: Top 5 manufacturing industries in Alberta by value of shipments<sup>5</sup>



- **Value added**

On the basis of value added, chemicals ranked 1<sup>st</sup> among all manufacturing industries (Figure 24) based on 2016 data (latest available).

Figure 24: Top 5 industries by value added in Alberta



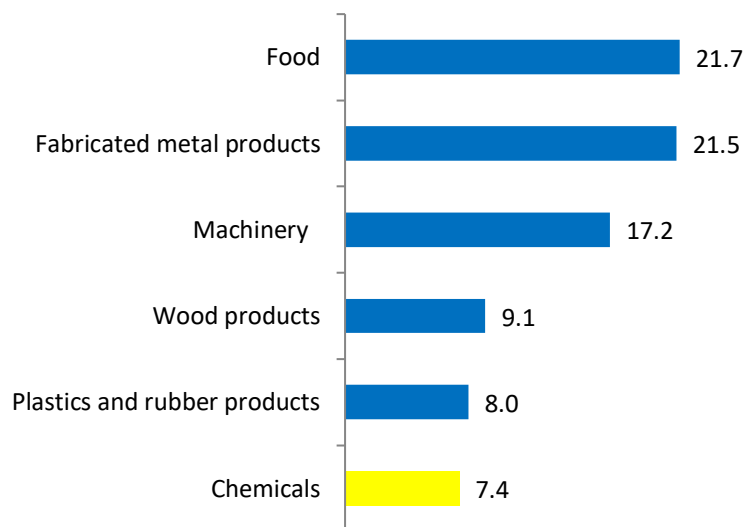
<sup>5</sup> The top 10 industries cannot be ranked because data for many industries has been suppressed by Statistics Canada.

# Industry Economic Profile

- **Employment ranking**

The chemical industry employed 7,400 people in Alberta in 2017, down 3 per cent compared to 2016. When indirect employment is included, it is estimated that the chemical industry supports about 45,000 jobs in the province. The number of employees working in industrial chemicals in 2017 was 3,800. When compared to other manufacturing industries in the province, chemicals ranked 6<sup>th</sup> (Figure 25).

**Figure 25: Top 5 manufacturing industries by employment in Alberta**

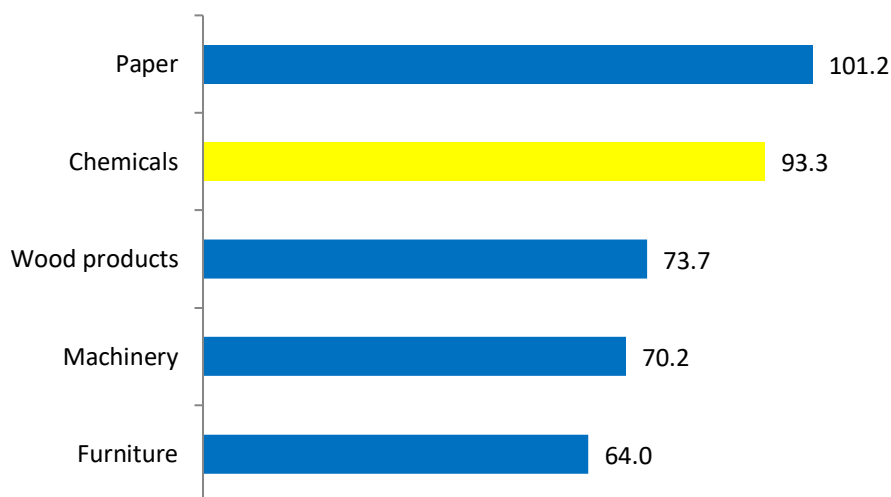


# Industry Economic Profile

## • Salaries and wages

The chemical industry paid a total of \$690 million in salaries and wages in the province in 2017. The average salary paid to employees in the chemical industry was \$93,300, which ranked 2<sup>nd</sup> among all manufacturing industries (Figure 26). The average salary within industrial chemicals was higher still at \$99,300. For all manufacturing the average salary in the province was \$61,100.

