

## CEMENT

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** In 2005, almost 93 million tons of portland cement and about 5 million tons of masonry cement were produced at 113 plants in 37 States; cement was also produced at 2 plants in Puerto Rico. Sales prices increased significantly during the year. The value of cement production, excluding Puerto Rico, was about \$8 billion, and the value of total sales (including imported cement) was about \$10 billion. Most of the cement was used to make concrete, worth at least \$48 billion. Imported cement and clinker (to make cement) accounted for about 25% of the cement sold; total imports rose significantly, owing to very high demand coupled with production shortfalls. Clinker, the main intermediate product in cement manufacture, was produced at 107 plants, with a combined apparent annual capacity of about 103 million tons. Including several facilities that only ground clinker produced elsewhere, total finished cement (grinding) capacity was about 115 million tons. Texas, California, Pennsylvania, Missouri, Michigan, and Alabama, in descending order, were the six leading producing States and accounted for about one-half of U.S. production. About 75% of cement sales went to ready-mixed concrete producers, 14% to concrete product manufacturers, 6% to contractors (mainly road paving), 3% to building materials dealers, and 2% to other users.

<b>Salient Statistics—United States:</b> <sup>1</sup>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005<sup>e</sup></b>
Production:					
Portland and masonry cement <sup>2</sup>	88,900	89,732	92,843	97,434	97,500
Clinker	78,451	81,517	81,882	86,658	87,000
Shipments to final customers, includes exports	113,136	108,778	112,929	120,731	124,000
Imports of hydraulic cement for consumption	23,694	22,198	21,015	25,396	29,000
Imports of clinker for consumption	1,782	1,603	1,808	1,630	2,800
Exports of hydraulic cement and clinker	746	834	837	818	800
Consumption, apparent <sup>3</sup>	112,810	110,020	114,090	121,910	125,800
Price, average mill value, dollars per ton	76.50	76.00	75.00	79.50	84.00
Stocks, cement, yearend	6,600	7,680	6,610	6,710	6,600
Employment, mine and mill, number <sup>e</sup>	18,000	18,100	18,100	18,000	18,000
Net import reliance <sup>4</sup> as a percentage of apparent consumption	21	20	20	21	25

**Recycling:** Cement kiln dust is routinely recycled to the kilns, which also can burn a variety of waste fuels and recycled raw materials such as slags and fly ash. Fly ash and granulated blast furnace slag also can be incorporated in blended cements and in the cement paste in concrete. Cement is not directly recycled, but there is recycling of some concrete for use as aggregate.

**Import Sources (2001-04):**<sup>5</sup> Canada, 22%; Thailand, 14%; China, 9%; Venezuela, 7%; and other, 48%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12-31-05</b>
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:** The devastating hurricanes that hit the Gulf States in August, September, and October were ultimately expected to lead to large local increases in cement consumption, but served to constrain demand and cement deliveries in the fourth quarter. Absent these events, overall cement consumption for 2005 would likely have been 4 million to 5 million tons higher, mostly from imports. Elsewhere in the country, consumption was expected to remain at record-high levels, spurred by continued low interest rates and increased public sector (transportation infrastructure) spending resulting from the signing of the \$286.5 billion SAFETEA bill. Imports were more readily available in 2005, owing to better ship availability and easing of shipping costs. Shortages of cement continued to be widely reported, and these fueled petitions to eliminate or reduce antidumping duties on imported Mexican cement; imports of cement from Mexico in 2005 were almost double those in 2004, despite the duties.

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A number of environmental issues, especially its large carbon dioxide emissions, potentially affect the cement industry. Carbon dioxide reduction strategies by the cement industry were aimed at lowering emissions per ton of cement product rather than by plant. These strategies included installation of more fuel-efficient kiln technologies, partial substitution of noncarbonate sources of calcium oxide in the kiln raw materials, and partial substitution of supplementary cementitious materials (SCM) additives, such as pozzolans, for portland cement in the finished cement products and in concrete. The United States lags behind many foreign countries in the use of SCM. Because SCM do not require the energy-intensive clinker manufacturing (kiln) phase of cement production, their use reduces the unit monetary and environmental costs of the cement component of concrete.

Fossil fuel cost increases were of continued concern to the cement industry; even in times of cement shortages, the industry found it difficult to fully pass on the cost increases to the customers. Some cement companies burn 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 burned hinge on current and future environmental regulations and their associated costs. The trend appears to be toward increased use of waste fuels.

### **World Production and Capacity:**

	<b>Cement production</b>		<b>Yearend clinker capacity<sup>e</sup></b>	
	<b><u>2004</u></b>	<b><u>2005<sup>e</sup></u></b>	<b><u>2004</u></b>	<b><u>2005</u></b>
United States (includes Puerto Rico)	99,000	99,100	105,000	106,000
Brazil	<sup>e</sup> 38,000	39,000	45,000	45,000
China	934,000	1,000,000	850,000	850,000
Egypt	<sup>e</sup> 28,000	27,000	35,000	35,000
France	21,000	20,000	22,000	22,000
Germany	32,000	32,000	31,000	31,000
India	<sup>e</sup> 125,000	130,000	150,000	150,000
Indonesia	<sup>e</sup> 36,000	37,000	42,000	42,000
Iran	<sup>e</sup> 30,000	32,000	33,000	35,000
Italy	<sup>e</sup> 38,000	38,000	46,000	46,000
Japan	67,400	66,000	76,000	74,000
Korea, Republic of	53,900	50,000	62,000	62,000
Mexico	35,000	36,000	40,000	40,000
Russia	<sup>e</sup> 43,000	45,000	65,000	65,000
Saudi Arabia	23,200	24,000	24,000	24,000
Spain	46,800	48,000	40,000	40,000
Thailand	35,600	40,000	50,000	50,000
Turkey	38,000	38,000	35,000	35,000
Vietnam	25,300	27,000	20,000	22,000
Other countries (rounded)	<u>381,000</u>	<u>392,000</u>	<u>330,000</u>	<u>346,000</u>
World total (rounded)	2,130,000	2,220,000	2,100,000	2,120,000

**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 future.

**Substitutes:** Virtually all portland cement is used either in making concrete or mortars and, as such, competes in the construction sector with concrete substitutes such as aluminum, asphalt, clay brick, rammed earth, fiberglass, glass, steel, stone, and wood. A number of materials, especially fly ash and ground granulated blast furnace slag, develop good hydraulic cementitious properties (the ability to set and harden under water) by reacting with the lime released by the hydration of portland cement. These pozzolanic and similar materials are increasingly being used as partial substitutes for portland cement in some concrete applications.

<sup>e</sup>Estimated.

<sup>1</sup>Portland plus masonry cement unless otherwise noted. Excludes Puerto Rico.

<sup>2</sup>Includes cement made from imported clinker.

<sup>3</sup>Production of cement (including from imported clinker) + imports (excluding clinker) – exports – changes in stocks.

<sup>4</sup>Defined as imports (revised to include clinker) – exports + adjustments for Government (nil) and industry stock changes.

<sup>5</sup>Hydraulic cement and clinker.