

## CEMENT

(Data in thousand metric tons, unless otherwise noted)<sup>1</sup>

**Domestic Production and Use:** In 1996, approximately 75 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 45 companies. In addition, there were two cement plants in Puerto Rico. The ex-plant value of production, excluding Puerto Rico, was about \$5.5 billion, and the dominant portland cement component was used to make concrete worth almost \$24 billion. Total cement consumption was about 90 million tons. There were 109 plants making clinker—the main intermediate product in cement manufacture—with a total calculated annual production capacity of about 76 million tons. Together with 9 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 77 million tons and almost 93 million tons, respectively. The top 5 cement companies together accounted for about 36% 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 50% 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.

<b>Salient Statistics—United States:</b> <sup>2</sup>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996<sup>e</sup></b>
Production, portland and masonry <sup>3</sup>	69,585	73,807	77,948	76,906	78,600
Shipments to final customers, including exports	76,520	80,099	85,934	86,561	92,600
Imports for consumption <sup>4</sup>	4,548	5,532	9,072	11,473	10,700
Exports	746	625	633	759	750
Consumption, apparent <sup>5</sup>	74,124	79,198	86,370	86,612	89,400
Price, average mill value, dollars per ton	54.61	56.36	61.88	68.46	70.00
Stocks, mill yearend	5,272	4,788	4,805	5,813	5,000
Employment, mine and mill <sup>e</sup> , number	17,700	17,900	17,900	17,800	17,900
Net import reliance <sup>6</sup> as a percent of apparent consumption	6	7	10	11	12

**Recycling:** None.

**Import Sources (1992-95):** Canada, 41%; Spain, 10%; Mexico, 8%; Greece, 7%; and other, 34%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Most favored nation (MFN) 12/31/96</b>	<b>Non-MFN<sup>7</sup> 12/31/96</b>
Cement clinker	2523.10.0000	Free	\$1.32/mt.
White nonstaining portland cement	2523.21.0000	13¢/mt	\$1.76/mt.
Other portland cement	2523.29.0000	Free	\$1.32/mt.
Aluminous cement	2523.30.0000	Free	\$1.32/mt.
Other hydraulic cement	2523.90.0000	Free	\$1.32/mt.

**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 generally robust construction market in 1996 supported higher consumption levels for cement. To a significant degree, demand growth in 1996 was met through increased production, whereas that in 1995 had been met largely through increased imports. Although there was expectation of some leveling of demand in 1997, the long-term prognosis for cement consumption levels was optimistic, and a number of companies were engaged in plant modernization projects, including capacity upgrades, accordingly.

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There continued to be concern over the environmental impact of cement manufacture, particularly the emissions of carbon dioxide and cement kiln dust (CKD). Although the Environmental Protection Agency has yet to release guidelines on CKD emissions, it declined to rule 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 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:

	<b>Cement production</b>		<b>Yearend clinker capacity</b>	
	<u>1995</u>	<u>1996<sup>e</sup></u>	<u>1995<sup>e</sup></u>	<u>1996<sup>e</sup></u>
United States (includes Puerto Rico)	78,320	84,000	77,285	80,000
Brazil	<sup>e</sup> 25,500	30,000	35,000	38,000
China	445,610	450,000	400,000	410,000
France	<sup>e</sup> 21,000	20,000	27,000	27,000
Germany	<sup>e</sup> 40,000	40,000	49,000	49,000
India	<sup>e</sup> 70,000	70,000	75,000	80,000
Indonesia	<sup>e</sup> 19,500	22,500	22,500	27,000
Italy	<sup>e</sup> 35,000	35,000	45,000	45,000
Japan	90,474	90,000	97,500	96,400
Korea, Republic of	55,130	56,500	57,000	58,000
Mexico	23,971	28,000	40,000	43,000
Russia	<sup>e</sup> 36,400	36,000	80,000	80,000
Spain	<sup>e</sup> 25,000	25,000	23,000	23,000
Taiwan	22,478	24,000	23,000	23,000
Thailand	<sup>e</sup> 26,500	35,000	30,000	35,000
Turkey	33,153	35,000	30,000	31,000
Other countries	<sup>e</sup> 373,300	<u>375,000</u>	<u>350,000</u>	<u>360,000</u>
World total (rounded)	<sup>e</sup> 1,421,300	1,460,000	1,500,000	1,500,000

**World Resources:** Although individual company's reserves are subject to exhaustion, cement raw materials, especially limestone, are geologically widespread and abundant and, 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. Pozzolan use is much more widespread overseas.

<sup>e</sup>Estimated.

<sup>1</sup>See Appendix A for conversion to short tons.

<sup>2</sup>Portland plus masonry cement, unless otherwise noted. Excludes Puerto Rico.

<sup>3</sup>Includes cement made from imported clinker.

<sup>4</sup>Hydraulic cement. Excludes clinker.

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

<sup>6</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>7</sup>See Appendix B.