

Made In America: Chemicals

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In 2012, shipments from the U.S. manufacturing sector totaled \$5.7 trillion. So, what do we make in the United States? This series of manufacturing profiles will answer that question one industry at a time. The focus of this profile is chemicals.¹ Previous profiles focused on [machinery](#); [food, beverages and tobacco products](#); and [transportation equipment \(excluding motor vehicles\)](#).

Among other findings, this report shows that chemical industry shipments totaled nearly \$800 billion in 2012, with pharmaceuticals constituting the largest sub-group by far and Texas leading the way as the largest chemical manufacturer. There is a significant wage premium associated with jobs in the chemical industry: 28 percent higher than the rest of the manufacturing sector. Also of note, the chemical industry employs more than four times as many scientists as any other manufacturing sector – 75,670.

As we continue to profile the various manufacturing industries, we will deepen our understanding of what is made in America and how it affects the economy as a whole.

Overview

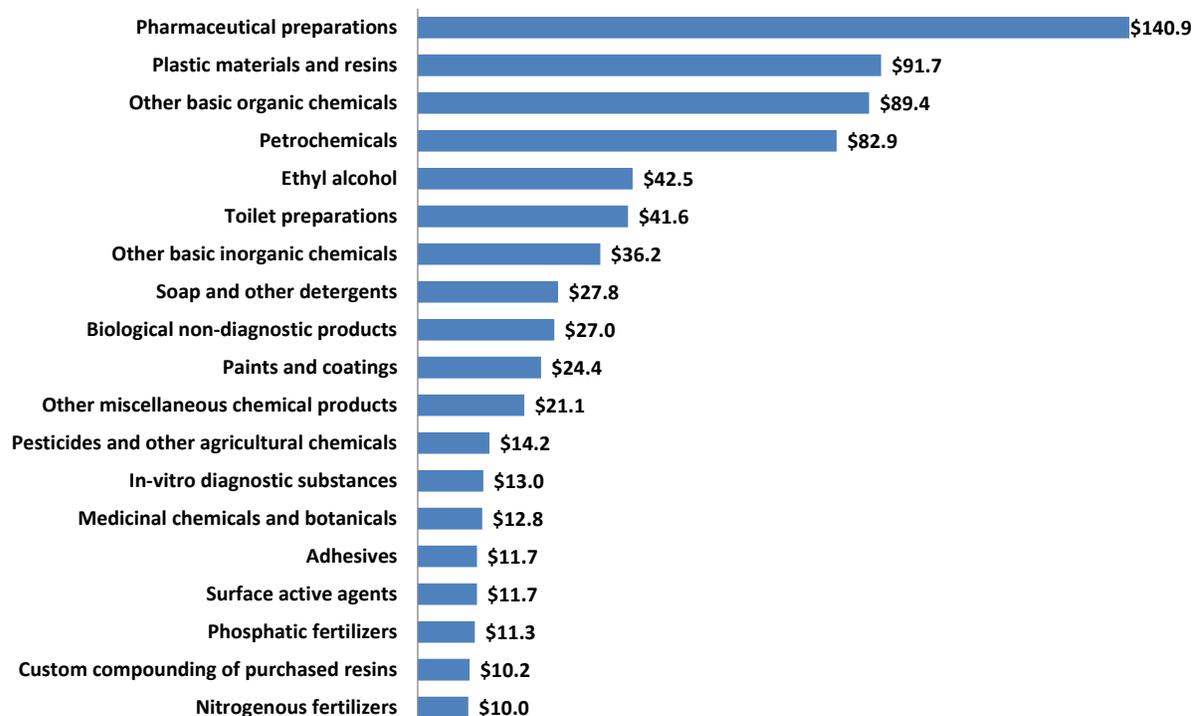
Chemical manufacturing shipments totaled \$794.7 billion or 13.9 percent of all manufacturing shipments in 2012. According to the North American Industry Classification System (NAICS), the industry is engaged in the “transformation of organic and inorganic raw materials by a chemical process and the formulation of products.”² It is important to distinguish this transformation of raw materials from the final production of goods, which may happen in a different industry. For instance, while the creation of plastics and rubbers is subsumed in chemical manufacturing, the final transformation of plastic into toys or auto parts takes place in other industries (such as plastic and rubber products or motor vehicles parts).



The output of the chemical industry varies, ranging from familiar consumer products—such as pharmaceuticals, pesticides, fertilizer, paint, and soap—to products that consumers may not purchase on a regular basis—such as petrochemicals, industrial gases, and synthetic rubbers and dyes. Like many manufacturing industries, the chemical industry’s products are a mix of final goods sold to consumers and businesses as well as intermediate products used in the manufacture of other goods.

