

2015

Statistical Review



**CHEMISTRY INDUSTRY
ASSOCIATION OF CANADA**



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Our commitment to sustainability.



Canada's chemical industry is a significant contributor to the Canadian national economy with shipments worth \$53 billion and exports valued at \$36 billion in 2014. The business of chemistry is directly responsible for 81,000 jobs and pays over \$5 billion in salaries and wages. Almost all goods manufactured in Canada contain products made by the Canadian chemical industry. To highlight the significance of Canadian chemistry, I am pleased to present the 2015 edition of the Chemistry Industry Association of Canada's Statistical Review of the Canadian Chemical Manufacturing Sector. This annual publication presents an economic profile of the chemical industry with an emphasis on the industrial chemicals subsector, and provides a quantitative insight into the contributions of the industry to the economy and to Canadians.

A handwritten signature in black ink that reads "Richard Paton". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Richard Paton
President and CEO
Chemistry Industry Association of Canada

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Introduction

This publication is prepared by the Chemistry Industry Association of Canada (CIAC)'s Business and Economics division which provides economic analysis of government policy initiatives, business trends and changing industry dynamics. The Business and Economics division also publishes provincial and national brochures and conducts a year-end economic survey of the Chemistry Industry Association of Canada's members.

CIAC is the national trade association of Canada's chemistry industry, representing over 50 companies that manufacture basic chemicals and synthetic resins and rubbers. Members range from family-owned companies to affiliates of global enterprises.

Responsible Care® is CIAC's commitment to sustainability - the betterment of society, the environment and the economy. Our member operations are bound and guided by the ethics and principles of Responsible Care® and constantly innovate for safer and more environmentally friendly products and processes. Furthermore, the ethic and principles of Responsible Care® oblige member companies to work cooperatively to identify and eliminate harm throughout the entire life cycle of their products.

Industrial classification

Industries in Canada (and North America) 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.

Within NAICS 325 are included 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 publication 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.

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

Data sources

Unless otherwise stated, all Canadian data originates with Statistics Canada.

This publication intends to provide the best information available. However, neither CIAC nor its employees makes 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 material.

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Chemical industry at a glance

Chemical industry¹ shipments in Canada in 2014 were \$53 billion, exports were \$36 billion and imports totaled \$50 billion.

The industry employed 81,000 workers in 2014 which constituted 5.4% of all manufacturing jobs. In addition to the direct jobs, other jobs are supported by the purchasing activity of the chemical industry and by the subsequent expenditure-induced activity. CIAC has estimated that for every job in the chemical industry, another 5 indirect jobs are created in other parts of the economy, so in total the chemical industry supports almost 485,000 jobs in Canada.

Industrial chemicals¹ 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 chemical industry, and by almost all other manufacturing segments. Major consumer industries include: plastic and rubber products, forest products, transportation equipment, energy, clothing, construction, and healthcare. For industrial chemicals, shipments in 2014 were \$29 billion, exports were \$20 billion, imports were \$19 billion, and employment was 15,000.

Table 1: Chemical industry statistics

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Shipments, \$ billion	47.2	48.6	49.9	48.2	49.7	40.1	43.4	47.1	48.5	50.4	52.8
Employment, 000	84.1	81.9	80.0	78.1	80.9	78.4	81.4	79.8	83.6	81.7	80.9
Imports, \$ billion	35.6	37.4	39.4	40.4	42.1	39.9	40.8	43.4	44.4	46.4	50.3
Exports, \$ billion	24.3	26.9	28.9	32.3	32.0	26.5	27.8	31.3	29.6	32.0	35.5

Table 2: Industrial chemical statistics

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Shipments, \$ billion	24.1	26.0	26.9	26.2	27.1	18.3	22.0	25.3	24.6	26.6	28.8
Employment, 000	21.5	19.8	18.7	17.8	18.1	16.1	17.2	17.2	17.2	16.6	15.1
Imports, \$ billion	15.5	16.7	17.2	17.1	17.5	13.8	15.9	17.1	17.3	17.9	19.3
Exports, \$ billion	14.9	16.8	17.9	19.7	18.4	13.2	15.7	18.6	17.0	18.7	19.8

¹ Chemical industry and industrial chemicals are defined on page 1.

Manufacturing shipments (revenue)

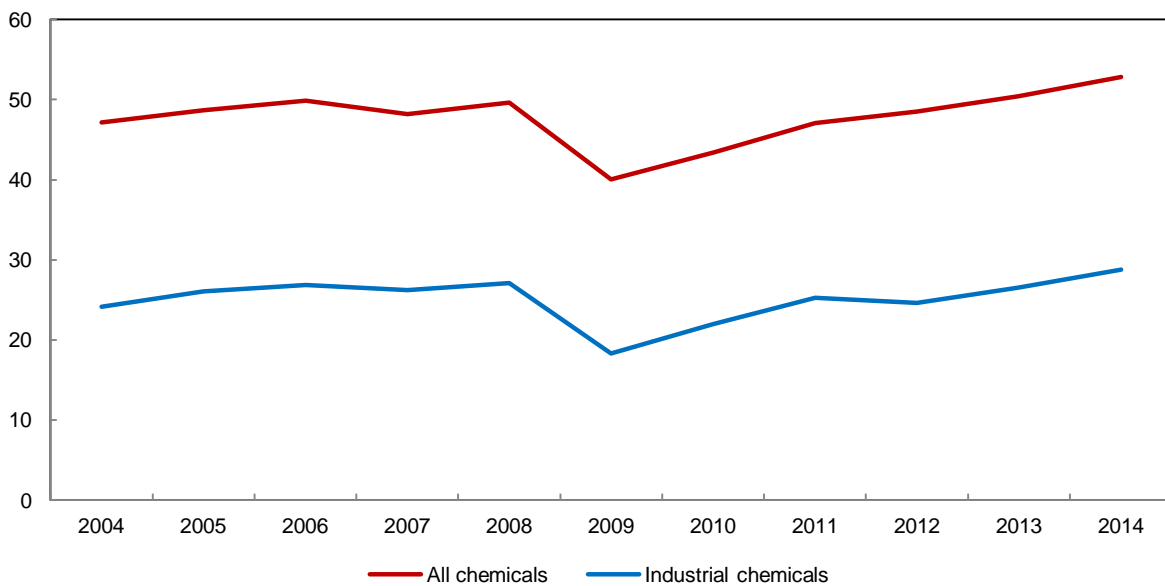
In 2014, the value of Canadian chemical industry manufacturing shipments was \$53 billion, an increase of 5% compared to 2013.

Shipments of industrial chemicals were \$29 billion in 2014, representing growth of 8.4% compared to 2013 (Table 3, Figure 1).

Table 3: Manufacturing shipments

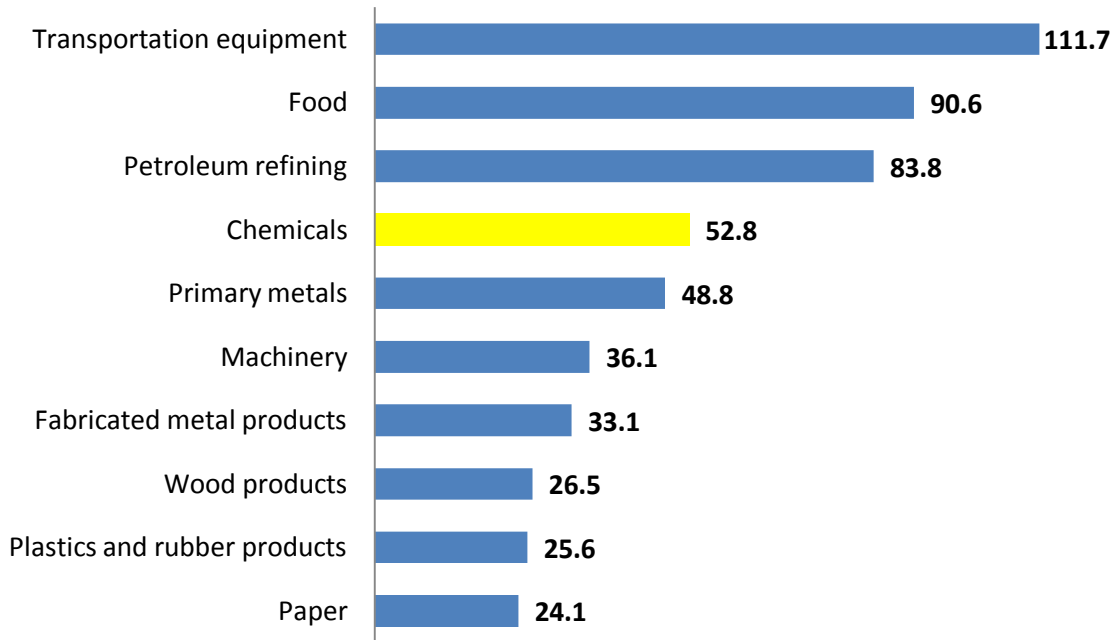
Manufacturing shipments, \$ billion	2013	2014	Change 2013-14
All chemicals	50.4	52.8	4.7%
Industrial chemicals	26.6	28.8	8.4%

Figure 1: Chemical industry shipments, \$ billion



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

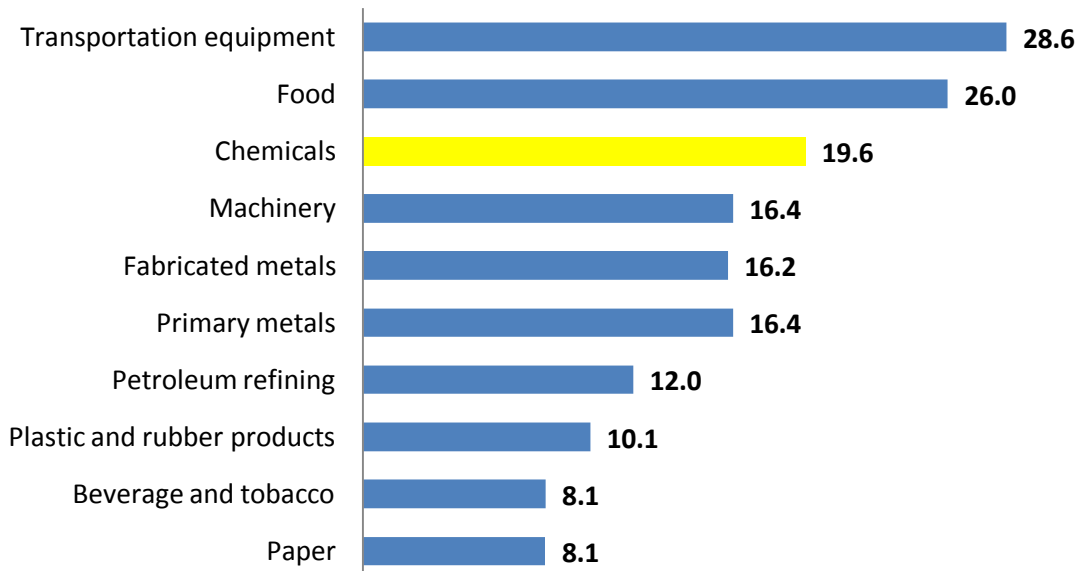
Figure 2: Top 10 manufacturing industries by value of shipments, \$ billion



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 3rd on the basis of value added in 2012 (latest available, Figure 3).

