

CEMENT

(Data in thousand metric tons, unless otherwise noted)

Domestic Production and Use: In 2000, about 86 million tons of portland cement and 5 million tons of masonry cement were produced at a total of 116 plants, in 37 States, by 1 State agency and about 40 companies. There were also two plants in Puerto Rico. The ex-plant value of cement production, excluding Puerto Rico, was about \$7.2 billion, and the value of total sales (including imported cement) was about \$8.7 billion. Most of the cement was used to make concrete, worth at least \$35 billion. Total domestic cement consumption (sales) was again at record levels. Imported cement and clinker (to make cement) accounted for about 25% of the cement sold; total imports were down slightly, reflecting additional domestic production capacity. Clinker, the main intermediate product in cement manufacture, was produced at 109 plants, with a combined apparent annual capacity of about 88 million tons. Including seven facilities that merely ground clinker produced elsewhere, total finished cement (grinding) capacity was about 100 million tons. Including Puerto Rico, clinker and cement capacities totaled about 90 and 102 million tons, respectively. California, Texas, Pennsylvania, Michigan, Missouri, and Alabama, in descending order, were the six largest producing States and accounted for about 50% of U.S. production. About 73% of cement sales went to ready-mixed concrete producers, 12% to concrete product manufacturers, 8% to contractors (mainly for road paving), 5% to building materials dealers, and 2% to other users.

Salient Statistics—United States: ¹	1996	1997	1998	1999	2000^e
Production, portland and masonry ²	79,266	82,582	83,931	85,952	90,600
Production, clinker	70,361	72,686	74,523	76,003	78,500
Shipments to final customers, including exports	91,438	96,801	103,696	108,862	113,000
Imports of hydraulic cement for consumption	11,565	14,523	19,878	24,578	24,000
Imports of clinker for consumption	2,402	2,867	3,905	4,164	4,000
Exports of hydraulic cement and clinker	803	791	743	694	450
Consumption, apparent ³	90,354	96,018	102,457	108,862	113,300
Price, average mill value, dollars per ton	71.19	73.49	76.46	78.27	77.50
Stocks, mill, yearend	5,488	5,784	5,393	6,367	7,200
Employment, mine and mill, number ^e	17,900	17,900	17,900	18,000	18,000
Net import reliance ⁴ as a percent of apparent consumption	12	14	19	21	20

Recycling: Cement kiln dust is routinely recycled to the kilns, which can also burn a variety of waste fuels and recycled raw materials such as slags. Cement itself generally is not recycled, but there is a small amount of recycling of concrete for use as aggregate.

Import Sources (1996-99):⁵ Canada, 26%; China, 10%; Spain, 9%; Venezuela, 9%; and other, 46%. Imports were coming from an increasing number of countries, with Asian sources (especially China, Korea, and Thailand) becoming major suppliers since 1998; Thailand became the single largest supplier of imported cement and clinker in 2000.

Tariff: Item	Number	Normal Trade Relations 12/31/00
Cement clinker	2523.10.0000	Free.
White portland cement	2523.21.0000	Free.
Other portland cement	2523.29.0000	Free.
Aluminous cement	2523.30.0000	Free.
Other hydraulic cement	2523.90.0000	Free.

Depletion Allowance: Not applicable. Certain raw materials for cement production have depletion allowances.

Government Stockpile: None.

Events, Trends, and Issues: Bolstered by continued low interest rates, the construction market in 2000 continued strong and again generated record consumption levels for cement. However, although strong, public sector spending on highways was less than had been expected, given the enhanced funding commitments of the Transportation Equity Act for the 21st Century ("TEA-21"), signed in mid-1998. A sunset review of decade-long antidumping remedies against cement and clinker imports from Japan, Mexico, and Venezuela was completed in October 2000 and upheld the remedies (tariffs) against Japan and Mexico, but dropped them against Venezuela.

Concern continued over the environmental impact of cement manufacture, particularly the emissions of carbon dioxide and cement kiln dust (CKD). The Intergovernmental Panel on Climate Change released guidelines for calculating

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national CO₂ emissions from cement manufacture within a compendium designed to help evaluate compliance with targeted emissions reductions called for in the Kyoto Protocol, signed in 1997. This accord had yet to be ratified by the U.S. Congress, and debate continued as to how this reduction was to be achieved and what its cost would be to the economy. The U.S. Environmental Protection Agency evaluated public comments in 2000 to its standards for handling CKD which were published in mid-1999; final standards had not been issued as of yearend.

Rapidly rising fossil fuel costs in 2000 were of increasing concern to the cement industry. Some cement companies burn solid or liquid waste materials in their kilns as a low-cost substitute for fossil fuels. 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 current and future environmental regulations and their associated costs. The trend, tempered by administrative constraints, appears to be towards increased use of waste fuels. Environmental issues common to mining, such as restrictions on silica in dust, also affect cement raw materials quarries.

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 that, in the presence of free lime, have hydraulic cementitious properties; examples include certain volcanic rocks and industrial byproducts such as granulated blast furnace slag, fly ash, and silica fume. Pozzolan 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 unit monetary and environmental costs of cement manufacture. In the United States, most pozzolan consumption continued to be as sales directly to concrete manufacturers rather than within blended cements sold by cement plants.

World Production and Capacity:

	Cement production		Yearend clinker capacity	
	1999	2000 ^e	1999 ^e	2000 ^e
United States (includes Puerto Rico)	87,777	92,300	⁶ 87,781	90,000
Brazil	40,270	41,500	45,000	45,000
China	573,000	576,000	550,000	570,000
Egypt	22,000	23,000	22,000	22,000
France	19,527	20,000	24,000	24,000
Germany	38,099	37,000	43,000	43,000
India	90,000	95,000	100,000	100,000
Indonesia	24,000	27,000	45,000	46,000
Italy	36,000	35,000	46,000	46,000
Japan	80,120	77,500	95,000	95,000
Korea, Republic of	48,157	50,000	57,000	57,000
Mexico	29,413	30,000	43,000	43,000
Russia	28,400	30,000	63,000	63,000
Spain	30,800	30,000	40,000	40,000
Taiwan	18,283	19,000	24,000	24,000
Thailand	34,500	38,000	45,000	45,000
Turkey	34,403	33,000	32,000	32,000
Other countries (rounded)	<u>375,000</u>	<u>450,000</u>	<u>340,000</u>	<u>350,000</u>
World total (rounded)	1,600,000	1,700,000	1,700,000	1,800,000

World Resources: Although individual company 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 imports of cement and/or clinker.

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, stone, and asphalt. Pozzolans and similar materials are being used as partial or complete substitutes for portland cement for some concrete applications.

^eEstimated.

¹Portland plus masonry cement, unless otherwise noted. Excludes Puerto Rico.

²Includes cement made from imported clinker.

³Production of cement (including from imported clinker) + imports (excluding clinker) - exports - changes in stocks.

⁴Defined as imports - exports + adjustments for Government and industry stock changes.

⁵Hydraulic cement and clinker.

⁶Reported.