Shipments

Figure 1. Shipments in Chemical Manufacturing, 2012
(billions of dollars)



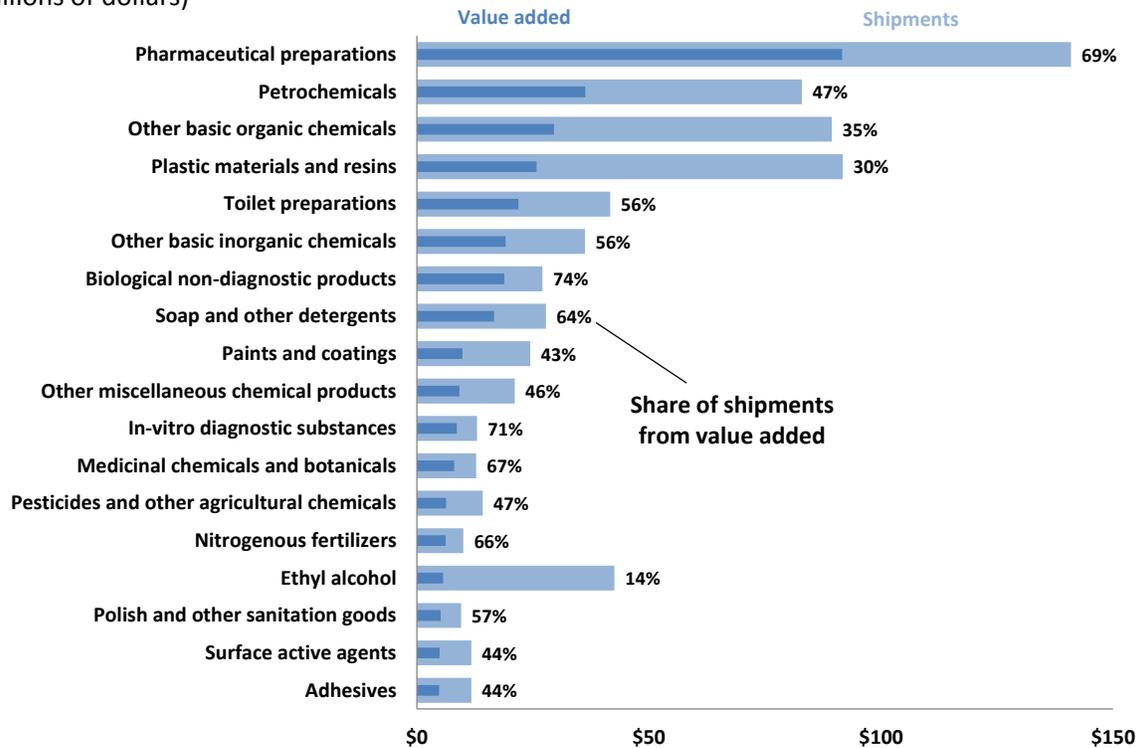
Note: Chemical manufacturing industries with less than \$10 billion in shipments for 2012 are not included in this chart.
Source: Census Bureau, Economic Census

- In 2012, the largest industry within chemical manufacturing was pharmaceuticals, with total shipments of \$140.9 billion (18 percent of all chemical shipments), followed by plastic materials and resins (\$91.7 billion, 12 percent), other basic organic chemicals (\$89.4 billion, 11 percent), and petrochemicals (\$82.9 billion, 10 percent).
- In total, these four industries accounted for \$405.0 billion of shipments, or 51 percent of chemical manufacturing in 2012.
- In 2012, 71 percent of the output of chemical manufacturing was used as intermediate inputs by other industries (including the chemical industry itself). The average for manufacturing as a whole is 65 percent. Within manufacturing, the percentages range from 33 percent (apparel) to essentially all output being intermediate inputs used elsewhere in manufacturing, as is the case with the primary metals industry.³

Value added

Figure 2. Value Added in Chemical Manufacturing , 2012

(billions of dollars)