Figure 3: Top 10 manufacturing industries by value added, \$ billion



Employment

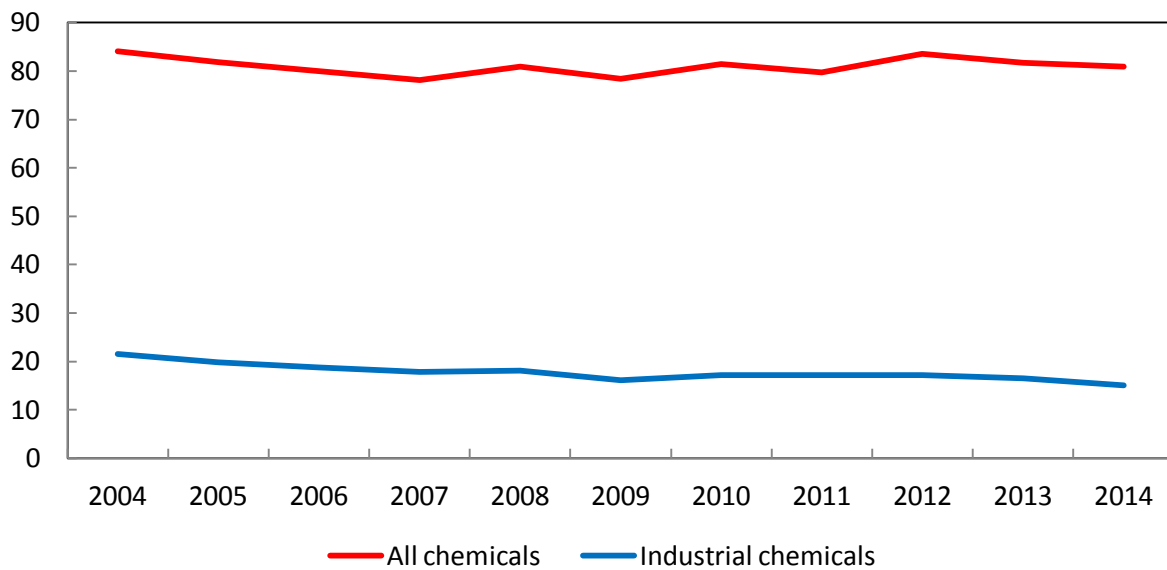
The chemical industry employed 80,900 workers in 2014. For industrial chemicals, the figure was 15,100. For both groupings, employment peaked in 2003 and has tended to decline since, although there was some bounce-back following the recession (Table 4 and Figure 4).

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 5 jobs in other sectors are indirectly linked to the industry. On this basis, the chemical industry supports almost 485,000 jobs in the overall Canadian economy.

Table 4: Employment in the Canadian chemical industry

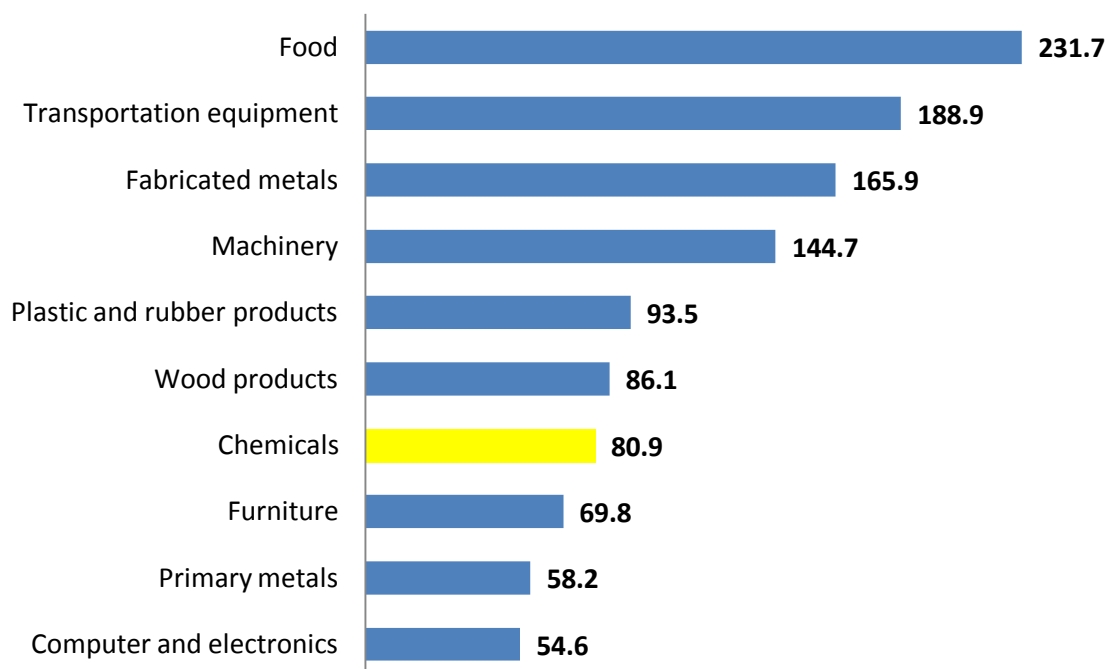
Total employment, 000	2013	2014	Change 2013-14
All chemicals	81.7	80.9	-1.0%
Industrial chemicals	16.6	15.1	-9.1%

Figure 4: Chemical industry employment (thousands)



On the basis of employment, chemicals ranks 7th among all manufacturing industries (Figure 5).

Figure 5: Top 10 manufacturing industries by employment (thousands)



Salaries and wages

Total salaries and wages paid to employees in the chemical industry in 2014 were \$5.4 billion, with \$1.3 billion paid within the industrial chemical segment (Table 5).

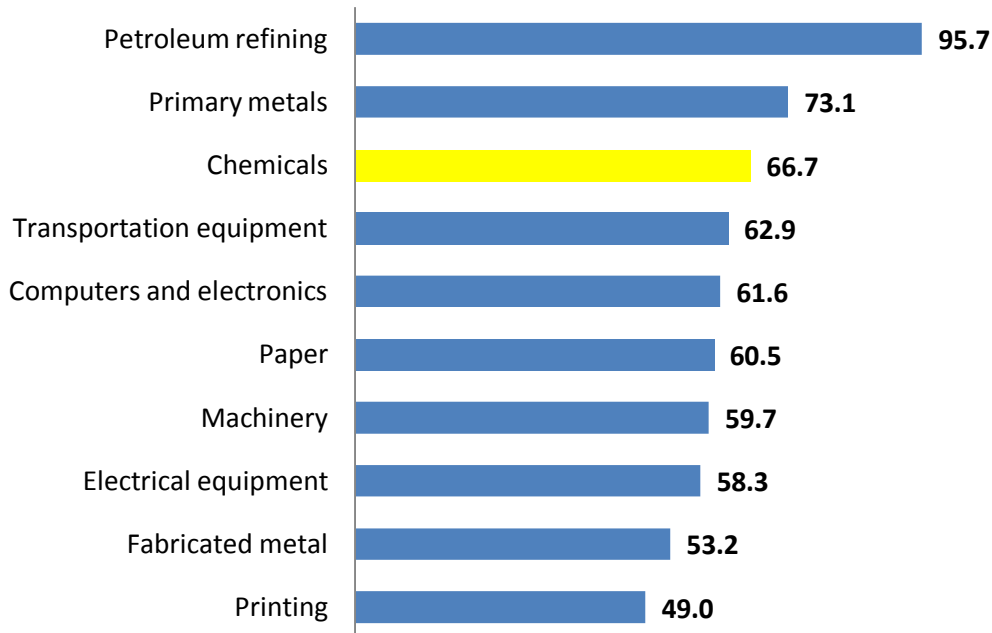
Table 5: Total salary and wages paid by the chemical industry

Total salaries and wages, \$ billion	2013	2014	Change 2013-14
All chemicals	5.4	5.4	no change
Industrial chemicals	1.5	1.3	-11.0%

Chemical companies operate a variety of types of complex equipment and processes using sophisticated computer control technologies. Employees require specialized education and training in order to operate these processes safely and efficiently. As a result, chemicals is a highly-paid industry, ranking 3rd among all manufacturing industries (Figure 6). For all manufacturing, the average salary in 2014 was \$53,200. For chemicals this was \$66,700 and higher still for industrial chemicals at \$84,400 (Table 6).

Table 6: Average salary and wages paid by the chemical industry

Average salaries and wages, \$000	2013	2014	Change 2013-14
All chemicals	66.6	66.7	0.1%
Industrial chemicals	86.3	84.4	-2.3%

Figure 6: Top 10 manufacturing industries based on average earnings per employee, \$000

International trade

Canada exported \$36 billion worth of chemicals and chemical products to the world in 2014, an increase of 11% from 2013. Canadian imports increased by 8% to \$50 billion (Table 7 and Figure 7). The United States represents the dominant export market and the dominant source of imports. In 2014, 76% of exports went to the United States and 62% of imports originated there. The next largest export markets were: China (4%), and followed by Japan, Italy, the United Kingdom, Mexico and Belgium (2% each). The next largest sources of imports were: Germany (5%), Switzerland (5%), and about 3% each from China, France and the United Kingdom.

For industrial chemicals, Canadian exports in 2014 were \$20 billion, an increase of 5% from 2013. Imports were \$19 billion, growing 7% (Table 7 and Figure 8). Again the United States is the primary trading partner, receiving 78% of exports and responsible for 71% of imports. The next largest export markets were: China (7%), the United Kingdom (2%) and Mexico (2%). The next largest sources of imports were: China (4%), Germany (3%) and about 2% each from Switzerland, Ireland and France.

Table 7: Trade in the chemical industry

Value of trade, \$ billion	2013	2014	Change 2013-14
All chemicals			
- Imports	46.4	50.3	8.3%
- Exports	32.1	35.5	10.8%
Industrial chemicals			
- Imports	18.0	19.3	7.4%
- Exports	18.8	19.8	5.4%

Figure 7: Trade by the total chemical industry, \$ billion

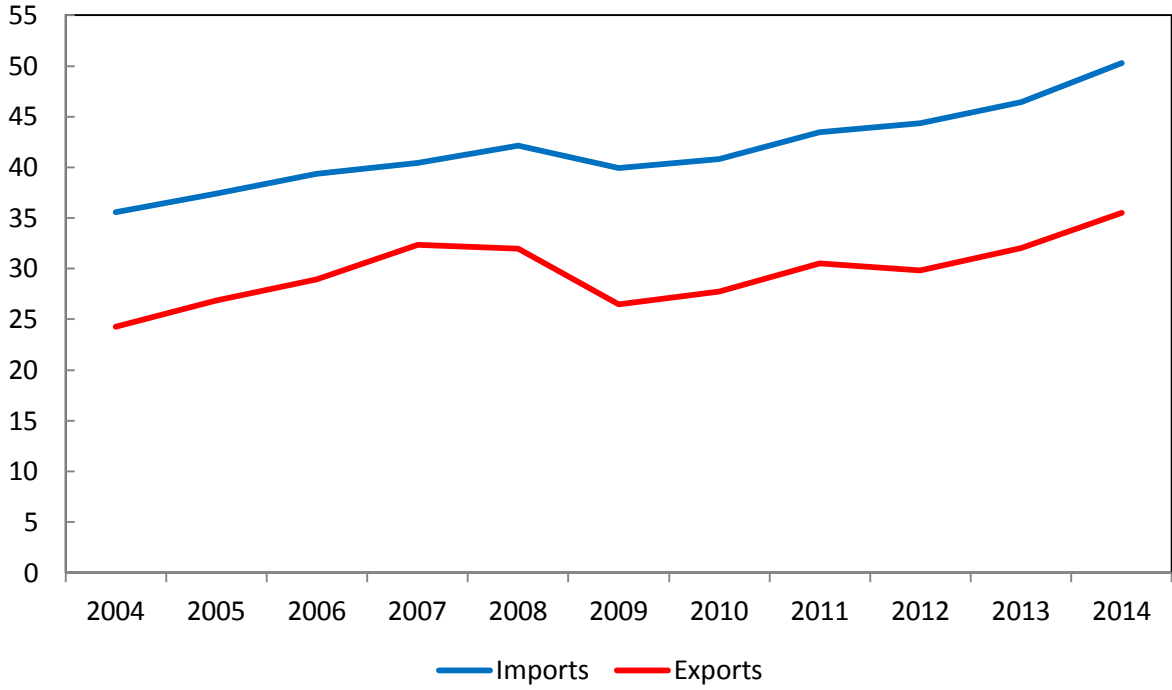
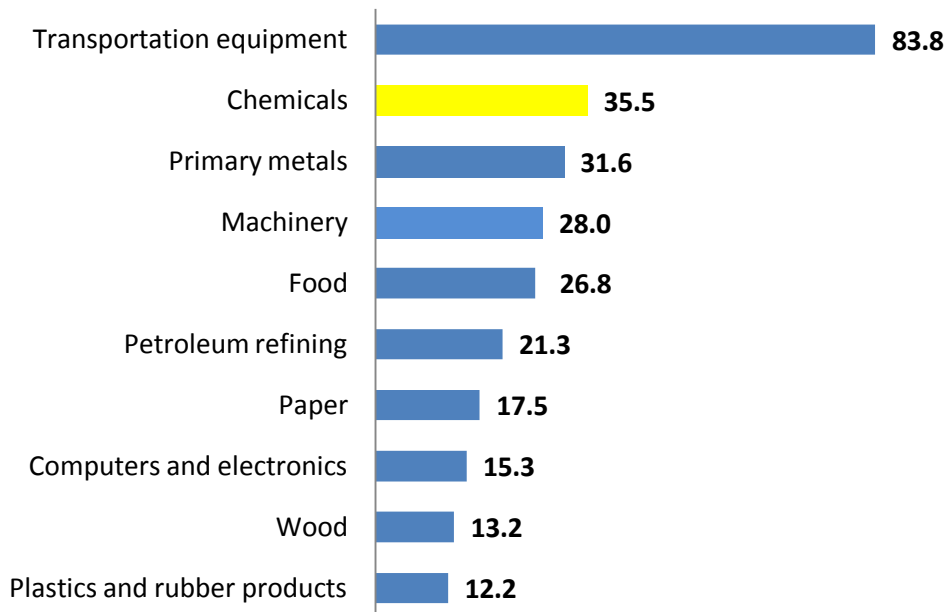


Figure 8: Trade in industrial chemicals, \$ billion



Chemicals is the 2nd largest exporter among all manufacturing industries (Figure 9).

