

CEMENT

(Data in thousand metric tons, unless otherwise noted)¹

Domestic Production and Use: In 1997, approximately 77 million tons of portland cement and 3.6 million tons of masonry cement were produced at a total of 118 plants, spread among 37 States, by 1 State agency and 43 companies. In addition, there were two cement plants in Puerto Rico. The explant value of production, excluding Puerto Rico, was about \$6 billion, and the dominant portland cement component was used to make concrete worth at least \$26 billion. Total cement consumption was about 94 million tons. There were 108 plants making clinker—the main intermediate product in cement manufacture—with a total calculated annual production capacity of about 74 million tons. Together with 8 other cement plants that were just grinding facilities for clinker produced elsewhere, total finish grinding capacity at yearend amounted to almost 91 million tons. If Puerto Rico is included, the clinker and grinding capacities become about 76 million tons and about 93 million tons, respectively. The top 5 cement companies together accounted for about 38% of total U.S. clinker production and capacity and the top 10 companies accounted for about 60%. California, Texas, Pennsylvania, Michigan, Missouri, and Alabama, in descending order, were the six largest cement-producing States and together accounted for 51% of total U.S. production. In terms of use, cement manufacturers sold about 70% of their portland cement output to ready mixed concrete producers; 11% to producers of concrete products, such as block, pipe, and precast slabs; 10% to contractors (largely for roadpaving); 4% to building material dealers; and 5% to miscellaneous users, including Government and other contractors.

Salient Statistics—United States: ²	1993	1994	1995	1996	1997^e
Production, portland and masonry ³	73,807	77,948	76,906	79,266	80,900
Shipments to final customers, including exports	80,099	85,934	86,561	92,965	95,000
Imports for consumption ⁴	5,532	9,072	10,900	11,419	13,500
Exports	625	633	759	803	850
Consumption, apparent ⁵	79,198	86,370	86,039	90,501	93,600
Price, average mill value, dollars per ton	55.65	61.26	67.87	71.15	74.50
Stocks, mill, yearend	4,788	4,805	5,813	5,525	5,525
Employment, mine and mill, number ^e	17,900	17,900	17,800	17,900	17,900
Net import reliance ⁶ as a percent of apparent consumption	7	10	11	12	14

Recycling: None.

Import Sources (1993-96):⁷ Canada, 39%; Spain, 11%; Venezuela, 9%; Mexico, 8%; and other, 33%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/97	Non-MFN⁸ 12/31/97
Cement clinker	2523.10.0000	Free	\$1.32/t.
White nonstaining portland cement	2523.21.0000	13¢/t	\$1.76/t.
Other portland cement	2523.29.0000	Free	\$1.32/t.
Aluminous cement	2523.30.0000	Free	\$1.32/t.
Other hydraulic cement	2523.90.0000	Free	\$1.32/t.

Depletion Allowance: Certain raw materials for cement production, such as limestone, bauxite, and gypsum, have depletion allowances.

Government Stockpile: None.

Events, Trends, and Issues: The robust construction market in 1997 generated higher consumption levels for cement. Demand growth in 1997 was met through a combination of increased production and imports, with imports playing a larger role than in 1996. There was expectation of higher interest rates in 1998, which may dampen demand somewhat, but the overall prognosis for cement consumption growth remains optimistic. A number of plants were engaged in projects to upgrade their capacities.

CEMENT

There continued to be concern over the environmental impact of cement manufacture, particularly the emissions of carbon dioxide and cement kiln dust (CKD). The Environmental Protection Agency has yet to release guidelines on CKD emissions, and it has, as yet, to designate the material a hazardous waste. A number of cement companies burn a proportion of solid or liquid waste materials in their kilns as a low-cost substitute for fossil fuels. Technically, cement kilns can be an effective and benign way of destroying such wastes; the viability of the practice, and the type of waste(s) burned, hinge on applicable current and future environmental regulations and their associated costs. The overall trend appears to be towards increased use of waste fuels, but some individual companies are abandoning the practice. A number of environmental issues, such as restrictions on silica in dust, also affect cement raw materials quarries, but these are common to other types of mines as well.

Although still relatively minor in the United States, there is growing use worldwide of natural and synthetic pozzolans as partial or complete replacements for portland cement. Pozzolans are materials having hydraulic cementitious properties when interground with free lime; examples include certain volcanic rocks and industrial byproducts, such as granulated blast furnace slag, fly ash, and silica fume. Pozzolonic cements, including blends with portland, can have performance advantages over some straight portland cements for certain applications. Because pozzolans do not require the energy-intensive clinker manufacturing (kiln) phase of production, their use reduces the monetary and environmental costs of cement manufacture. In the United States, most pozzolan consumption continued to be by concrete manufacturers rather than by cement plants.

World Production and Capacity:

	Cement production		Yearend clinker capacity	
	<u>1996</u>	<u>1997^e</u>	<u>1996^e</u>	<u>1997^e</u>
United States (includes Puerto Rico)	80,818	82,500	77,155	74,500
Brazil	34,597	36,000	38,500	39,000
China	490,000	510,000	410,000	420,000
France	^e 20,000	20,000	24,000	24,000
Germany	^e 40,000	40,000	41,900	42,000
India	76,220	80,000	67,500	70,000
Indonesia	25,000	30,000	24,000	25,000
Italy	^e 34,000	34,000	45,700	46,000
Japan	94,492	95,000	97,032	97,500
Korea, Republic of	57,334	59,000	55,800	56,000
Mexico	22,829	25,000	43,000	43,000
Russia	27,800	30,000	67,500	67,500
Spain	25,157	26,000	33,800	39,000
Taiwan	21,537	21,500	23,000	23,000
Thailand	^e 35,000	30,000	30,000	30,000
Turkey	32,500	33,500	28,600	28,600
Other countries	^e 367,280	<u>350,000</u>	<u>336,000</u>	<u>340,000</u>
World total (rounded)	^e 1,485,000	1,500,000	1,440,000	1,470,000

World Resources: Although individual company reserves are subject to exhaustion, cement raw materials, especially limestone, are geologically widespread and abundant; overall shortages are unlikely in the foreseeable future. Local shortages generally can be met through outside purchases, and both clinker and cement are widely traded on the world market.

Substitutes: Virtually all portland cement is utilized either in making concrete or mortars and, as such, competes with substitutes for concrete in the construction sector. These substitutes include brick clay, glass, aluminum, steel, fiberglass, wood, and stone. In the important road paving market, the main competitor is asphalt. There is a small but growing use in the United States of natural and synthetic pozzolans as partial or complete substitutes for portland cement for some concrete applications.

^eEstimated.

¹See Appendix A for conversion to short tons.

²Portland plus masonry cement, unless otherwise noted. Excludes Puerto Rico.

³Includes cement made from imported clinker.

⁴Hydraulic cement. Excludes clinker.

⁵Production of cement (including from imported clinker) + imports (excluding clinker) - exports - changes in stocks.

⁶Defined as imports - exports + adjustments for Government and industry stock changes.

⁷Includes clinker.

⁸See Appendix B.