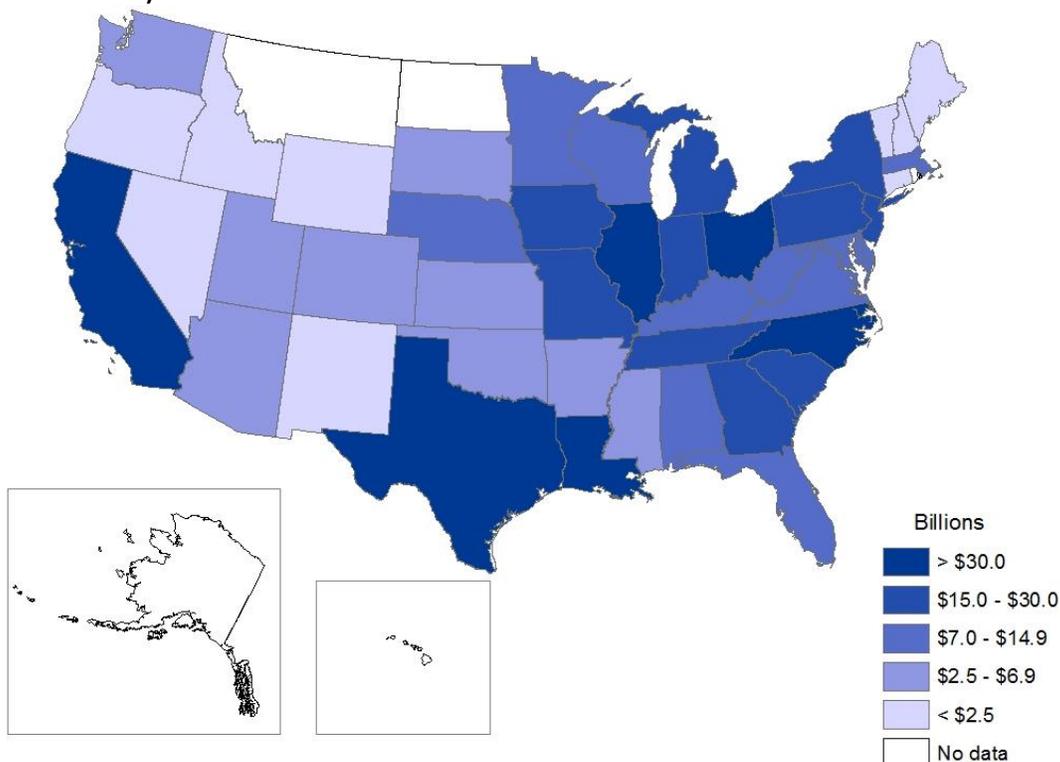


Note: Chemical manufacturing industries with less than \$5 billion in value added for 2012 are not included in this chart.
Source: Census Bureau, Economic Census

- In 2012, value added accounted for 49 percent of the total value of chemical shipments. For some chemical industries, such as biological non-diagnostic products and in-vitro diagnostic substances, the share is much higher.⁴
- Chemical manufacturing is a capital-intensive industry. In 2012, returns to capital accounted for 69 percent of value added.⁵ Compensation of employees, or labor, accounted for another 26 percent, while taxes on production and imports less subsidies made up the remaining 5 percent. Petroleum and coal products is the only manufacturing industry more capital-intensive than chemicals.
- Overall, the median hourly wage (as of May 2013) in the industry was \$23.23, a 28 percent premium over the manufacturing sector as a whole (\$18.12). While the most common jobs in the industry are production workers (41 percent of total employment), chemical manufacturing is unique among manufacturing industries because it employs a large number of scientists (75,670, or 10 percent of total employment).⁶ No other manufacturing industry has a science workforce even a quarter as large.

Which States Make Chemicals?

Figure 3. Chemical Manufacturing Shipments, 2011
(billions of dollars)

