PHOSPHATE ROCK

(Data in thousand metric tons, marketable phosphate rock, unless otherwise specified)

Domestic Production and Use: In 2024, phosphate rock ore was mined by five companies at 10 mines in four States and processed into an estimated 20 million tons of marketable product, valued at $2 billion, free on board (f.o.b.) mine. Phosphate rock was produced in Florida, Idaho, North Carolina, and Utah. Marketable product refers to beneficiated phosphate rock with phosphorus pentoxide (P_2O_5) content suitable for phosphoric acid or elemental phosphorus production. More than 95% of the phosphate rock mined in the United States was used to manufacture wet-process phosphoric acid and superphosphoric acid, which were used as intermediate feedstocks in the manufacture of granular and liquid ammonium phosphate fertilizers and animal feed supplements. About 25% of the wet-process phosphoric acid produced was exported in the form of upgraded granular diammonium phosphate (DAP), monoammonium phosphate (MAP) fertilizer, merchant-grade phosphoric acid, and other phosphate fertilizer products. The balance of the phosphate rock mined was for the manufacture of elemental phosphorus, which was used to produce phosphorus compounds for industrial applications, primarily glyphosate herbicide.

Salient Statistics—United States:	2020	2021	2022	2023	2024[e]
Production, marketable	23,500	21,600	[e]19,800	[e]19,600	20,000
Sold or used by producers	22,600	21,900	[e]19,800	[e]20,000	19,000
Imports for consumption	2,520	2,460	2,500	2,590	3,500
Consumption, apparent[1]	25,100	24,400	[e]22,300	[e]22,600	23,000
Price, average value, f.o.b. mine,[2] dollars per metric ton	76	83	[e]99	[e]101	100
Stocks, producer, yearend	11,000	10,700	[e]10,600	[e]9,550	10,000
Employment, mine and beneficiation plant, number[e]	1,800	2,000	1,900	1,900	1,900
Net import reliance[3] as a percentage of apparent consumption	6	11	12	16	13

Recycling: None.

Import Sources (2020–23): Peru, 98%; and Morocco, 2%.

Tariff: Item	Number	Normal Trade Relations 12–31–24
Natural calcium phosphates:		
Unground	2510.10.0000	Free.
Ground	2510.20.0000	Free.

Depletion Allowance: 14% (domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: U.S. production and consumption of phosphate in 2024 were estimated to have increased slightly from those in 2023. Imports were estimated to have increased by 35% to 3.5 million tons in 2024.

Storm damage from Hurricane Helene and Hurricane Milton caused flooding at phosphate plants and mines in central Florida in September and October 2024. Several facilities were closed for as much as 2 weeks, and fertilizer production and shipments were halted during that period.

Global production of phosphate rock was estimated to be slightly higher than that in 2023, with China, Morocco, the United States, and Russia, in descending order of production, remaining the leading producers. World consumption of P_2O_5 contained in fertilizers was estimated to have been 47.5 million tons in 2024 compared with 45.8 million tons in 2023. World consumption of P_2O_5 in fertilizers was projected to increase to 51.8 million tons by 2028. The leading regions for growth were expected to be Asia and South America.

The two new mines and associated purified phosphoric acid plants were under development in Quebec, Canada. One company planned to focus exclusively on the manufacturing of lithium-iron-phosphate (LFP) battery cathode active material (CAM) and will have its own facility to produce iron phosphate CAM. The other company planned to produce high-purity phosphoric acid for both LFP CAM and established food and industrial applications. In 2024, more than 90% of all LFP batteries were manufactured in China.

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Global phosphate production capacity, in terms of P_2O_5 content, was projected to increase to 70.6 million tons by 2028 compared with 65.0 million tons in 2024. Capacity expansions to phosphate rock production that were expected to be completed by 2027 were ongoing in Brazil, Kazakhstan, Mexico, Morocco, and Russia. Significant new mining projects that were planned to be completed after 2027 were under development in Canada, Congo (Brazzaville), Guinea-Bissau, and Senegal.

World Mine Production and Reserves: Reserves for China and Saudi Arabia were revised based on company and Government reports.

	Mine production[e]		Reserves[4]
	2023	2024	
United States	19,600	20,000	1,000,000
Algeria	2,000	2,000	2,200,000
Australia	2,500	2,500	[5]1,100,000
Brazil	5,280	5,300	1,600,000
China[6]	105,000	110,000	3,700,000
Egypt	5,000	5,000	2,800,000
Finland	906	900	1,000,000
India	1,800	1,600	31,000
Israel	2,310	2,300	60,000
Jordan	11,500	12,000	1,000,000
Kazakhstan	1,500	1,700	260,000
Mexico	439	360	30,000
Morocco	33,000	30,000	50,000,000
Peru	4,700	5,000	210,000
Russia	13,000	14,000	2,400,000
Saudi Arabia	9,900	9,500	1,000,000
Senegal	2,400	2,500	50,000
South Africa	1,720	2,200	1,500,000
Syria	800	2,000	250,000
Togo	1,610	1,500	30,000
Tunisia	3,600	3,300	2,500,000
Turkey	960	800	71,000
Uzbekistan	800	900	100,000
Vietnam	2,500	2,600	30,000
Other countries	730	770	800,000
World total (rounded)	233,000	240,000	74,000,000

World Resources:[4] Some world reserves were reported only in terms of ore tonnage and grade. Phosphate rock resources occur principally as sedimentary marine phosphorites. The largest sedimentary deposits are found in northern Africa, the Middle East, China, and the United States. Significant igneous occurrences are found in Brazil, Canada, Finland, Russia, and South Africa. Large phosphate resources have been identified on the continental shelves and on seamounts in the Atlantic Ocean and the Pacific Ocean. World resources of phosphate rock are more than 300 billion tons. There are no imminent shortages of phosphate rock.

Substitutes: There are no substitutes for phosphorus in agriculture.

[e]Estimated.

[1]Defined as phosphate rock sold or used by producers + imports. U.S. producers stopped exporting phosphate rock in 2003.

[2]Marketable phosphate rock, weighted value, all grades.

[3]Defined as imports ± adjustments for industry stock changes.

[4]See Appendix C for resource and reserve definitions and information concerning data sources.

[5]For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 120 million tons.

[6]Production data for large mines only, as reported by the National Bureau of Statistics of China.