Figure 9: Top 10 manufacturing industries by exports, \$ billion



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 total chemical industry were \$8.5 billion in 2014, the best year ever, and \$4.0 billion for industrial chemicals, also setting a new record (Table 8).

Table 8: Operating profits in the chemical industry, \$ billion

Operating profit, \$ billion	2013	2014	Change 2013-14
Total chemicals	7.2	8.5	19%
Industrial chemicals	3.6	4.0	12%

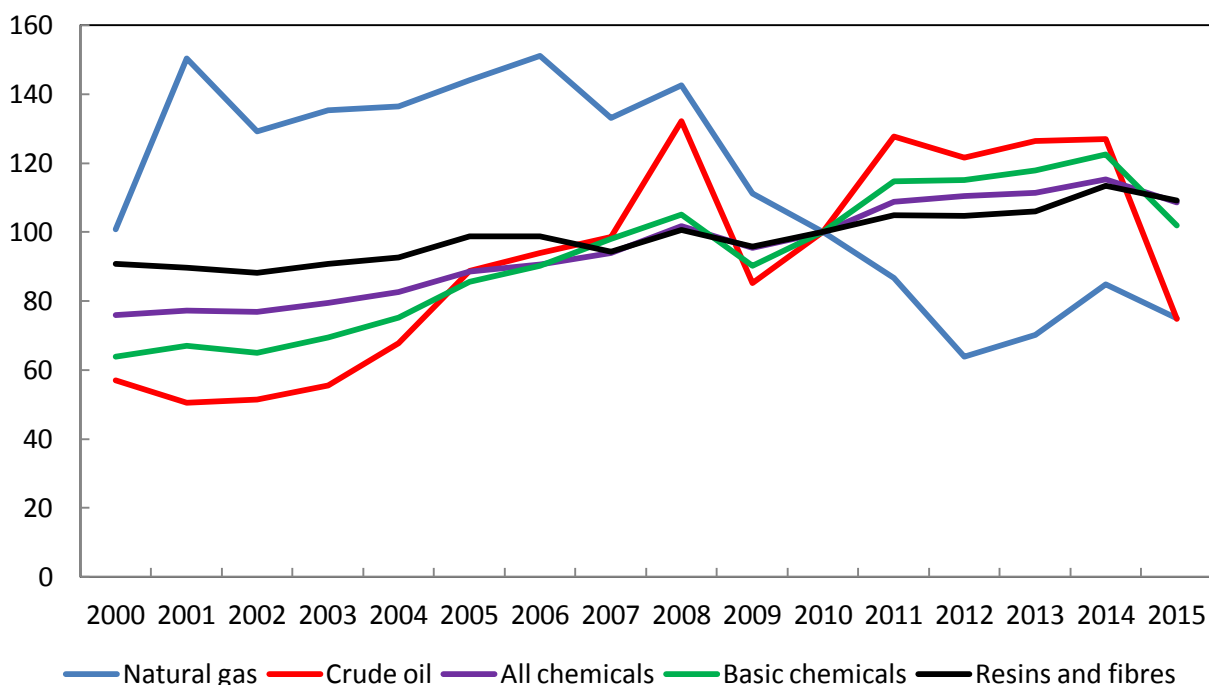
Price index

The Industrial Product Price Index (IPPI) reflects the prices that producers in Canada receive as the goods leave the plant gate. It does not reflect what the consumer pays. Unlike the Consumer Price Index (CPI), the IPPI excludes indirect taxes and all the costs that occur between the time a good leaves the plant and the time the final user takes possession of it, including the transportation, wholesale, and retail costs.

Natural gas and crude oil are two important sources of feedstocks for the chemical industry. Natural gas and crude oil have shown very different price behaviour in recent years. Natural gas prices rose steadily until 2008, and have trended 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, then declined in 2009 due to the global recession, but climbed steeply again in 2010 and 2011, leveled off in 2012 and 2013, and then fell sharply in 2014. The extent of the decline for crude is not reflected in the price index for 2014, but it does show up in early data for 2015 (Figure 10). All of the other indices also show declines for the early part of 2015. Unlike Europe and Asia, North American petrochemical production is based primarily on feedstock from natural gas. The traditional ratio between the price of crude oil (\$/bbl) and natural gas (\$/million Btu) had been about 6:1 based on energy equivalencies. This ratio was in excess of 30 earlier in 2014, but has since fallen back to a range of about 15:1. This has narrowed the competitive advantage in North America compared to Europe and Asia, but the gap is still large by historical terms.

Figure 10: Price index, 2010=100



Productivity

One measure of manufacturing productivity is the value of revenue per employee. Output per employee increased from \$561,000 in 2004 to \$655,000 in 2014 (Table 9). Output per employee is much higher for industrial chemicals reflecting the capital intensive nature of this industry compare to chemicals overall. For industrial chemicals, output per employee increased from \$1.1 million in 2004 to \$1.9 million in 2014.

Table 9: Productivity

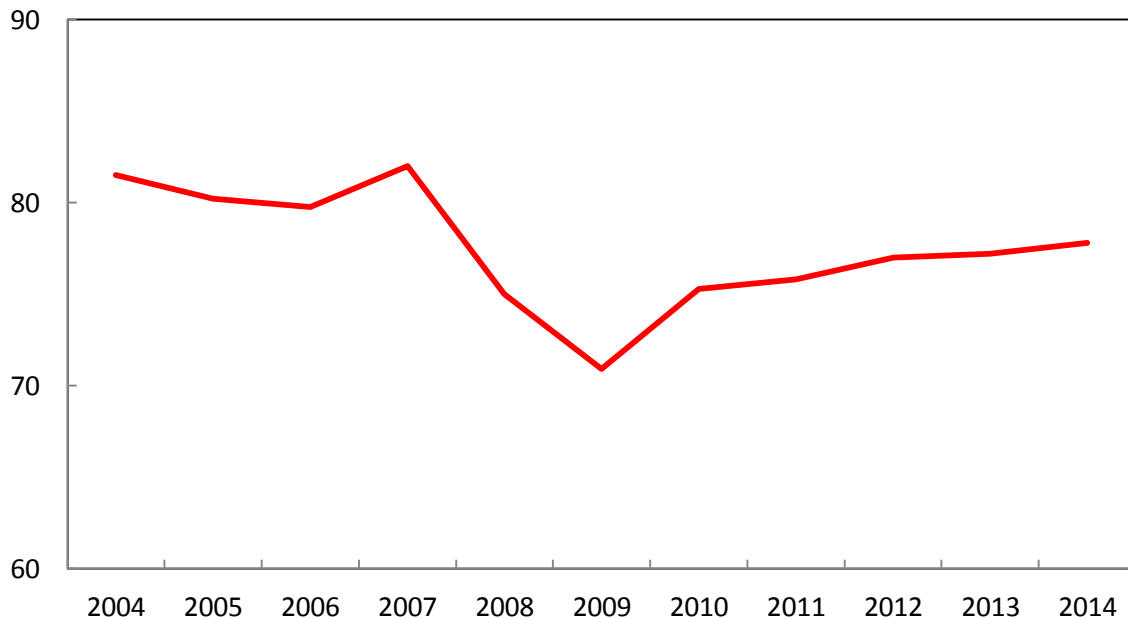
Output per employee, \$000	2004	2014
All chemicals	561	653
Industrial chemicals	1121	1908

Capacity utilization

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

Since 2000, capacity utilization for the chemical industry has averaged 78%. The most-recent peak (82%) was observed in 2007 which represented the highest capacity utilization rate since 1996. In 2009, capacity utilization reached its lowest level since the statistic has been measured, falling under 70%. In 2014, average capacity utilization for the year was 78%, up slightly from 2013 (Figure 11). 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 11: Capacity utilization in the overall chemical industry, %



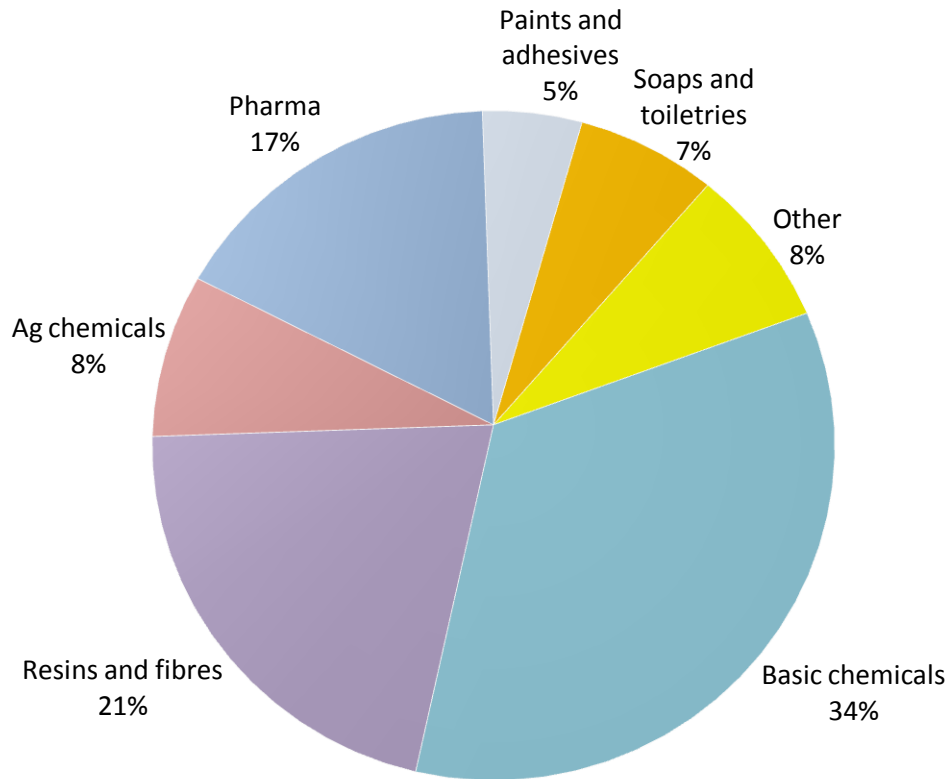
Other chemical manufacturing subsectors

As mentioned previously, the Canadian chemical industry is comprised of the following sub-industries:

- Basic chemicals (NAICS 3251)
- Synthetic resins and fibres (NAICS 3252)
- Pesticide, fertilizer and other agricultural chemicals (NAICS 3253)
- Pharmaceuticals (NAICS 3254)
- Paints, coatings and adhesives (NAICS 3255)
- Soaps, cleaning compounds and toilet preparations (NAICS 3256)
- Other chemical products (NAICS 3259).