Figure 26: Top 5 manufacturing industries by average salary in Alberta



## • Trade

The value of exports by the chemical industry from Alberta in 2017 was \$8.4 billion, while imports were \$2.7 billion (Table 18). The United States was the destination for 80 per cent of exports, followed by China (12 per cent) and Mexico (3 per cent). The United States was also the source of most imports (80 per cent), followed by China (6 per cent), and Germany (2 per cent).

For industrial chemicals, exports from the province in 2017 were \$7.4 billion, while imports were \$1.5 billion. The United States was the destination for 78 per cent of exports, followed by China (13 per cent), and Mexico (4 per cent). The United States was the source of most imports (78 per cent), followed by China (9 per cent), and Italy (3 per cent).

Table 18: Trade by the chemical industry in Alberta

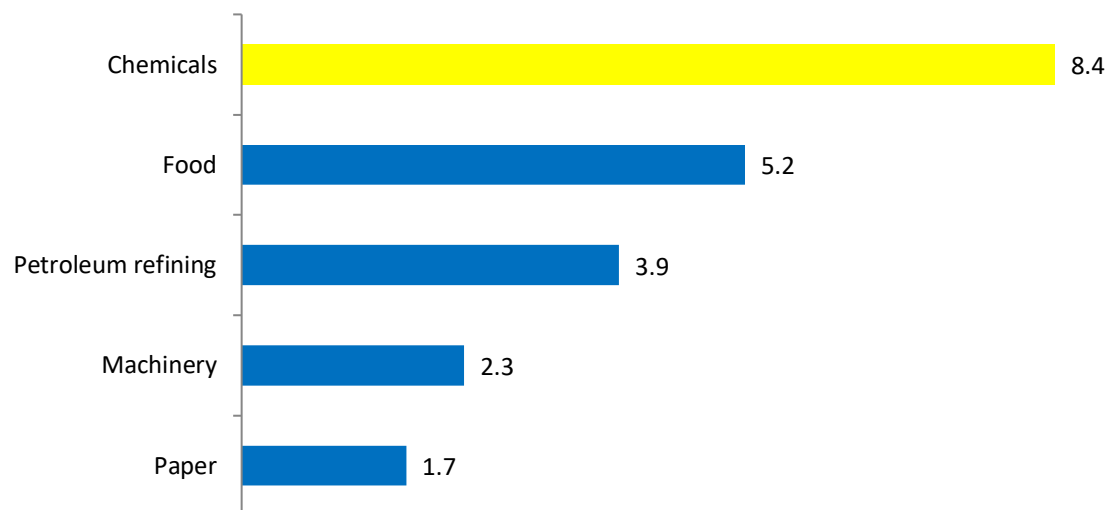


Value of trade, \$ billion		2016	2017	Change 2016-17
All chemicals	Imports	2.4	2.7	13.8%
	Exports	8.2	8.4	3.2%
Industrial chemicals	Imports	1.2	1.5	18.5%
	Exports	6.8	7.4	9.2%

