

SODIUM SULFATE

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: The domestic natural sodium sulfate industry consisted of two producers operating two plants, one each in California and Texas. Fourteen companies operating 17 plants in 14 States recovered byproduct sodium sulfate from various manufacturing processes or products, including ascorbic acid, battery reclamation, cellulose, rayon, and silica pigments. About one-half of the total output was a byproduct of these plants in 2006. The total value of natural and synthetic sodium sulfate sold was an estimated \$70 million. Estimates of U.S. sodium sulfate consumption by end use were soap and detergents, 46%; pulp and paper, 13%; textiles, 12%; glass, 11%; carpet fresheners, 7%; and miscellaneous, 11%.

Salient Statistics—United States:	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006^e</u>
Production, total (natural and synthetic) ¹	500	466	469	467	480
Imports for consumption	51	45	49	75	65
Exports	139	154	138	149	140
Consumption, apparent (natural and synthetic)	412	357	380	393	405
Price, quoted, sodium sulfate (100% Na ₂ SO ₄), bulk, f.o.b. works, East, dollars per short ton	114	114	114	134	134
Employment, well and plant, number ^e	225	225	225	225	225
Net import reliance ² as a percentage of apparent consumption	E	E	E	E	E

Recycling: There was some recycling of sodium sulfate by consumers, particularly in the pulp and paper industry, but no recycling by sodium sulfate producers.

Import Sources (2002-05): Canada, 90%; Mexico, 6%; and other, 4%.

Tariff:	Item	Number	Normal Trade Relations <u>12-31-06</u>
	Disodium sulfate:		
	Saltcake (crude)	2833.11.1000	Free.
	Other:	2833.11.5000	0.4% ad val.
	Anhydrous	2833.11.5010	0.4% ad val.
	Other	2833.11.5050	0.4% ad val.

Depletion Allowance: Natural, 14% (Domestic and foreign); synthetic, none.

Government Stockpile: None.

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Events, Trends, and Issues: Both U.S. and Canadian natural sodium sulfate producers implemented energy surcharges on all shipments of sodium sulfate because escalating energy costs affected operating economics. Domestic producers used the New York Mercantile Exchange Henry Hub to base surcharges on the fifteenth day of the month preceding the beginning of each quarter, whereas Canadian natural sodium sulfate operators used the Natural Gas Exchange (AECO) that based quarterly surcharges on the AECO monthly index average for the previous quarter.

The primary use of sodium sulfate worldwide is in powdered detergents. Sodium sulfate is a low-cost, inert, white filler in home laundry detergents. Although powdered home laundry detergents may contain as much as 50% sodium sulfate in their formulation, the market for liquid detergents, which do not contain any sodium sulfate, continued to increase. Asia and Latin America are major markets for sodium sulfate consumption because of the increasing demand for packaged powder detergents. Sodium sulfate consumption in the domestic textile industry also has been declining because of imports of less expensive textile products.

The outlook for sodium sulfate in 2007 is expected to be comparable with that of 2006, with detergents remaining the leading sodium-sulfate-consuming sector. If the winter of 2006-07 is relatively mild, byproduct recovery of sodium sulfate from automobile batteries may decline because fewer battery failures during mild winter weather reduce recycling. World production and consumption of sodium sulfate have been stagnant but are expected to increase in the next few years, especially in Asia and South America.

World Production, Reserves, and Reserve Base: Although data on mine production for natural sodium sulfate are not available, total world production of natural sodium sulfate is estimated to be about 4 million tons. Total world production of byproduct sodium sulfate is estimated to be between 1.5 and 2.0 million tons.

	Reserves³	Reserve base³
United States	860,000	1,400,000
Canada	84,000	270,000
Mexico	170,000	230,000
Spain	180,000	270,000
Turkey	100,000	NA
Other countries	<u>1,900,000</u>	<u>2,400,000</u>
World total (rounded)	3,300,000	4,600,000

World Resources: Sodium sulfate resources are sufficient to last hundreds of years at the present rate of world consumption. In addition to the countries with reserves listed above, the following countries also possess identified resources of sodium sulfate: Botswana, China, Egypt, Italy, Mongolia, Romania, and South Africa. Commercial production from domestic resources is from deposits in California and Texas. The brine in Searles Lake, CA, contains about 450 million tons of sodium sulfate resource, representing about 35% of the lake's brine. In Utah, about 12% of the dissolved salts in the Great Salt Lake is sodium sulfate, representing about 400 million tons of resource. An irregular, 21-meter-thick mirabilite deposit is associated with clay beds 4.5 to 9.1 meters below the lake bottom near Promontory Point, UT. Several playa lakes in west Texas contain underground sodium-sulfate-bearing brines and crystalline material. Other economic and subeconomic deposits of sodium sulfate are near Rhodes Marsh, NV, Grenora, ND, Okanogan County, WA, and Bull Lake, WY. Sodium sulfate also can be obtained as a byproduct from the production of ascorbic acid, battery recycling, boric acid, cellulose, chromium chemicals, lithium carbonate, rayon, resorcinol, and silica pigments. The quantity and availability of byproduct sodium sulfate are dependent on the production capabilities of the primary industries and the sulfate recovery rates.

Substitutes: In pulp and paper, emulsified sulfur and caustic soda (sodium hydroxide) can replace sodium sulfate. In detergents, a variety of products can substitute for sodium sulfate. In glassmaking, soda ash and calcium sulfate have been substituted for sodium sulfate with less effective results.

⁰Estimated. E Net exporter. NA Not available.

¹Source: U.S. Census Bureau. Synthetic production data are revised in accordance with recent updated Census statistics.

²Defined as imports – exports + adjustments for Government and industry stock changes (if available).

³See Appendix C for definitions.