

## STRONTIUM

(Data in metric tons of strontium content,<sup>1</sup> unless otherwise noted)

**Domestic Production and Use:** No strontium minerals have been produced in the United States since 1959. The most common strontium mineral celestite, which consists primarily of strontium sulfate, was imported exclusively from Mexico. A company in Georgia was the only major U.S. producer of strontium compounds. Primary strontium compounds were used in the faceplate glass of color television picture tubes, 77%; ferrite ceramic magnets, 8%; pyrotechnics and signals, 9%; and other applications, 6%.

<b>Salient Statistics—United States:</b>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001<sup>e</sup></u>
Production, strontium minerals	—	—	—	—	—
Imports for consumption:					
Strontium minerals	12,500	10,600	13,700	11,000	7,900
Strontium compounds	26,000	25,000	26,800	29,900	30,600
Exports, compounds	599	875	2,890	4,520	1,040
Shipments from Government stockpile excesses	—	—	—	—	—
Consumption, apparent, celestite and compounds	37,900	34,700	37,600	36,400	37,500
Price, average value of mineral imports					
at port of exportation, dollars per ton	72	60	73	62	62
Net import reliance <sup>2</sup> as a percentage of apparent consumption	100	100	100	100	100

**Recycling:** None.

**Import Sources (1997-2000):** Strontium minerals: Mexico, 100%. Strontium compounds: Mexico, 92%; Germany, 6%; and other, 2%. Total imports: Mexico, 94%; Germany, 4%; and other, 2%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations <u>12/31/01</u></b>
Celestite	2530.90.0010	Free.
Strontium metal	2805.22.1000	3.7% ad val.
Compounds:		
Strontium carbonate	2836.92.0000	4.2% ad val.
Strontium nitrate	2834.29.2000	4.2% ad val.
Strontium oxide, hydroxide, peroxide	2816.20.0000	4.2% ad val.

**Depletion Allowance:** 22% (Domestic), 14% (Foreign).

**Government Stockpile:** Although 5,100 tons of celestite is in the National Defense Stockpile, none of it is stockpile grade; its total value is listed as zero. The stockpile goal for celestite was reduced to zero in 1969, and at that time, the stockpile contained stockpile- and nonstockpile-grade material. Since then, all the stockpile-grade celestite has been sold. Although the nonstockpile-grade celestite has been offered for sale, none has been sold since 1979. The fiscal year 2002 Annual Materials Plan, announced at the end of October 2001 by the Defense National Stockpile Center, listed 3,270 tons of celestite to be offered for disposal. Because the remaining material does not meet the quality specifications of celestite purchasers, the material will be difficult to dispose of in the traditional markets. It might be attractive as a low-cost replacement for barite in drilling mud applications.

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**Events, Trends, and Issues:** With the capacity to produce 95,000 and 103,000 tons per year, respectively, Germany and Mexico have been the largest producers of strontium carbonate for many years. The German producer uses imported celestite, and Mexican producers use domestic ore to supply their plants. Operations in both countries were believed to be operating near capacity. In recent years, Chinese strontium carbonate capacity has expanded tremendously to about 140,000 tons per year, although actual production is believed to be about 100,000 tons per year. The Chinese strontium carbonate is marketed in Asia and Europe, causing decreases in celestite and strontium carbonate prices in those regions. Chinese celestite reserves are smaller and of lower quality than the ores in major producing countries including Mexico, Spain, and Turkey, raising the question of whether Chinese producers will be able to maintain high production levels to meet the demand at strontium carbonate plants for an extended period of time.

The demand for strontium carbonate for television faceplate glass continues and increases as the popularity of larger screen sizes increases. China, Europe, and North America are the most important markets for televisions. Southeast Asia and Latin America have higher growth rates, representing potentially huge markets for television manufacturers and thus the strontium carbonate industry. Flat screen technology likely will diminish the demand for strontium carbonate for television displays when the technology becomes affordable and commonplace. Industry experts, however, do not expect flat screens to present significant competition for the next 10 years.

### World Mine Production, Reserves, and Reserve Base:<sup>3</sup>

	Mine production		Reserves <sup>4</sup>	Reserve base <sup>4</sup>
	2000	2001 <sup>e</sup>		
United States	—	—	—	1,400,000
Argentina	3,000	3,000		
China	<sup>e</sup> 200,000	200,000		
Iran	2,000	2,000		
Mexico	157,000	160,000	Other:	Other:
Pakistan	600	600	6,800,000	11,000,000
Spain	130,000	130,000		
Tajikistan	NA	NA		
Turkey	<u>25,000</u>	<u>25,000</u>		
World total (may be rounded)	<u>520,000</u>	<u>520,000</u>	<u>6,800,000</u>	<u>12,000,000</u>

**World Resources:** Resources in the United States are several times the reserve base. Although not thoroughly evaluated, world resources are thought to exceed 1 billion tons.

**Substitutes:** Although it is possible to substitute other materials for strontium in some of its applications, such a change would adversely affect product performance and/or cost. For example, barium could replace strontium in color television picture tube glass only after extensive circuit redesign to reduce operating voltages that produce harmful secondary x rays. Barium replacement of strontium in ferrite ceramic magnets would decrease the maximum energy and temperature characteristics of the magnets. Substituting for strontium in pyrotechnics would be impractical because the desired brilliance and visibility are imparted only by strontium and its compounds.

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

<sup>1</sup>The strontium content of celestite is 43.88%; this amount was used to convert units of celestite.

<sup>2</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>3</sup>Metric tons of strontium minerals.

<sup>4</sup>See Appendix C for definitions.