

**LIME<sup>1</sup>**

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** In 2006, 21.2 million metric tons (23.5 million short tons) of quicklime and hydrate was produced (excluding commercial hydrators) in 35 States and Puerto Rico. Production was valued at more than \$1.7 billion. Six companies accounted for about 75% of the total output. Principal producing States, each with production of more than 1 million tons, were Alabama, Kentucky, Missouri, Nevada, Ohio, Pennsylvania, and Texas. These seven States produced about 13.6 million tons (15.0 million short tons), or 64% of the total output. Major markets for lime were steelmaking, flue gas desulfurization, mining, construction, pulp and paper, precipitated calcium carbonate, and water treatment.

<b>Salient Statistics—United States:</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006<sup>e</sup></b>
Production <sup>2</sup>	17,900	19,200	20,000	20,000	21,200
Imports for consumption	157	202	232	310	286
Exports	106	98	100	133	116
Consumption, apparent	17,900	19,300	20,200	20,200	21,500
Quicklime average value, dollars per ton at plant	59.20	61.40	64.80	72.10	80.50
Hydrate average value, dollars per ton at plant	88.50	84.80	89.80	91.10	93.00
Stocks, yearend	NA	NA	NA	NA	NA
Employment, mine and plant, number	5,400	5,350	5,350	5,300	5,300
Net import reliance <sup>3</sup> as a percentage of apparent consumption	( <sup>4</sup> )	( <sup>4</sup> )	1	1	1

**Recycling:** Large quantities of lime are regenerated by paper mills. Some municipal water-treatment plants regenerate lime from softening sludge. Quicklime is regenerated from waste hydrated lime in the carbide industry. Data for these sources were not included as production in order to avoid duplication.

**Import Sources (2002-05):** Canada, 73%; Mexico, 26%; and other, 1%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12-31-06</b>
Quicklime	2522.10.0000	Free.
Slaked lime	2522.20.0000	Free.
Hydraulic lime	2522.30.0000	Free.
Calcined dolomite	2518.20.0000	3% ad. val.

**Depletion Allowance:** Limestone produced and used for lime production, 14% (Domestic and foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** In 2006, production of lime increased by more than 6% compared with 2005. Strong demand by the steel and construction markets help push up production to a record level, breaking the previous high set in 1998. U.S. production of raw steel was up an estimated 4.5% for the year, which helped the sales of high-calcium and dolomitic quicklime. Steel and other iron-related uses have consumed about 30% of all lime in the United States in recent years. More than 60% of lime consumed in construction markets is used in soil stabilization, primarily in road and highway construction projects.

The recent trend of large price increases (by historic industry standards) continued in 2006 as the average value per ton of quicklime increased by about \$8 per metric ton. Hydrate prices increased by a more modest \$2 per metric ton. Quicklime values have increased by more than \$21 per metric ton since 2002, an increase of 36%.

In September, the U.S. Environmental Protection Agency announced final revisions to its national air quality standards for fine particulate matter and some coarse particles. When breathed, these particles can accumulate in the respiratory system and are associated with numerous health effects. For fine particles [ $\leq 2.5$  micrometers ( $\mu\text{m}$ ) in diameter], the 24-hour standard was strengthened to 35 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) from 65  $\mu\text{g}/\text{m}^3$  and the annual standard was retained at 15  $\mu\text{g}/\text{m}^3$ . For inhalable coarse particles ( $>2.5$  and  $<10$   $\mu\text{m}$ ), the existing 24-hour standard of 150  $\mu\text{g}/\text{m}^3$  was retained. Under the final rule, only two additional lime plants (located in particulate matter nonattainment areas) will be affected and may require additional air monitoring and possibly installation of additional control technologies.<sup>5</sup>

## LIME

**World Lime Production and Limestone Reserves and Reserve Base:**

	Production		Reserves and reserve base <sup>6</sup>
	2005	2006 <sup>e</sup>	
United States	20,000	21,200	Adequate for all countries listed.
Austria	2,000	2,000	
Belgium	2,000	2,000	
Brazil	6,500	6,900	
Bulgaria	2,500	2,500	
Canada	2,250	2,410	
China	24,000	25,000	
France	3,000	3,000	
Germany	6,700	6,800	
Iran	2,500	2,500	
Italy <sup>7</sup>	3,000	3,000	
Japan (quicklime only)	8,600	8,900	
Mexico	5,700	5,800	
Poland	2,000	1,800	
Romania	2,000	2,000	
Russia	8,200	8,500	
South Africa (sales)	1,400	1,600	
Turkey (sales)	3,400	3,400	
United Kingdom	2,000	2,000	
Other countries	<u>19,000</u>	<u>19,000</u>	
World total (rounded)	127,000	130,000	

**World Resources:** Domestic and world resources of limestone and dolomite suitable for lime manufacture are adequate.

**Substitutes:** Limestone is a substitute for lime in many applications, such as agriculture, fluxing, and sulfur removal. Limestone, which contains less reactive material, is slower to react and may have other disadvantages compared with lime, depending on the application; however, limestone is considerably less expensive than lime. Calcined gypsum is an alternative material in industrial plasters and mortars. Cement and lime kiln dust and fly ash are potential substitutes for some construction uses of lime. Magnesium hydroxide is a substitute for lime in pH control, and magnesium oxide is a substitute for dolomitic lime as a flux in steelmaking.

<sup>e</sup>Estimated. NA Not available.

<sup>1</sup>Data are for quicklime, hydrated lime, and refractory dead-burned dolomite. Includes Puerto Rico.

<sup>2</sup>Sold or used by producers.

<sup>3</sup>Defined as imports – exports + adjustments for Government and industry stock changes; stock changes are assumed to be zero for apparent consumption and net import reliance calculations.

<sup>4</sup>Less than ½ unit.

<sup>5</sup>National Lime Association, 2006, Final PM standard issued—More lenient than proposed rule: Limelites, July-September, p. 8.

<sup>6</sup>See Appendix C for definitions.

<sup>7</sup>Includes hydraulic lime.