# Industry Economic Profile

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**



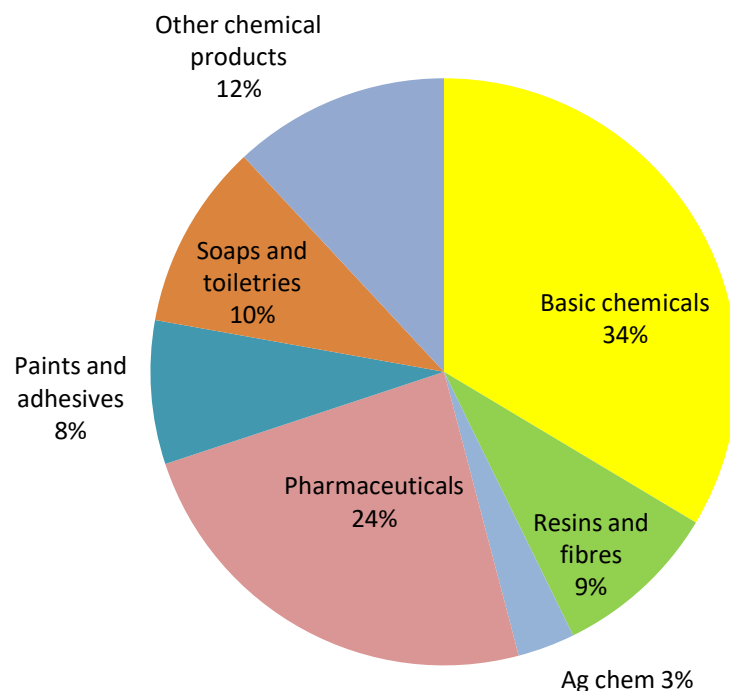


# Industry Economic Profile

## c. Quebec

In 2017, Quebec's chemical industry had shipments of \$9.5 billion and over 40 per cent was comprised of industrial chemicals (Figure 28).

**Figure 28: Composition of the Quebec chemical industry**



Shipments of industrial chemicals were \$4.1 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**

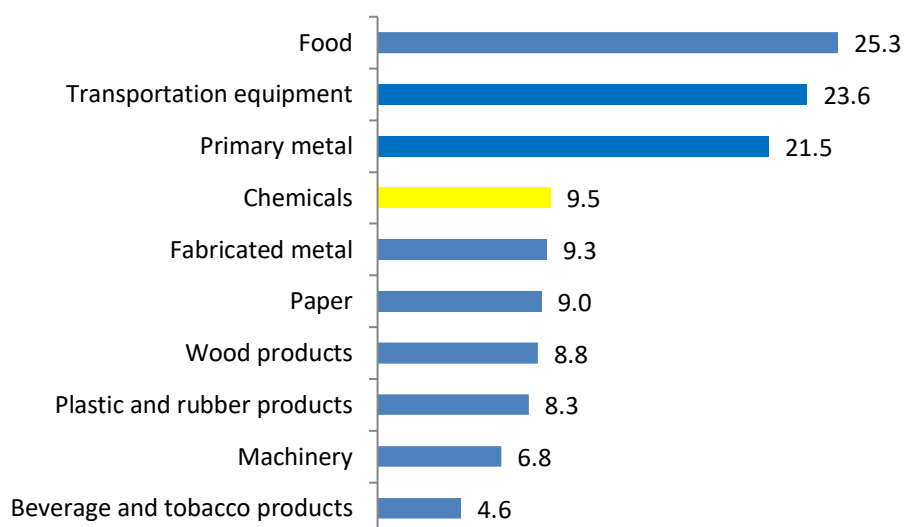


Shipments, \$billion	2016	2017	Change 2016-17
All chemicals	8.9	9.5	6.3%
Industrial chemicals	3.6	4.1	11.3%

Chemicals was the 4<sup>th</sup> largest manufacturing industry on the basis of shipments (Figure 29).

# Industry Economic Profile

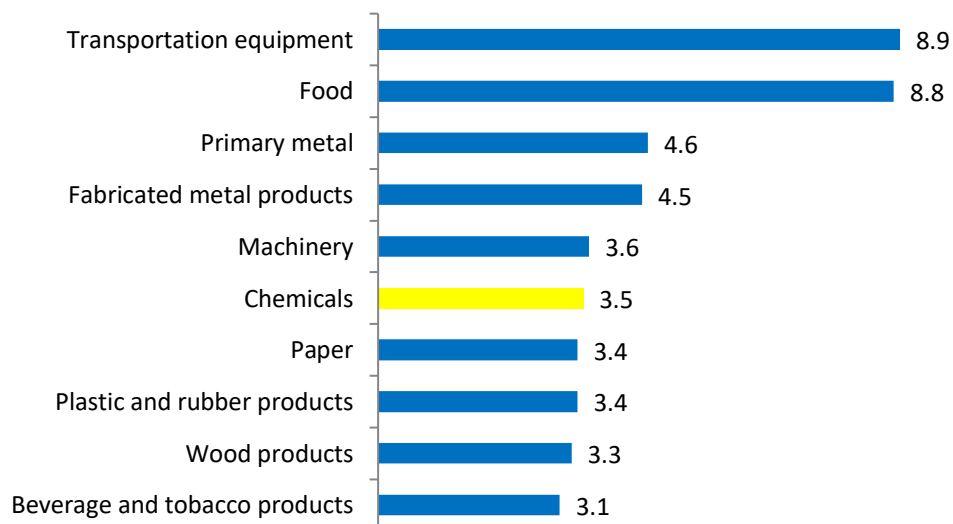
Figure 29: Top 10 manufacturing industries in Quebec by value of shipments



