

STRONTIUM

(Data in metric tons of strontium content unless otherwise noted)

Domestic Production and Use: Although deposits of strontium minerals occur widely throughout the United States, none have been mined in the United States since 1959. Domestic production of strontium carbonate, the principal strontium compound, ceased in 2006. It is thought that virtually all of the strontium mineral celestite consumed in the United States since 2006 has been used as an additive in drilling fluids for oil and natural gas wells. A few domestic companies produced small quantities of downstream strontium chemicals from imported strontium carbonate.

Based on import data, the estimated end-use distribution in the United States for strontium, including celestite and strontium compounds, was, in descending order, drilling fluids, 70%; ceramic ferrite magnets, and pyrotechnics and signals, 9% each; electrolytic production of zinc, master alloys, pigments and fillers, and other applications, including glass, 3% each.

Salient Statistics—United States:	2014	2015	2016	2017	2018^e
Production	—	—	—	—	—
Imports for consumption:					
Celestite ¹	24,200	24,500	4,420	11,300	21,000
Strontium compounds ²	7,600	7,100	6,420	6,660	6,800
Exports, strontium compounds	104	86	91	36	37
Consumption, apparent:					
Celestite	24,200	24,500	4,420	11,300	21,000
Strontium compounds	7,500	7,020	6,330	6,620	6,800
Total	31,700	31,500	10,700	17,900	28,000
Price, average value of celestite imports at port of exportation, dollars per ton	50	51	78	74	75
Net import reliance ³ as a percentage of apparent consumption	100	100	100	100	100

Recycling: None.

Import Sources (2014–17): Celestite: Mexico, 100%. Strontium compounds: Mexico, 52%; Germany, 39%; China, 6%; and other, 3%. Total imports: Mexico, 86%; Germany, 12%; and China, 2%.

Tariff:	Item	Number	Normal Trade Relations
			12–31–18
			Free.
	Celestite	2530.90.8010	
	Strontium compounds:		
	Strontium metal	2805.19.1000	3.7% ad val.
	Strontium oxide, hydroxide, peroxide	2816.40.1000	4.2% ad val.
	Strontium nitrate	2834.29.2000	4.2% ad val.
	Strontium carbonate	2836.92.0000	4.2% ad val.

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

Government Stockpile: None.

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Events, Trends, and Issues: For the second year in a row, imports of celestite, the most commonly used strontium mineral, increased significantly. Imports increased by an estimated 88% in 2018 from those in 2017 and by 155% from those in 2016. The decrease in 2016 was likely the result of decreased natural gas- and oil-drilling activity owing to low gas and oil prices in 2014 and 2015. The imports of celestite correlated with the number of active drilling rigs in 2016 through 2018. Nearly all of the celestite is imported from Mexico, with the exception of a small amount of specimen samples, and is thought to be used exclusively as an additive in drilling fluids for oil and natural gas exploration and production. For these applications, celestite is ground but undergoes no chemical processing. Outside the United States, celestite is the raw material used for production of strontium compounds.

Strontium compounds include strontium carbonate, which is sintered with iron oxide to produce permanent ceramic ferrite magnets, and strontium nitrate, which contributes a brilliant red color to fireworks and signal flares. Smaller quantities of these and other strontium compounds were consumed in several other applications, including electrolytic production of zinc, glass production, master alloys, and pigments and fillers.

In May 2018, the U.S. Department of the Interior, in coordination with other executive branch agencies, published a list of 35 critical minerals (83 FR 23295), including strontium. This list was developed to serve as an initial focus, pursuant to Executive Order 13817, "A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals" (82 FR 60835).

World Mine Production and Reserves:⁴ Production data for celestite in Iran was added owing to a new source of Government data. Output from Iran was previously not estimated and not included in world totals.

	Mine production		Reserves ⁵
	2017	2018 ^e	
United States	—	—	—
Argentina	5,000	5,000	All other:
China	50,000	50,000	6,800,000
Iran	40,000	37,000	
Mexico	70,000	70,000	
Spain	90,000	100,000	
World total (rounded)	255,000	260,000	6,800,000

World Resources: World resources of strontium are thought to exceed 1 billion tons.

Substitutes: Barium can be substituted for strontium in ferrite ceramic magnets; however, the resulting barium composite will have reduced maximum operating temperature when compared with that of strontium composites. Substituting for strontium in pyrotechnics is hindered by difficulty in obtaining the desired brilliance and visibility imparted by strontium and its compounds. In drilling mud, barite is the preferred material, but celestite may substitute for some barite, especially when barite prices are high.

^eEstimated. — Zero.

¹The strontium content of celestite is 43.88%, assuming an ore grade of 92%, which was used to convert units of celestite to strontium content.

²Strontium compounds, with their respective strontium contents, in descending order, include metal (100.00%); oxide, hydroxide, and peroxide (70.00%); carbonate (59.35%); and nitrate (41.40%). These factors were used to convert gross weight of strontium compounds to strontium content.

³Defined as imports – exports.

⁴Gross weight of celestite in tons.

⁵See Appendix C for resource and reserve definitions and information concerning data sources.