Figure 12 shows the relative size of these industries by shipment value in 2013. Industrial chemicals accounts for over half of the total industry.

Figure 12: 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

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2004	3,698	4,363	1,484	1,407
2005	3,913	3,808	1,519	1,669
2006	3,747	3,807	1,544	1,564
2007	4,235	4,067	1,745	1,678
2008	5,234	4,433	2,405	2,401
2009	4,328	4,486	2,054	1,645
2010	3,869	4,161	1,974	1,594
2011	4,530	4,645	2,405	2,015
2012	4,811	5,235	2,700	2,141
2013	4,775	4,860	3,116	1,951
2014	4,470	5,170	3,358	1,715

Table 11: Principal statistics for pharmaceuticals

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2004	8,861	26,144	9,563	4,011
2005	8,416	26,939	10,030	4,337
2006	9,492	28,016	11,369	5,442
2007	8,047	27,465	12,334	6,802
2008	7,807	28,869	12,661	6,768
2009	8,143	30,012	14,539	7,569
2010	8,062	31,749	13,331	6,158
2011	7,742	30,249	13,597	5,895
2012	8,613	31,802	13,517	5,549
2013	8,525	31,810	13,721	6,054
2014	8,805	30,570	15,382	8,300

Table 12: Principal statistics for paints, coatings and adhesives

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2004	2,767	8,884	1,473	650
2005	2,663	8,277	1,469	679
2006	2,609	7,940	1,494	705
2007	2,799	8,020	1,512	691
2008	2,664	8,729	1,485	604
2009	2,601	7,371	1,473	423
2010	2,399	6,742	1,586	409
2011	2,145	6,111	1,633	474
2012	2,750	7,391	1,825	535
2013	2,680	7,730	1,902	528
2014	2,755	8,375	2,051	596

Table 13: Principal statistics for soaps, cleaning compounds and toilet preparations

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2004	3,063	11,571	3,459	1,938
2005	2,866	11,492	3,450	2,004
2006	2,984	11,147	3,619	2,037
2007	2,942	10,883	3,712	2,043
2008	2,954	10,791	4,060	2,143
2009	2,933	10,666	4,330	2,125
2010	2,788	10,724	4,303	2,183
2011	2,859	10,803	4,274	2,334
2012	2,978	11,236	4,566	2,447
2013	3,385	10,925	4,935	2,665
2014	3,535	11,295	5,312	2,907

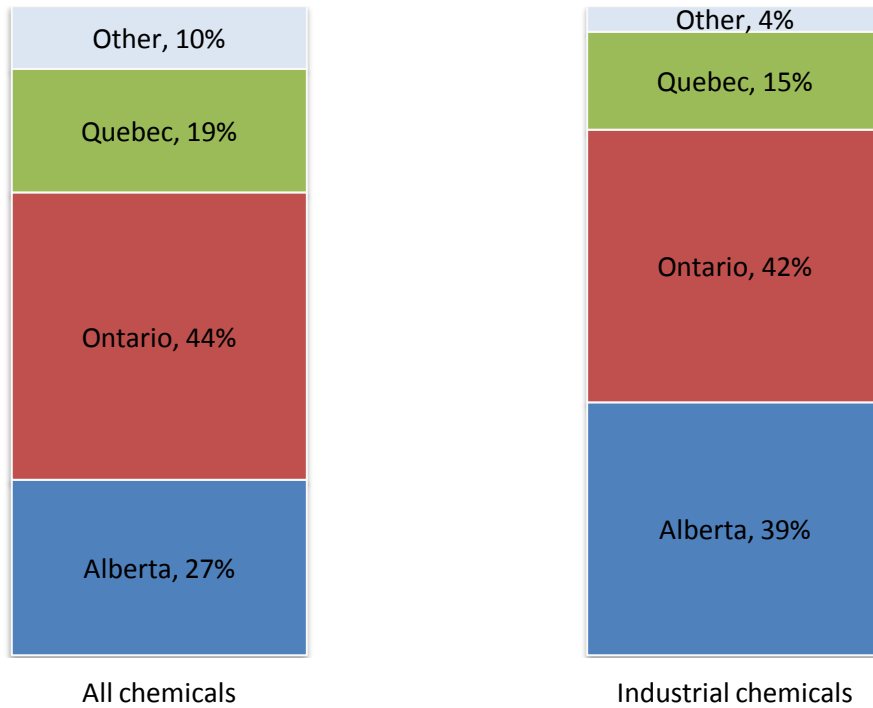
Table 14: Principal statistics for other chemical products

	Shipments, \$ million	Employment	Imports, \$ million	Exports, \$ million
2004	4,631	11,590	4,110	1,410
2005	4,748	11,536	4,228	1,343
2006	4,176	10,341	4,095	1,321
2007	3,955	9,829	4,028	1,388
2008	3,870	9,987	3,970	1,687
2009	3,808	9,743	3,675	1,499
2010	4,269	10,908	3,732	1,723
2011	4,521	10,759	4,363	1,913
2012	4,694	10,749	4,460	1,966
2013	5,200	10,170	4,796	2,055
2014	5,265	10,875	4,884	2,179

Provincial statistics

Both the overall chemical industry and the industrial chemicals segment are concentrated in the provinces of Ontario, Alberta and Quebec (Figure 13).

Figure 13: Provincial distribution of the chemical industry, by value of shipments

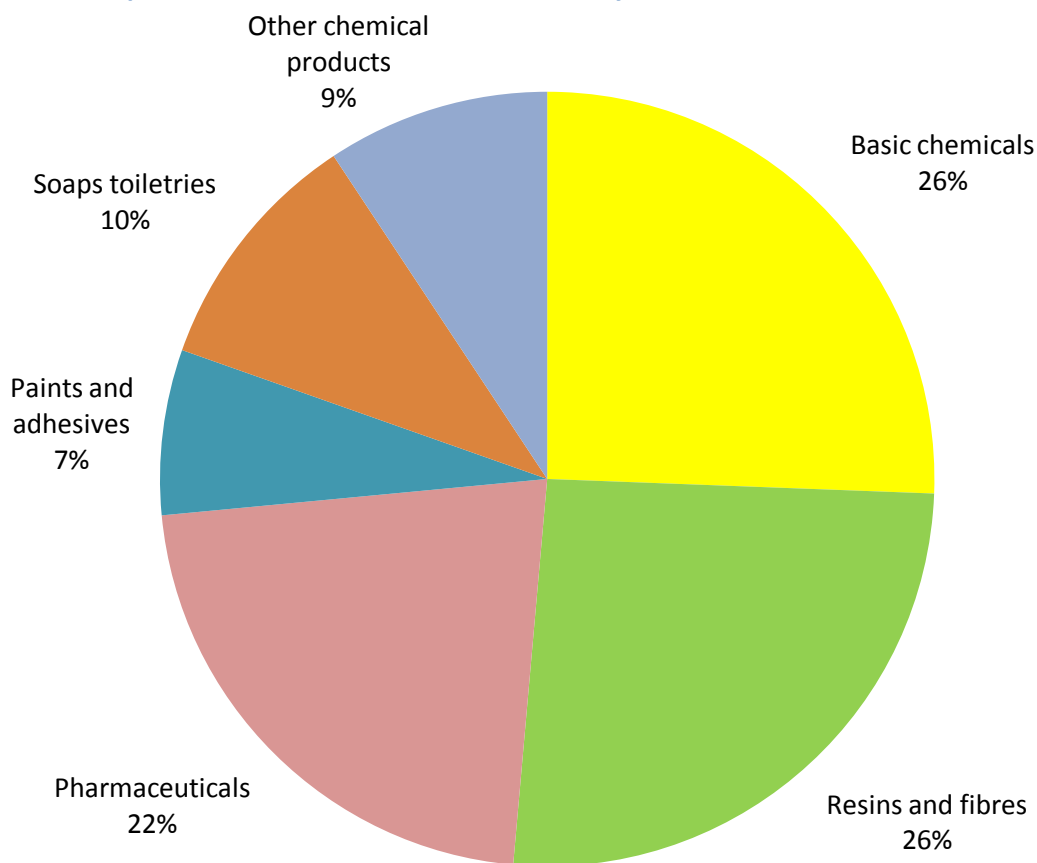


Further information about these three main provinces is contained in the following portions of the analysis.

Ontario

In 2014, Ontario’s chemical industry had shipments of over \$23 billion and more than half of this was comprised of industrial chemicals (Figure 14).

Figure 14: Composition of the Ontario chemical industry



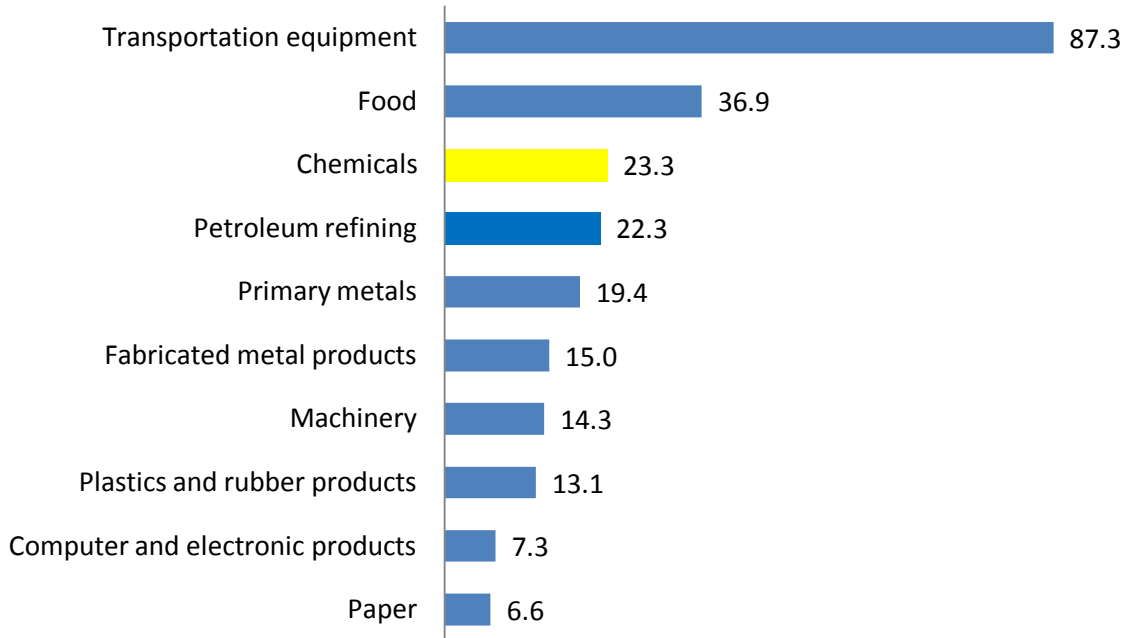
The value of industrial chemical shipments dropped significantly during the recession, but has rebounded since, and grew 4% in 2014 to reach \$12.0 billion (Table 15). The largest cluster for the industrial chemical industry is located in the Sarnia region, with the next largest concentrations in the Golden Horseshoe and along the St. Lawrence Seaway.

Table 15: Ontario chemical industry shipments

Shipments, \$billion	2013	2014	Change 2013-14
All chemicals	22.4	23.3	4.3%
Industrial chemicals	11.5	12.0	4.0%

Chemicals was the 3rd largest of all manufacturing industries in the province in 2014, on the basis of shipments (Figure 15).