- **Value added**

On the basis of value added, chemicals ranked 6<sup>th</sup> among all manufacturing industries in Quebec (Figure 30).

Figure 30: Top 10 manufacturing industries by value added in Quebec

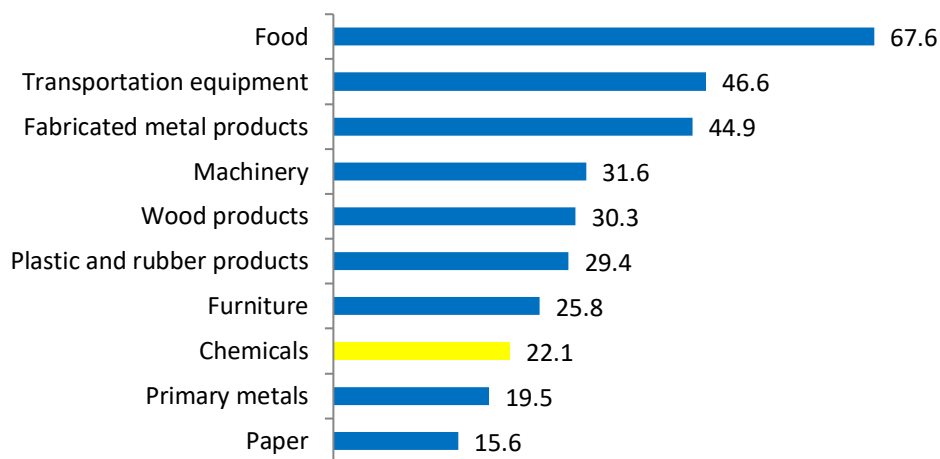


# Industry Economic Profile

## • Employment ranking

The chemical industry employed 22,100 people in Quebec in 2017. When indirect employment is included, it is estimated that the chemical industry supports 125,000 jobs in the province. The industrial chemical industry employs 3,200 in the province. When compared to all manufacturing industries in the province, chemicals ranked 8<sup>th</sup> (Figure 31).

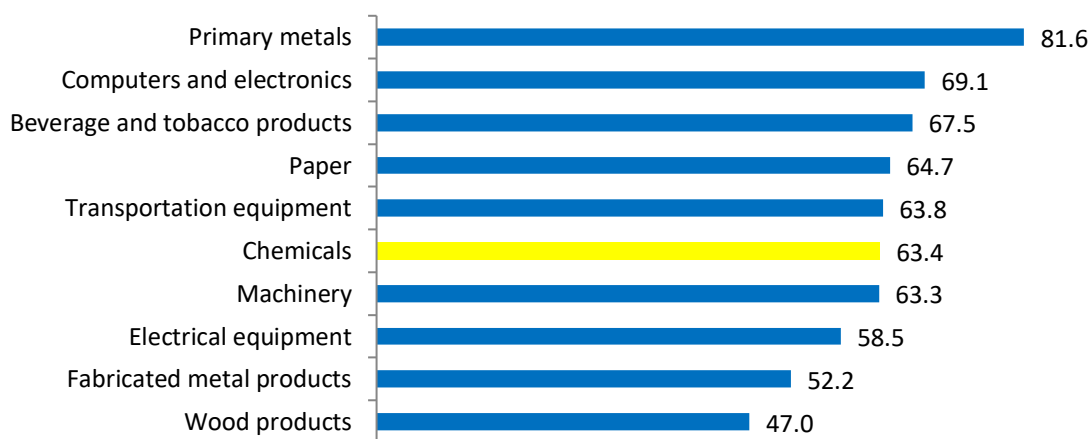
Figure 31: Top 10 manufacturing industries by employment in Quebec



## • Salaries and wages

The chemical industry paid a total of \$1.3 billion in salaries and wages in the province in 2017, corresponding to an average annual salary of \$63,400, which placed the industry 6<sup>th</sup> in Quebec (Figure 32). The average salary for industrial chemicals was \$76,800. For all manufacturing, the average salary in the province was \$48,900.

