

PHOSPHATE ROCK

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Phosphate rock ore was mined by 6 firms at 11 mines in 4 States and upgraded to an estimated 32.3 million tons of marketable product valued at \$3.0 billion, f.o.b. mine. Florida and North Carolina accounted for more than 85% of total domestic output; the remainder was produced in Idaho and Utah. Marketable product refers to beneficiated phosphate rock with phosphorus pentoxide (P₂O₅) content suitable for phosphoric acid or elemental phosphorus production. More than 95% of the U.S. phosphate rock mined 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. Approximately 45% of the wet-process phosphoric acid produced was exported in the form of upgraded granular diammonium and monoammonium phosphate (DAP and MAP, respectively) fertilizer, and merchant-grade phosphoric acid. The balance of the phosphate rock mined was for the manufacture of elemental phosphorus, which was used to produce phosphorus compounds for a variety of food-additive and industrial applications.

Salient Statistics—United States:	2009	2010	2011	2012	2013^e
Production, marketable	26,400	25,800	28,100	30,100	32,300
Sold or used by producers	25,500	28,100	28,600	27,300	29,000
Imports for consumption	2,000	2,400	3,350	3,080	2,600
Consumption ¹	27,500	30,500	32,000	30,400	31,600
Price, average value, dollars per ton, f.o.b. mine ²	127.19	76.69	96.64	102.54	91.40
Stocks, producer, yearend	8,120	5,620	4,580	6,700	8,200
Employment, mine and beneficiation plant, number ^e	2,500	2,300	2,260	2,240	2,150
Net import reliance ³ as a percentage of apparent consumption	1	16	13	3	3

Recycling: None.

Import Sources (2009–12): Morocco, 70%; and Peru, 30%.

Tariff: Item	Number	Normal Trade Relations 12–31–13
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: Domestic consumption of phosphate rock in 2013 was estimated to have increased by less than 4% over that of 2012, owing to increased production of phosphoric acid. World production was estimated to be slightly higher in 2013 compared with that of 2012.

The leading U.S. phosphate rock producer purchased the phosphate assets of the only other phosphate rock producer in central Florida. The transaction included a phosphate rock mine, processing facility, and fertilizer plant. The acquisition was subject to Federal Antitrust review, which was expected to be completed in early 2014.

The development of a new underground phosphate rock mine continued in southeastern Idaho in 2013. The results of a feasibility study reported that the mine has 16.7 million tons of reserves, with an average grade of 29.5% P₂O₅. The Canadian owner of the mine planned to have an average production rate of 904,000 tons per year over the expected 19-year lifespan of the mine. The company expected to begin production in early 2015.

World phosphate rock annual production capacity was projected to increase from 228 million tons in 2013 to about 260 million tons in 2017. The largest of increases in capacity were expected from projects in Brazil, China, Morocco, Peru, and Saudi Arabia. Other significant development projects were planned or in progress in Algeria, Australia, Canada, Kazakhstan, Namibia, Russia, Togo, and Tunisia.

World consumption of P₂O₅ in fertilizers was projected to increase from 40.7 million tons in 2013 to 45 million tons in 2017, with the largest growth in Asia and South America.

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World Mine Production and Reserves: Reserves for Jordan, Saudi Arabia, and the United States were updated with information in company reports. Reserves for India were updated with data from the Indian Minerals Yearbook. Reserves for Australia were updated with data from Geoscience Australia. Reserves for Israel, Senegal, and Togo were updated with data from the International Fertilizer Development Center. Reserves for Kazakhstan were from individual company reports.

	Mine production		Reserves ⁴
	2012	2013 ^e	
United States	30,100	32,300	1,100,000
Algeria	1,250	1,500	2,200,000
Australia	2,600	2,600	870,000
Brazil	6,750	6,740	270,000
Canada	900	300	2,000
China ⁵	95,300	97,000	3,700,000
Egypt	6,240	6,000	100,000
India	1,260	1,270	35,000
Iraq	200	350	430,000
Israel	3,510	3,600	130,000
Jordan	6,380	7,000	1,300,000
Kazakhstan	1,600	1,600	260,000
Mexico	1,700	1,700	30,000
Morocco and Western Sahara	28,000	28,000	50,000,000
Peru	3,210	3,900	820,000
Russia	11,200	12,500	1,300,000
Saudi Arabia	3,000	3,000	211,000
Senegal	1,380	920	50,000
South Africa	2,240	2,300	1,500,000
Syria	1,000	500	1,800,000
Togo	870	900	30,000
Tunisia	2,600	4,000	100,000
Other countries	5,500	5,630	520,000
World total (rounded)	217,000	224,000	67,000,000

World Resources: Some world reserves were reported only in terms of ore and grade, not as marketable phosphate rock. Phosphate rock resources occur principally as sedimentary marine phosphorites. The largest sedimentary deposits are found in northern Africa, China, the Middle East, 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.

Substitutes: There are no substitutes for phosphorus in agriculture.

^eEstimated.

¹Defined as phosphate rock sold or used + imports.

²Marketable phosphate rock, weighted value, all grades.

³Defined as imports – exports + adjustments for Government and industry stock changes.

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

⁵Production data for large mines only.