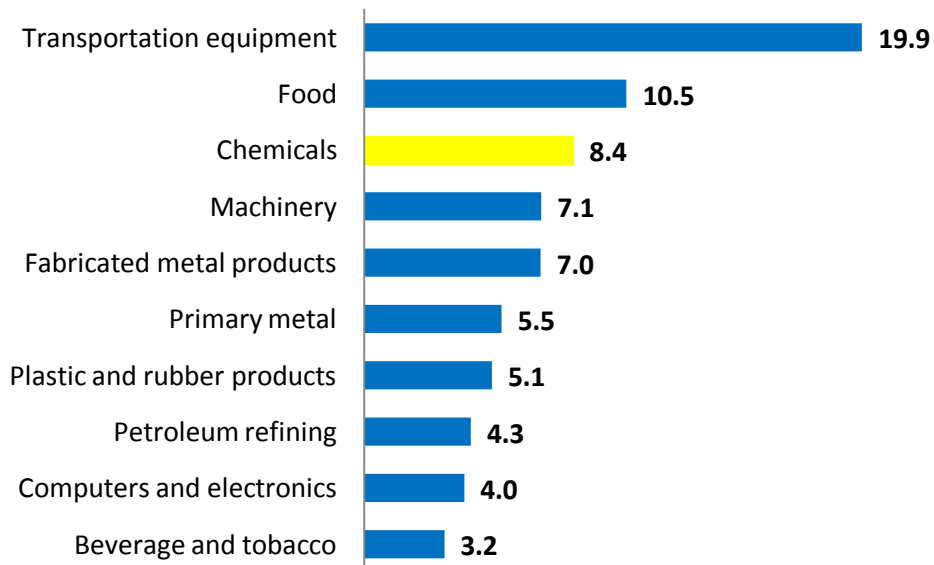
Figure 15: Top 10 manufacturing industries in Ontario by value of shipments (\$billion)



Value added

On the basis of value added, chemicals also ranked 3rd among all manufacturing industries in 2012 (latest data available) (Figure 16).

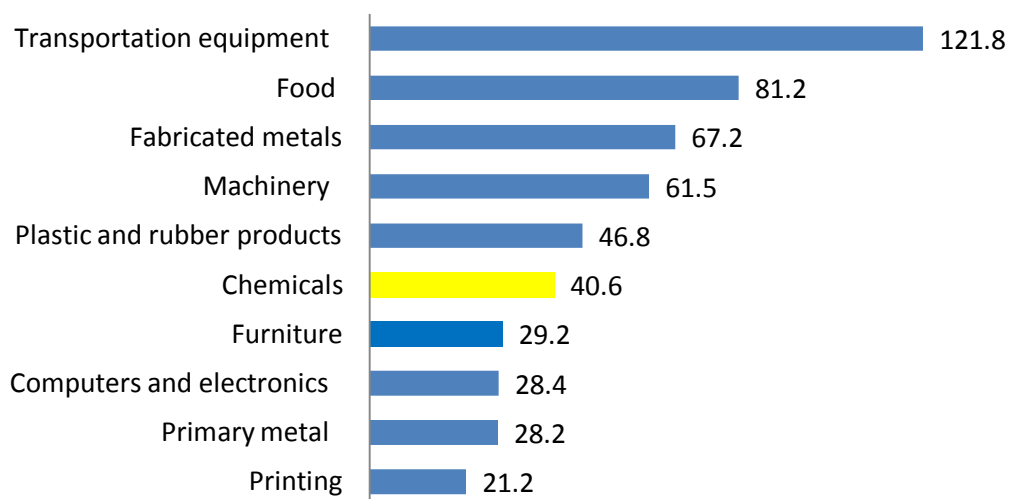
Figure 16: Top 10 manufacturing industries by value added in Ontario (\$ billion)



Employment ranking

The chemical industry directly employed 40,600 people in Ontario in 2014, down 3% from 2013. When indirect employment is included, it is estimated that the chemical industry supports about 250,000 jobs in the province. The number of employees working in industrial chemicals was 6,500, down 16% from 2013, and representing 43% of the national total. When compared to other manufacturing industries, chemicals ranked 6th on the basis of employment (Figure 17).

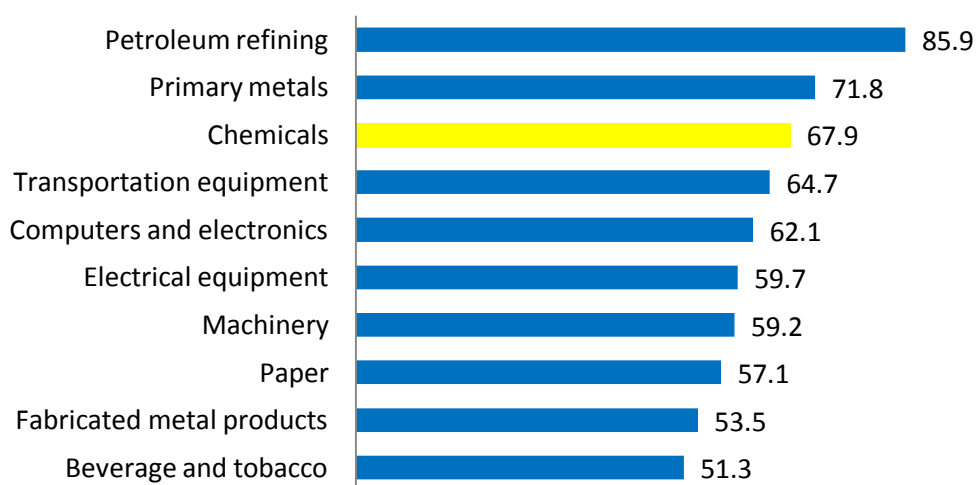
Figure 17: Top 10 manufacturing industries by employment in Ontario (thousands)



Salaries and wages

The chemical industry paid a total of \$2.7 billion in salaries and wages in the province in 2014. With an average annual salary of \$67,900, the industry ranked 3rd among all manufacturing industries in Ontario (Figure 18). The average salary within industrial chemicals was much higher at \$81,500. The average salary across all manufacturing industries in Ontario was \$56,300.

Figure 18: Top 10 manufacturing industries by average salary in Ontario (\$000)



Trade

The value of exports by the chemical industry from Ontario in 2014 was \$18.8 billion, while imports were \$32.6 billion (Table 16). The United States was the destination for 74% of exports, followed by Japan (4%), Italy (4%) and the United Kingdom (3%). The United States was also the source for most of the imports (62%), followed by Switzerland (6%), Germany (5%) and Belgium (3%).

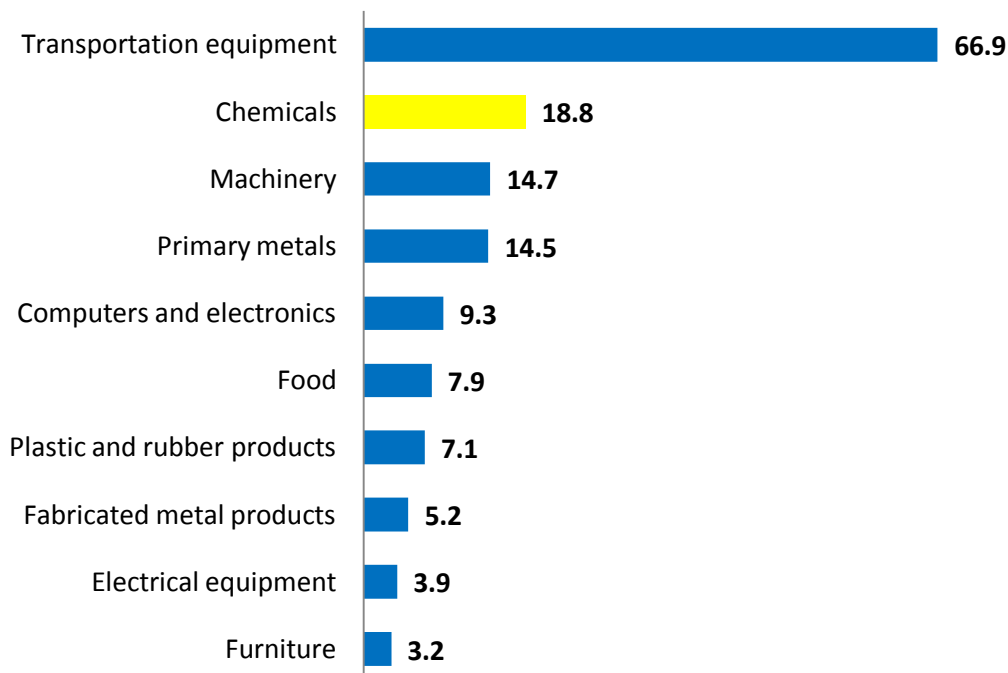
For industrial chemicals, exports from the province in 2014 were \$8.0 billion, while imports were \$10.9 billion. The United States was the destination for 78% of exports, followed by the United Kingdom (5%), and China (4%). The United States was also the source of most of the imports (74%), followed by China (4%), and Switzerland (3%).

Table 16: Trade by the chemical industry in Ontario

Value of trade, \$ billion	2013	2014	Change 2013-14
All chemicals			
- Imports	29.6	32.6	10.3%
- Exports	16.6	18.8	13.5%
Industrial chemicals			
- Imports	10.3	10.9	5.9%
- Exports	8.3	8.0	-2.7%

Chemicals is the 2nd largest exporter among all manufacturing industries (Figure 19).

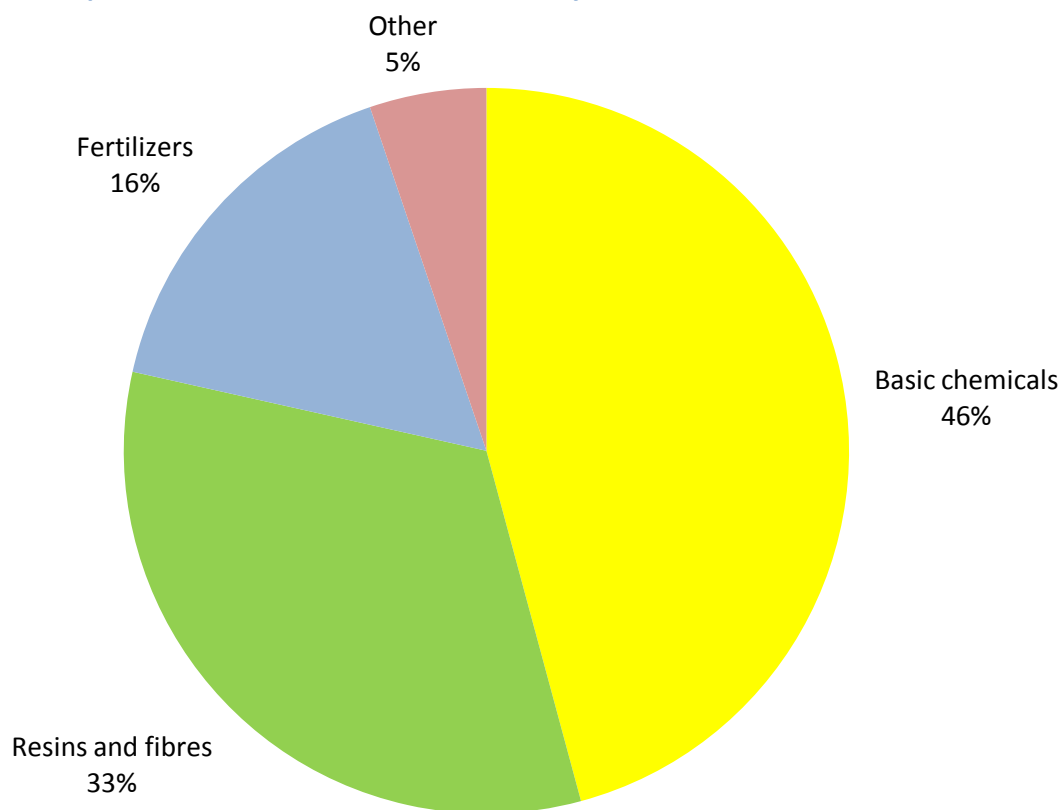
Figure 19: Top 10 manufacturing industries by value of exports from Ontario (\$ billion)



Alberta

In 2014, Alberta’s chemical industry had shipments of \$14.3 billion (Table 17). Over three-quarters of the total was comprised of industrial chemicals. (Figure 20).