Figure 32: Top 10 industries by average salary in Quebec



# Industry Economic Profile

## • Trade

The value of exports by the chemical industry from Quebec in 2017 was \$5.6 billion and imports were \$8.1 billion (Table 20). The United States was the destination for 75 per cent of exports, followed by Mexico and Belgium (3 per cent each). Quebec is different from the other provinces in that a much lower proportion of its imports come from the United States (32 per cent), followed by Germany (11 per cent), Ireland (8 per cent) and France (7 per cent).

For industrial chemicals, exports from the province in 2017 were \$2.6 billion, and imports were \$2.9 billion. The United States was the destination for 83 per cent of exports, followed by Mexico (4 per cent) and Spain (2 per cent). The United States was the source of 40 per cent of imports, followed by China (9 per cent), and Germany (7 per cent).

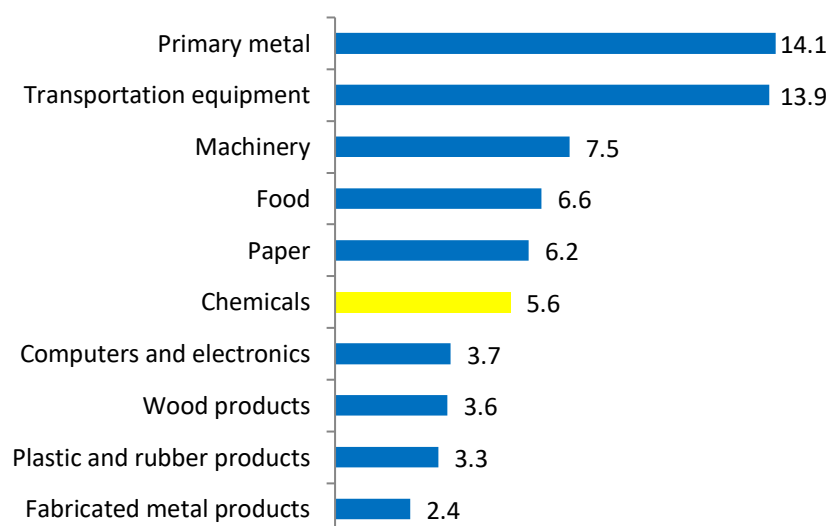
**Table 20: Trade by the chemical industry in Quebec**



Value of trade, \$ billion		2016	2017	Change 2016-17
<b>All chemicals</b>	<b>Imports</b>	7.3	8.1	10.8%
	<b>Exports</b>	5.7	5.6	-0.9%
<b>Industrial chemicals</b>	<b>Imports</b>	2.9	2.9	no change
	<b>Exports</b>	2.5	2.6	6.1%

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

**Figure 33: Top 10 industries by value of exports from Quebec, \$ billion**



# Industry Economic Profile

## 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 are producers of 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**

	2013	2014	2015	2016	2017
<b>Establishments</b>					
Petrochemicals	25	26	27	28	27
Other organic chemicals	135	135	140	133	150
<b>Shipments \$M</b>					
Petrochemicals	6,789	7,011	5,596	5,597	6,200
Other organic chemicals	4,138	4,031	4,622	3,262	3,780
<b>Employment</b>					
Petrochemicals	1,408	1,637	1,859	1,859	1,900
Other organic chemicals	2,728	3,172	3,603	2,807	2,880
<b>Exports \$M</b>					
Petrochemicals	2,597	2,874	1,839	1,565	1,890
Other organic chemicals	3,777	4,231	3,963	4,098	4,266
<b>Imports \$M</b>					
Petrochemicals	1,067	1,155	985	894	966
Other organic chemicals	6,035	6,510	6,750	6,021	6,290