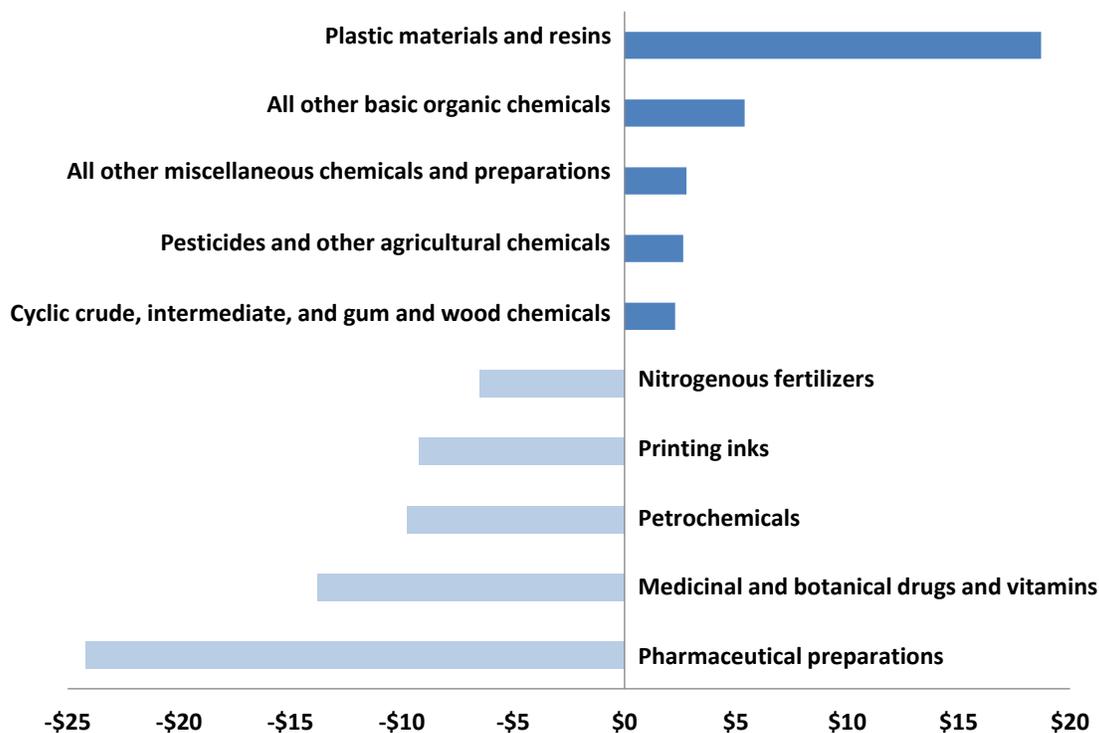


Source: Census Bureau, Annual Survey of Manufactures

- Texas manufactures a large amount of chemicals—in 2011, chemical shipments from Texas totaled \$163.2 billion, or 21 percent of the nationwide total.
- Four other states contributed at least 5 percent of total chemical shipments—Louisiana (\$68.3 billion; 9 percent), North Carolina (\$56.6 billion; 7 percent), California (\$50.7 billion; 7 percent), and Illinois (\$39.9 billion; 5 percent). Together, the five largest chemical manufacturing states accounted for almost half of all chemical shipments.
- At a more detailed level, however, there is an important difference between these five large chemical manufacturing states. Texas and Louisiana, perhaps due to their large petroleum industries, saw the largest share of their output come from basic chemicals (a category that includes petrochemicals, which are derived from petroleum). Meanwhile, North Carolina, California, and Illinois specialized in pharmaceuticals.
- For the United States overall, chemicals accounted for 14 percent of total manufacturing shipments in 2011. In some states, chemicals made up a much larger share of total manufacturing activity; particularly noteworthy are Delaware (51 percent), West Virginia (34 percent), North Carolina (28 percent), Wyoming (28 percent), and Louisiana (25 percent).

Satisfying Demand for Chemicals Here and Abroad

Figure 4. Top Five Surpluses and Deficits in U.S. Chemical Manufacturing Trade, 2013 (billions of dollars)



Source: Census Bureau, USA Trade Online

- Chemicals are an important U.S. export. In 2013, the United States exported \$189.4 billion of chemicals, 16 percent of total exports of manufactured goods. This is slightly more than chemical manufacturing's share of overall U.S. manufacturing (14 percent).
- On the other hand, the United States imported \$206.7 billion of chemicals in 2013, resulting in a trade deficit of \$17.3 billion. Chemicals contribute slightly (3 percent) to the overall manufacturing trade deficit, which was \$680.4 billion in 2013.
- The United States ran a trade surplus of \$18.7 billion in plastic materials and resins and a very large deficit of \$24.2 billion in pharmaceutical preparations. Other notable deficits were in medicinal and botanical drugs and vitamins (\$13.8 billion), petrochemicals (\$9.8 billion), and printing inks (\$9.2 billion).
- More than half of all the chemicals purchased by U.S. consumers and businesses in 2012 were domestically made.⁷

Endnotes

1. For additional information about how to measure what is made in America and for further explanation of concepts used in this report, see Economics and Statistics Administration, “What is Made in America?” available at: <http://www.esa.doc.gov/Reports/what-made-america>.
2. The chemical manufacturing subsector is categorized by the North American Industry Classification System (NAICS) as NAICS 325. Industry definition available at: <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=325&search=2012%20NAICS%20Search>. For full classification structure, see: <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2012>.
3. The national accounts data show that more than 100 percent of the output in primary metals manufacturing is an intermediate input. The value can be greater than 100 percent due to accounting principles in the national accounts. Because the United States imports more primary metals than it consumes as final goods, total commodity output in that industry is calculated to be smaller than the sum of intermediate inputs used by other industries.
4. Value added considers only the new production completed at each stage of the manufacturing process—i.e., the labor and capital applied by each firm to the purchased inputs produced elsewhere. This measure of manufacturing activity is derived in the Economic Census by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning and end of year inventories.
5. Bureau of Economic Analysis industry data available from: www.bea.gov. For more information on these concepts, see “Measuring the Nation’s Economy: An Industry Perspective. A Primer on BEA’s Industry Accounts.” Bureau of Economic Analysis. Available at: http://bea.gov/industry/pdf/industry_primer.pdf.
6. For more detail on the occupations and wages in the chemical manufacturing industry, refer to the Occupational Employment Statistics program of the Bureau of Labor Statistics. Available at: http://www.bls.gov/oes/current/naics3_325000.htm.
7. Economics and Statistics Administration, “What is Made in America?” (endnote 1). See Figure 8 and associated discussion.