Figure 20: Composition of the Alberta chemical industry



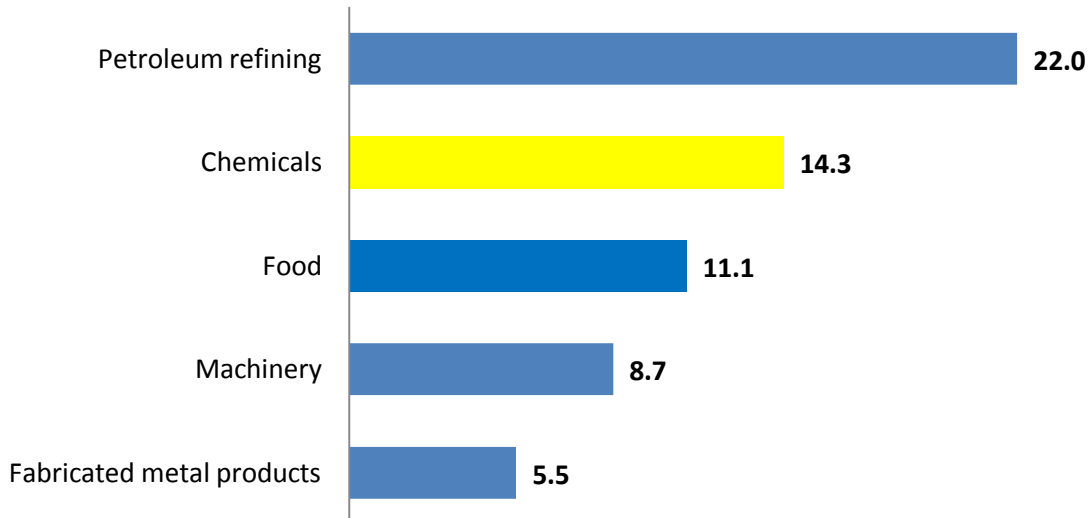
The value of industrial chemical shipments in 2014 were \$11.2 billion. There are two main clusters for the industrial chemical industry in Alberta. One is the region to the northeast of Edmonton, and the second is situated in central Alberta, near Red Deer.

Table 17: Alberta chemical industry shipments

Shipments, \$billion	2013	2014	Change 2013-14
All chemicals	13.6	14.3	5.4%
Industrial chemicals	9.9	11.2	14.0%

Chemicals was the 2nd largest manufacturing industry in the province in 2014, on the basis of shipments (Figure 21).

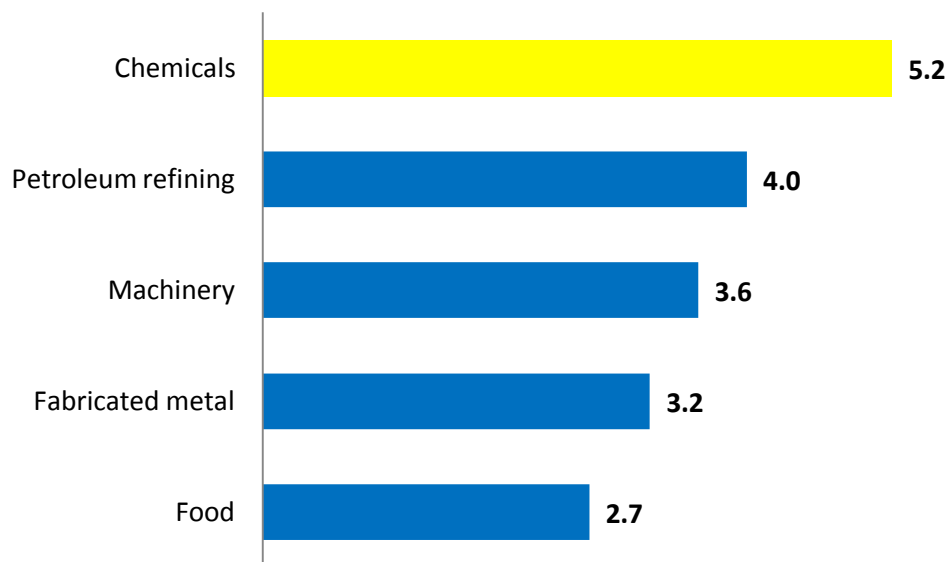
Figure 21: Top 5 manufacturing industries in Alberta by value of shipments (\$billion)*



Value added

On the basis of value added, chemicals ranked 1st among all manufacturing industries in Alberta (Figure 22). The higher ranking compared to shipments reflects the fact that the chemical industry is a high-value adding manufacturing activity.

Figure 22: Top 5 manufacturing industries by value added in Alberta (\$ billion)

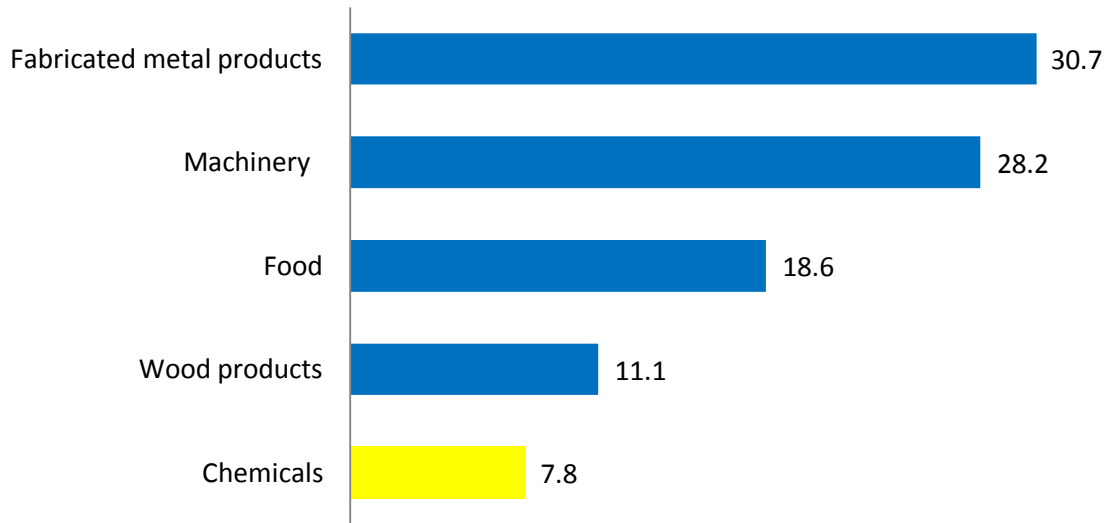


* The top 10 industries cannot be ranked because too many industries have been suppressed by Statistics Canada after the top 5.

Employment ranking

The chemical industry employed 7,845 people in Alberta in 2014, up 4% compared to 2013. When indirect employment is included, it is estimated that the chemical industry supports about 47,000 jobs in the province. The number of employees working in industrial chemicals in 2014 was 3,855. When compared to other manufacturing industries in the province, chemicals ranked 5th (Figure 23).

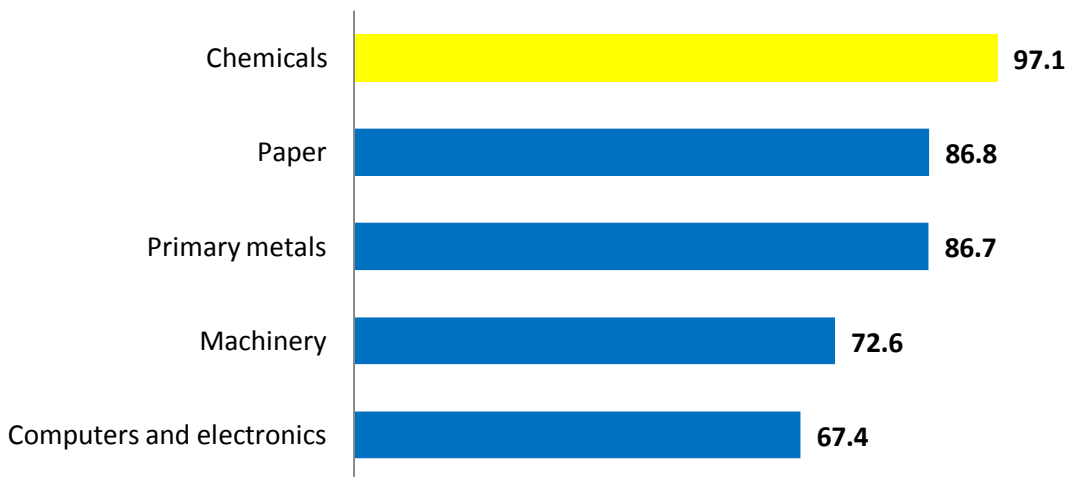
Figure 23: Top 5 manufacturing industries by employment in Alberta (thousands)



Salaries and wages

The chemical industry paid a total of \$730 million in salaries and wages in the province in 2014. The average salary paid to employees in the chemical industry was \$93,100, which ranked 1st among all manufacturing industries (Figure 24). (NB: Petroleum refining would be in the top 5 but its data has been suppressed.) The average salary for industrial chemicals was higher still at \$104,100. For all manufacturing the average salary in the province was \$61,700.

Figure 24: Top 5 manufacturing industries by average salary in Alberta (\$000)



Trade

The value of exports by the chemical industry from Alberta in 2014 was \$8.7 billion, while imports were \$2.9 billion (Table 18). The United States was the destination for 83% of exports, followed by China (9%) and Mexico (3%). The United States was also the source of most imports (80%), followed by China (5%), Germany (3%), and the United Kingdom (2%).

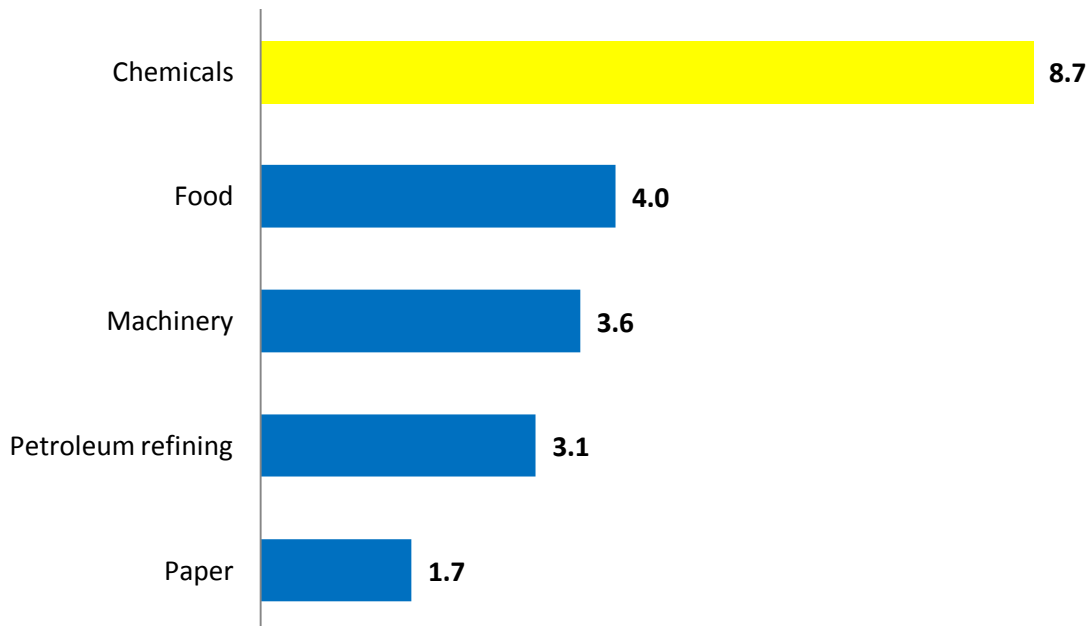
For industrial chemicals, exports from the province in 2014 were \$7.5 billion, while imports were \$1.5 billion. The United States was the destination for 81% of exports, followed by China (10%), and Mexico (4%). The United States was the source of most imports (80%), followed by China (8%), and the United Kingdom (2%).