# Industry Economic Profile

- 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**

	2012	2013	2014	2015	2016
Benzene	569	529	670	585	597
Toluene	236	258	229	175	128
Xylenes	273	293	381	350	307
Butadiene	209	234	216	219	237
Propylene	624	616	550	532	515
Formaldehyde	161	154	165	150	149

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**

	Value, \$M	Quantity, kt	Top markets
Benzene	143	116	USA 90% France 5% Netherlands 5%
Butadiene	78	66	USA 100%
Ethylene glycol	1,432	1,553	China 56% USA 40% Mexico 3%
Higher olefins	195	154	USA 94% China 5%
Isopropyl alcohol	106	87	USA 100%
Methanol	136	311	USA 100%
Propylene	216	207	USA 100%
Styrene	823	587	USA 100%

- **CIAC members producing petrochemicals and organic chemicals in Canada**

- › Akzo Nobel Chemicals Ltd.
- › ARLANXEO Canada Inc.
- › BASF Canada
- › BioAmber Inc.
- › Dow Chemical Canada ULC
- › Evonik Oil Additives Canada Inc.
- › H.L. Blachford Ltd.
- › Imperial
- › INEOS Canada Partnership
- › Lanxess Canada
- › Jungbunzlauer Canada Inc.
- › MEGlobal Canada ULC
- › Methanex Corporation
- › NOVA Chemicals Corporation
- › PCAS Canada Inc.
- › Shell Chemicals Canada
- › Stepan Canada Inc.
- › W.R. Grace Canada Corp.

# Industry Economic Profile

## b. 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 24: Principal statistics for inorganic chemicals**

	2013	2014	2015	2016	2017
<b>Establishments</b>					
Chlor-alkali	8	9	6	7	7
Other inorganic chemicals	130	133	129	132	128
<b>Shipments \$M</b>	4,518	4,172	4,147	4,349	4,540
<b>Employment, 000</b>	4,750	5,033	5,308	5,042	5,170
<b>Exports \$M<sup>6</sup></b>					
Chlor-alkali	153	101	90	90	83
Other inorganic chemicals	4,047	3,606	4,086	3,869	3,579
<b>Imports \$M</b>					
Chlor-alkali	325	328	377	402	435
Other inorganic chemicals	2,309	2,075	2,112	1,971	1,848

## • Commodity data

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

**Table 25: Canadian production of specific inorganic chemicals, kilotonnes**

	2012	2013	2014	2015	2016
Carbon black	224	221	241	219	215
Chlorine	550	600	510	442	411
Hydrogen peroxide	217	225	240	247	220
Sodium hydroxide*	605	661	560	487	453

\*estimated

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

<sup>6</sup> Exports sometimes exceed shipments due to different databases used to collect the two sets of data.



# Industry Economic Profile

**Table 26: Canadian exports of select inorganic chemicals**

	Value, \$M	Quantity, kt	Top markets
Chlorine	34	158	USA 100%
Hydrochloric acid	34	278	USA 99% Netherlands 1%
Hydrogen peroxide	47	86	USA 100%
Sodium chlorate	411	603	USA 84% Japan 8% Australia 2% Chile 2%
Sodium hydroxide	49	59	USA 98% El Salvador 2%
Sodium silicate	12	18	USA 96% UK 1% Taiwan 1%
Sulphuric acid	124	2,016	USA 99%
Titanium dioxide	16	5	Belgium 66% USA 12% India 8% Brazil 4%

## • CIAC members producing inorganic chemicals in Canada

- › Akzo Nobel Chemicals Ltd.
- › Arkema Canada Inc.
- › Axiall Canada Inc.
- › CCC Sulphur Products
- › Chemtrade
- › ERCO Worldwide
- › Evonik Canada Inc.
- › KRONOS Canada Inc.
- › National Silicates
- › NorFalco Sales Inc., GLENCORE Canada Corporation
- › Olin Canada ULC
- › PeroxyChem Canada
- › Praxair
- › Solvay Canada Inc.
- › W.R. Grace Canada Corp.

