

## SILICON

(Data in thousand metric tons of silicon content, unless noted)

**Domestic Production and Use:** Estimated value of silicon metal and alloys (excluding semiconductor-grade silicon) produced in the United States in 1995 was about \$570 million. Ferrosilicon was produced by five companies in six plants, while production of silicon metal was distributed between five companies in eight plants. Most of the ferrosilicon and silicon metal plants were east of the Mississippi River or in the Pacific Northwest. Most ferrosilicon was consumed in the ferrous foundry and steel industries, predominantly in the eastern one-half of the United States. The main consumers of silicon metal were aluminum producers and the chemical industry.

<b>Salient Statistics—United States:</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995<sup>e</sup></b>
Production	363	370	367	390	390
Imports for consumption	164	193	212	245	240
Exports	35	38	31	32	60
Consumption, apparent	500	532	557	607	580
Price, <sup>1</sup> average, cents per pound Si:					
Ferrosilicon, 50% Si	38.3	36.9	40.8	43.9	54.5
Ferrosilicon, 75% Si	37.0	35.4	40.6	40.8	55.1
Silicon metal	61.5	60.0	66.4	64.1	67.8
Stocks, producer and consumer, yearend	64	57	48	44	34
Employment, plant <sup>e</sup>	2,300	2,300	NA	NA	NA
Net import reliance <sup>2</sup> as a percent of apparent consumption	27	30	34	36	33

**Recycling:** Insignificant.

**Import Sources (1991-94):** Norway, 19%; Brazil, 17%; Canada, 13%; Russia, 10%; and other, 41%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Most favored nation (MFN) 12/31/95</b>	<b>Non-MFN<sup>3</sup> 12/31/95</b>
Ferrosilicon, 55%-80% Si:			
More than 3% Ca	7202.21.1000	1.1% ad val.	11.5% ad val.
Other	7202.21.5000	1.5% ad val.	11.5% ad val.
Ferrosilicon, 80%-90% Si	7202.21.7500	1.9% ad val.	9% ad val.
Ferrosilicon, more than 90% Si	7202.21.9000	5.8% ad val.	40% ad val.
Ferrosilicon, other:			
Ferrosilicon, more than 2% Mg	7202.29.0010	Free	4.4¢/kg Si.
Ferrosilicon, other	7202.29.0050	Free	4.4¢/kg Si.
Silicon, more than 99.99% Si	2804.61.0000	3% ad val.	25% ad val.
Silicon, 99.00%-99.99% Si	2804.69.1000	5.3% ad val.	21% ad val.
Silicon, other	2804.69.5000	8.3% ad val.	45% ad val.

**Depletion Allowance:** Quartzite, 14% (Domestic and Foreign); gravel, 5% (Domestic and Foreign).

**Government Stockpile:** Information on silicon carbide in the National Defense Stockpile is discussed in the "Manufactured Abrasives" chapter.

**Events, Trends, and Issues:** Overall consumption for silicon decreased compared with that of the previous year. Demand for silicon ferroalloys closely follows overall iron and steel production, whereas demand for silicon metal largely reflects the health of the aluminum and chemical industries. Consumption of ferrosilicon and miscellaneous silicon alloys was about 350,000 tons, while consumption of silicon metal was about 230,000 tons.

In mid-October, the "dealer import" price for 50%-grade ferrosilicon was \$0.64 to \$0.66 per pound, the import price for 75%-grade ferrosilicon was \$0.64 to \$0.655 per pound, and the import price for silicon metal was \$0.72 to \$0.75 per pound. Escalating prices for both ferrosilicon and silicon metal were being influenced by the respective tight markets, antidumping duties imposed in the United States and Europe, and declining exports to the West from China and producing countries of the Former Soviet Union.

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For the first one-half-year, total gross ferrosilicon imports decreased by about 25%. Norway and Iceland were the leading suppliers, with about 60% of both total quantity and value. For the same period, silicon metal imports were up slightly, with Russia providing about 35% of both total quantity and value.

It is estimated that in 1996 domestic production of silicon-containing ferroalloys and metal will be about 400,000 tons and U.S. apparent consumption will be about 600,000 tons.

### World Production, Reserves, and Reserve Base:

	Production <sup>e</sup>		Reserves and reserve base <sup>4</sup>
	1994	1995	
United States	390	390	The reserves and reserve base in most major producing countries are ample in relation to demand. Quantitative estimates are not available.
Australia	30	30	
Brazil	250	250	
Canada	55	60	
China	715	720	
Egypt	30	30	
France	85	90	
Iceland	40	40	
India	55	60	
Kazakstan	230	230	
Norway	350	350	
Poland	50	50	
Romania	20	20	
Russia	340	340	
South Africa	100	100	
Spain	20	20	
Ukraine	260	260	
Venezuela	30	30	
Other countries	120	130	
World total	3,170	3,200	

**World Resources:** The world and domestic resources for making silicon metal and alloys are abundant and, in most producing countries, adequate to supply world requirements for many decades.

**Substitutes:** Various metals and alloys, such as aluminum and silicomanganese, can be substituted for ferrosilicon in some applications. Germanium and gallium arsenide are the principal substitutes for silicon in semiconductor and infrared applications.

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

<sup>1</sup>Based on U.S. dealer import price.

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

<sup>3</sup>See Appendix B.

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