Table 18: Trade by the chemical industry in Alberta

Value of trade, \$ billion	2013	2014	Change 2013-14
All chemicals			
- Imports	2.8	2.9	3.5%
- Exports	7.8	8.7	10.6%
Industrial chemicals			
- Imports	1.4	1.5	6.5%
- Exports	6.3	7.5	17.7%

Chemicals ranks 1st among manufacturing industries in terms of exports from Alberta (Figure 25). For all commodities, chemicals ranks 3rd behind crude oil and natural gas.

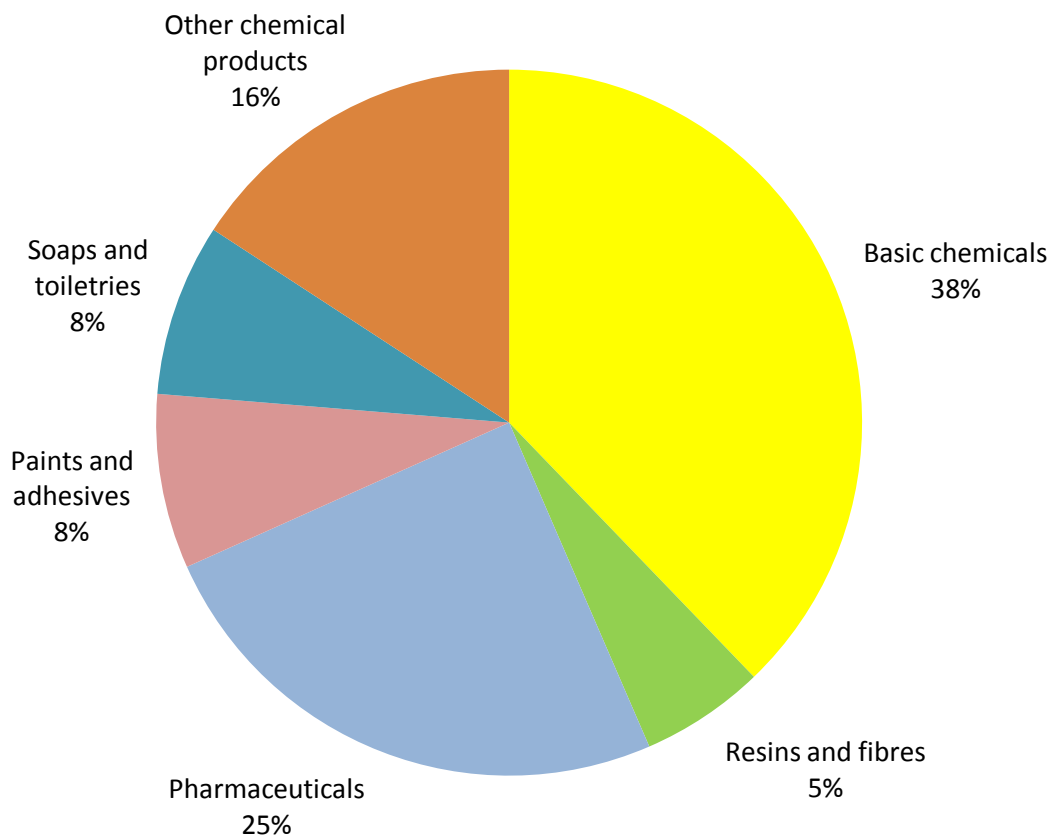
Figure 25: Top 10 manufacturing industries by value of exports from Alberta (\$ billion)



Quebec

In 2014, Quebec’s chemical industry had shipments of \$10 billion and over 40% was comprised of industrial chemicals (Figure 26).

Figure 26: Composition of the Quebec chemical industry



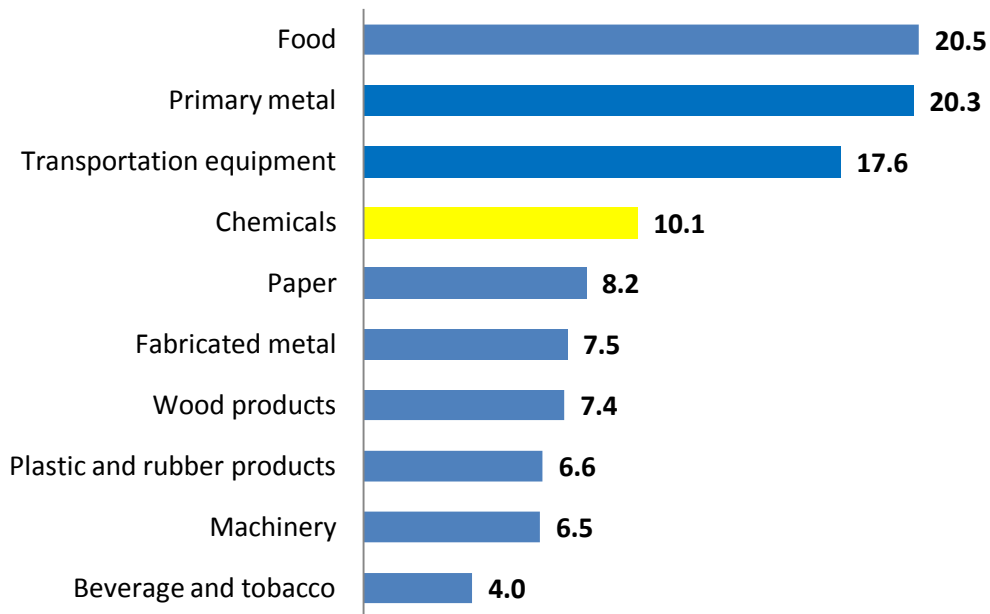
It is estimated that shipments of industrial chemicals from Quebec in 2014 were \$4.4 billion (Table 19). The industrial chemical industry in Quebec is concentrated in the eastern end of Montreal and along the south shore of the St. Lawrence.

Table 19: Quebec chemical industry shipments

Shipments, \$billion	2013	2014	Change 2013-14
All chemicals	9.7	10.0	3.8%
Industrial chemicals	4.2	4.4	5.5%

Chemicals was the 4th largest manufacturing industry on the basis of shipments (Figure 27).

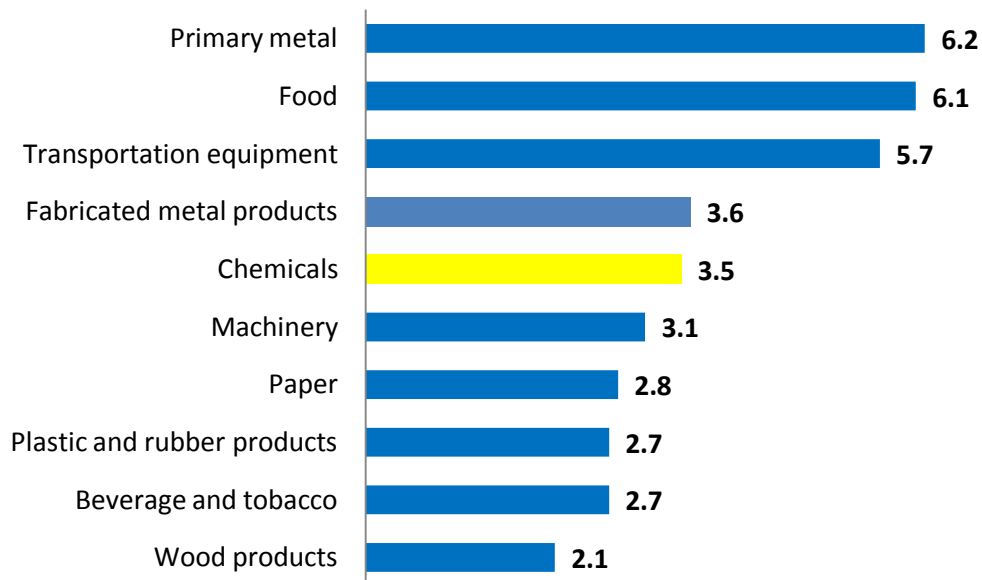
Figure 27: Top 10 manufacturing industries in Quebec by value of shipments (\$billion)*



Value added

On the basis of value added, chemicals ranked 5th among all manufacturing industries in Quebec (Figure 28).

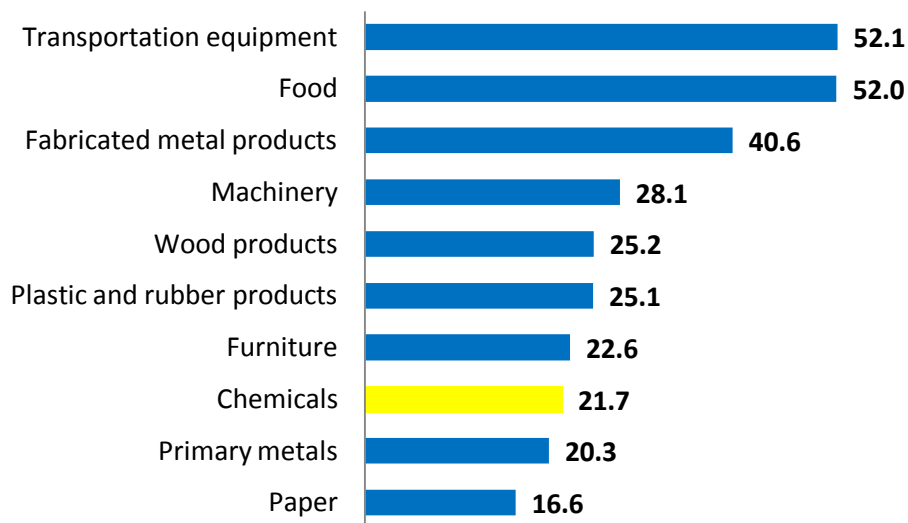
Figure 28: Top 10 manufacturing industries by value added in Quebec (\$ billion)



Employment ranking

The chemical industry employed 21,710 people in Quebec in 2014. When indirect employment is included, it is estimated that the chemical industry supports 130,000 jobs in the province. It is estimated that 3,020 people were employed by the industrial chemical industry. When compared to all manufacturing industries in the province, chemicals ranked 8th (Figure 29).

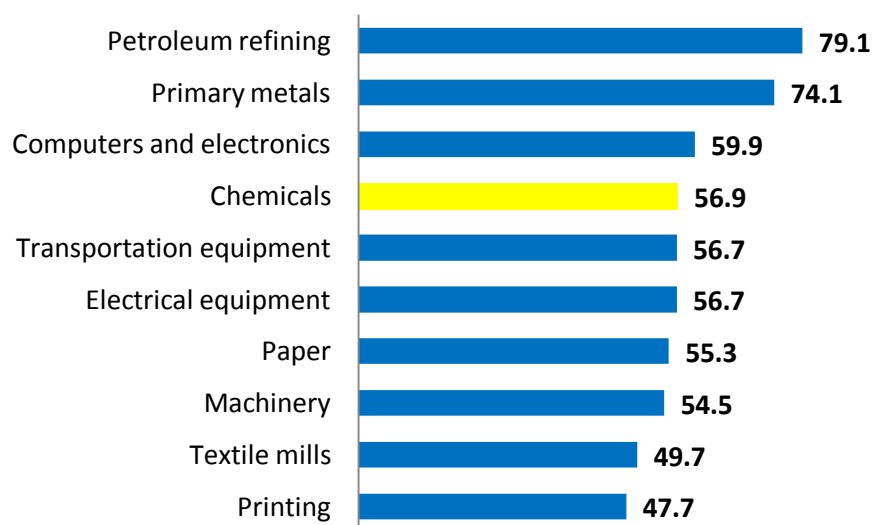
Figure 29: Top 10 manufacturing industries by employment in Quebec (thousands)



Salaries and wages

The chemical industry paid a total of \$1.3 billion in salaries and wages in the province in 2014, corresponding to an average annual salary of \$60,700, which placed the industry 4th in Quebec (Figure 30). The average salary for industrial chemicals was \$80,300. For all manufacturing, the average salary in the province was \$49,400.