## 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 27: Principal statistics for synthetic resins rubbers and fibres**

	2013	2014	2015	2016	2017
<b>Establishments</b>					
Synthetic resins and rubbers	133	127	121	117	119
Synthetic fibres	25	33	30	25	28
<b>Shipments \$M</b>	9,003	9,546	9,599	9,791	9,360
<b>Employment, 000</b>	5,983	5,335	4,705	4,916	5,330
<b>Exports \$M</b>					
Synthetic resins and rubbers	7,073	7,946	8,143	7,932	7,736
Synthetic fibres	400	367	391	370	316
<b>Imports \$M</b>					
Synthetic resins and rubbers	6,960	7,878	8,045	8,033	8,741
Synthetic fibres	536	564	608	583	601

## • Commodity data

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

**Table 28: Canadian production of synthetic resins, kilotonnes**

	2012	2013	2014	2015	2016
Polyethylene	3,186	3,503	3,407	3,641	3,854

# Industry Economic Profile

**Table 29: Canadian exports of select synthetic resins and rubbers**

	Value, \$M	Quantity, kt	Top markets
Butyl and halobutyl rubbers	292	96	USA 37% China 31% South Korea 7% Mexico 6%
Polyethylene	3,572	2,173	USA 90% Mexico 4% China 2%

- **CIAC members producing synthetic resins, rubbers and fibres in Canada**

- › ARLANXEO Canada Inc.
- › BASF Canada
- › Dow Chemical Canada ULC
- › Imperial
- › 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 about 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 30: Estimated principal statistics for specialty chemicals**

	2013	2014	2015	2016	2017
<b>Establishments</b>					
Other organic chemicals	135	135	140	133	150
Specialty chemicals	115	115	120	115	130
<b>Shipments \$M</b>					
Other organic chemicals	4,138	4,031	4,622	3,262	3,780
Specialty chemicals	1,830	1,660	1,880	1,400	1,620
<b>Employment, 000</b>					
Other organic chemicals	2,728	3,172	3,603	2,807	2,880
Specialty chemicals	1,190	1,280	1,450	1,210	1,240
<b>Exports \$M</b>					
Other organic chemicals	3,777	4,231	3,963	4,098	4,266
Specialty chemicals	1,670	1,745	1,664	1,758	1,830
<b>Imports \$M</b>					
Other organic chemicals	6,035	6,510	6,750	6,021	6,290
Specialty chemicals	2,650	2,685	2,824	2,583	2,680

# Industry Economic Profile

## • Commodity data

Table 31 shows the exports for a select range of specialty chemicals, in both tonnage and dollar value terms in 2014.

**Table 31: Canadian exports of select specialty chemicals**

	Value, \$M	Quantity, t	Top markets
Palmitates and stearates	8.4	4.3	USA 88% China 4%
Dinonyl or didecyl orthophthalates	1.1	0.4	USA 100%
Azo compounds	3.1	0.01	USA 75% Japan 15% Netherlands 5%
Cyanine dyes	50.2	3.5	USA 100%
Azo dyes	4.6	0.2	USA 82% China 16%
Other fatty acids	13.9	12.0	USA 96% Germany 2%

## • CIAC members producing specialty chemicals in Canada

- › Akzo Nobel Chemicals Ltd.
- › BASF Canada
- › Evonik Oil Additives Canada Inc.
- › H.L. Blachford Ltd.
- › Imperial
- › Jungbunzlauer Canada Inc.
- › Lanxess Canada
- › PCAS Canada Inc.
- › Stepan Canada Inc.
- › W.R. Grace Canada Corp.

---

805 - 350 Sparks Street, Ottawa, ON K1R 7S8 | 613-237-6215

[canadianchemistry.ca](http://canadianchemistry.ca) | [@ChemistryCanada](https://www.instagram.com/ChemistryCanada)

[info@canadianchemistry.ca](mailto:info@canadianchemistry.ca)

---