Figure 30: Top 10 manufacturing industries by average salary in Quebec (\$000)



Trade

The value of exports by the chemical industry from Quebec in 2014 was \$5.2 billion and imports were \$8.0 billion (Table 20). The United States was the destination for 76% of exports, followed by Mexico (3%), and Belgium (2%). Quebec is different from the other provinces in that a much lower proportion of its imports come from the United States (42%), followed by Germany (11%), France (6%) and Ireland (4%).

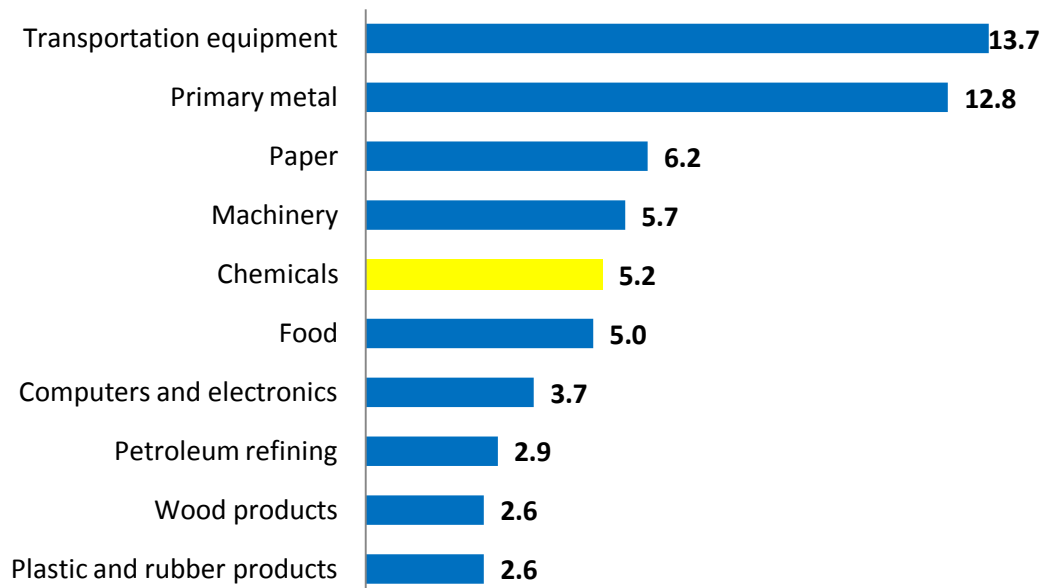
For industrial chemicals, exports from the province in 2014 were \$2.6 billion, while imports were \$4.0 billion. The United States was the destination for 85% of exports, followed by Mexico (4%). The United States was the source of 56% of imports, followed by China (5%, Germany (4%) and Kazakhstan (4%).

Table 20: Trade by the chemical industry in Quebec

Value of trade, \$ billion	2013	2014	Change 2013-14
All chemicals			
- Imports	8.0	8.0	no chg
- Exports	4.8	5.2	9.0%
Industrial chemicals			
- Imports	3.8	4.0	5.7%
- Exports	2.5	2.6	4.1%

Compared to all other manufacturing industries, chemicals was the 5th largest export industry (Figure 31).

Figure 31: Top 10 manufacturing 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

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.

Principal statistics for these industries are shown in Table 1.

Table 1: Principal statistics for petrochemicals and other organic chemicals

	2010	2011	2012	2013	2014
Establishments					
Petrochemicals	17	19	20	25	26
Other organic chemicals	117	135	137	135	135
Shipments \$M					
Petrochemicals	6,651	7,529	7,151	7,675	7,835
Other organic chemicals	3,486	4,318	3,960	4,145	4,090
Employment					
Petrochemicals	1,219	1,316	1,186	1,160	1,130
Other organic chemicals	2,146	2,292	2,297	2,250	2,190
Exports \$M					
Petrochemicals	2,406	2,634	2,301	2,597	2,874
Other organic chemicals	3,036	3,608	3,402	3,777	4,231
Imports \$M					
Petrochemicals	907	859	907	1,067	1,155
Other organic chemicals	5,609	5,634	5,601	6,033	6,506

Commodity data

Statistics Canada reports production data for a limited number of organic chemicals as shown in Table 2. Data for ethylene was last published in 2007 when 5055 kt were produced. Since then data has been suppressed by Statistics Canada due to confidentiality concerns.

Table 2: Canadian production of specific organic chemicals, kilotonnes

	2010	2011	2012	2013	2014
Benzene	639	589	569	529	670
Toluene	269	241	236	258	229
Xylenes	222	241	273	293	381
Butadiene	213	215	209	234	216
Butylenes	162	202	176	155	177
Propylene	660	601	624	616	550
Formaldehyde	158	159	161	154	165

More data exists for imports and exports than for domestic production. Table 3 shows the exports for a select range of organic chemicals, in both tonnage and dollar value terms.

Table 3: Canadian exports of select organic chemicals

	Value, \$M	Quantity, kt	Top markets
Benzene	227	156	USA 82% Netherlands 13% France 3%
Butadiene	142	84	USA 100%
Ethylene glycol	1,454	1,507	USA 54% China 42% Brazil 2%
Higher olefins	213	140	USA 99%
Isopropyl alcohol	121	79	USA 99% Mexico 1%
Methanol	101	206	USA 100%
Propylene	378	239	USA 100%
Styrene	993	576	USA 100%

CIAC members producing petrochemicals and organic chemicals in Canada

Akzo Nobel Chemicals Ltd.

BASF Canada

Chemtura Canada Co./Cie

Dow Chemical Canada ULC

E.I. duPont Canada Company

Evonik Oil Additives Canada Inc.

H.L. Blachford Ltd.

Imperial Oil, Products & Chemicals Division

INEOS Canada Partnership

Jungbunzlauer Canada Inc.

Lanxess Inc.

MEGlobal Canada Inc.

METHANEX CORPORATION

NOVA Chemicals Corporation

Shell Chemicals Canada Ltd.

St-Jean PhotoChemicals Inc.

Stepan Canada Inc.

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.

However, beginning in 2010, all data except establishment count has 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.

Principal statistics for these industries are shown in Table 1.

Table 1: Principal statistics for inorganic chemicals

	2010	2011	2012	2013	2014
Establishments					
Chlor-alkali	6	7	7	8	9
Other inorganic chemicals	108	117	118	130	133
Shipments \$M	3,033	3,549	3,683	3,667	3,965
Employment, 000	4,373	4,356	4,475	4,385	4,265
Exports \$M	3,661	4,752	4,010	4,344	3,725
Imports \$M	2,156	2,675	2,639	2,634	1,812

* Exports are larger than domestic production due to the inclusion of uranium compounds in the export data, but not in the shipment statistics.

Commodity data

Statistics Canada reports production data for a limited number of inorganic chemicals as shown in Table 2.

Table 2: Canadian production of specific inorganic chemicals, kilotonnes

	2010	2011	2012	2013	2014
Carbon black	228	233	224	221	241
Chlorine	466	567	550	600	510
Hydrogen peroxide	217	225	217	225	240

More data exists for imports and exports than for domestic production. Table 3 shows the exports for a select range of inorganic chemicals, in both tonnage and dollar value terms.

Table 3: Canadian exports of select inorganic chemicals

	Value, \$M	Quantity, kt	Top markets
Chlorine	33	189	USA 100%
Hydrochloric acid	50	408	USA 99%
Hydrogen peroxide	50	97	USA 99%
Sodium chlorate	395	590	USA 77% Japan 8% Chile 5%
Sodium hydroxide	66	89	USA 100%
Sodium silicate	13	24	USA 99% Italy 1%
Sulphuric acid	149	2,041	USA 100%
Titanium dioxide	1.6	0.5	USA 79% Costa Rica 16% Venezuela 3%

CIAC members producing inorganic chemicals in Canada

Akzo Nobel Chemicals Ltd.
 Arkema Canada Inc.
 Axiall Canada Inc.
 CCC Sulphur Products
 Canexus Chemicals Canada LP
 Chemtrade
 Cytec Canada Inc.
 ERCO Worldwide
 Evonik Canada Inc.
 KRONOS Canada Inc.
 Nalco Canada Co. (An EcoLab Co.)
 National Silicates
 NorFalco Sales Inc.
 Olin Canada ULC
 PeroxyChem Canada

Synthetic resins, rubbers and fibres

There are two industry sub-groups within this classification:

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

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.

Principal statistics for these industries are shown in Table 1.

Table 1: Principal statistics for synthetic resins rubbers and fibres

	2010	2011	2012	2013	2014
Establishments					
Synthetic resins and rubbers	139	141	144	133	127
Synthetic fibres	26	25	26	25	33
Shipments \$M					
Synthetic resins and rubbers	6,884	7,818	7,712	8,994	10,040
Synthetic fibres	583	595	603	704	785
Employment, 000					
Synthetic resins and rubbers	5,611	5,439	5,399	5,040	4,065
Synthetic fibres	1,315	1,252	1,214	1,135	915
Exports \$M					
Synthetic resins and rubbers	5,540	6,476	6,333	7,073	7,945
Synthetic fibres	457	472	436	400	367
Imports \$M					
Synthetic resins and rubbers	6,043	6,709	6,857	6,950	7,882
Synthetic fibres	522	554	555	536	564

Commodity data

Within these industries, Statistics Canada reports production data only for polyethylene as shown in Table 2.

Table 2: Canadian production of synthetic resins, kilotonnes

	2010	2011	2012	2013	2014
Polyethylene	3,182	3,226	3,186	3,503	3,407

Table 3 shows the exports for a select synthetic resins and rubbers, in both tonnage and dollar value terms.

Table 3: Canadian exports of select synthetic resins and rubbers

	Value, \$M	Quantity, kt	Top markets
Butyl and halobutyl rubbers	399	94	USA 36% China 24% South Korea 9% Japan 6%
Polyacrylamides	212	78	USA 85% Belgium 13%
Polyethylene	5,158	2,917	USA 89% Mexico 5% China 2%

CIAC members producing synthetic resins, rubbers and fibres in Canada

- BASF Canada
- Dow Chemical Canada ULC
- Imperial Oil, Products & Chemicals Division
- Lanxess Inc.
- Nalco Canada Co. (An EcoLab Co.)
- NOVA Chemicals Corporation

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 fuels, 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 1. 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 1: Estimated principal statistics for specialty chemicals

	2010	2011	2012	2013	2014
Establishments					
Other organic chemicals	117	135	137	135	135
Specialty chemicals	97	115	115	113	113
Shipments \$M					
Other organic chemicals	3,486	4,318	3,960	4,145	4,090
Specialty chemicals	1,630	1,935	1,975	1,830	1,690
Employment, 000					
Other organic chemicals	2,146	2,276	2,570	2,250	2,190
Specialty chemicals	1,029	1,049	1,190	995	905
Exports \$M					
Other organic chemicals	3,036	3,608	3,402	3,777	4,231
Specialty chemicals	1,427	1,696	1,590	1,670	1,745
Imports \$M					
Other organic chemicals	5,609	5,634	5,601	6,033	6,506
Specialty chemicals	2,638	2,650	2,590	2,650	2,685

Commodity data

Table 2 shows the exports for a select range of specialty chemicals, in both tonnage and dollar value terms in 2014.

Table 2: Canadian exports of select specialty chemicals

	Value, \$M	Quantity, kt	Top markets
Palmitates and stearates	6.4	3.5	USA 94% China 2% Israel 1%
Dinonyl or didecyl orthophthalates	8.6	3.2	USA 100%
Azo compounds	2.4	0.02	USA 92% Mexico 4% Japan 3%
Cyanine dyes	40.8	3.0	USA 100%
Azo dyes	5.5	0.2	USA 97% South Korea 2%
Other fatty acids	10.5	7.3	USA 98% France 1%

CIAC members producing specialty chemicals in Canada

Akzo Nobel Chemicals Ltd.
 BASF Canada
 Chemtura Canada Co./Cie
 E.I. duPont Canada Company
 Evonik Oil Additives Canada Inc.
 H.L. Blachford Ltd.
 Imperial Oil, Products & Chemicals Davison
 Jungbunzlauer Canada Inc.
 St-Jean PhotoChemicals Inc.
 Stepan Canada Inc.