SILICON

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

<u>Domestic Production and Use</u>: Estimated value of silicon metal and alloys (excluding semiconductor-grade silicon) produced in the United States in 2002 was about \$265 million. Ferrosilicon was produced by four companies in five plants, and silicon metal was produced by three companies in four plants. Two of the six companies in the industry produced both products. All of the active ferrosilicon and silicon metal plants were east of the Mississippi River. 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 producers of aluminum and aluminum alloys and the chemical industry. The semiconductor industry, which manufactures chips for computers from high-purity silicon, accounted for only a few percent of silicon demand.

Salient Statistics—United States:	<u> 1998</u>	<u> 1999</u>	<u>2000</u>	<u>2001</u>	2002 ^e
Production	429	423	367	282	270
Imports for consumption	241	286	361	231	280
Exports	47	61	41	23	21
Consumption, apparent	616	643	689	502	509
Price, ¹ average, cents per pound Si:					
Ferrosilicon, 50% Si	52.1	49.1	45.0	42.8	41
Ferrosilicon, 75% Si	43.1	40.2	35.4	31.9	32
Silicon metal	70.5	58.1	54.8	50.5	52
Stocks, producer, yearend	50	54	52	40	61
Net import reliance ² as a percentage					
of apparent consumption	30	34	47	44	47

Recycling: Insignificant.

Import Sources (1998-2001): Norway, 23%; South Africa, 17%; Russia, 11%; Canada, 10%; and other, 39%.

Tariff: Item	Number	Normal Trade Relations 12/31/02	
Ferrosilicon, 55%-80% Si:			
More than 3% Ca	7202.21.1000	1.1% ad val.	
Other	7202.21.5000	1.5% ad val.	
Ferrosilicon, 80%-90% Si	7202.21.7500	1.9% ad val.	
Ferrosilicon, more than 90% Si	7202.21.9000	5.8% ad val.	
Ferrosilicon, other:			
More than 2% Mg	7202.29.0010	Free.	
Other	7202.29.0050	Free.	
Silicon, more than 99.99% Si	2804.61.0000	Free.	
Silicon, 99.00%-99.99% Si	2804.69.1000	5.3% ad val.	
Silicon, other	2804.69.5000	5.5% ad val.	

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

Government Stockpile: None.

Events, Trends, and Issues: Domestic apparent consumption of silicon for 2002 is projected to be just slightly more than that for 2001, or approximately 17% less than the average for 1998-2001. Of the 2002 total, the share accounted for by ferrosilicon is estimated to have decreased to 52% from 53% in 2001, while that for silicon metal increased to 48% from 47%. The annual growth rate for ferrosilicon demand usually falls in the range of 1% to 2%, in line with long-term trends in steel production. Through the first one-half of 2002, however, domestic steel production was 4% less than for 2001. In recent years, the annual growth rate for overall silicon metal demand has been in the vicinity of 5%. In 2002, this rate probably was not sustained, at least in part, because of lagging global demand by the chemical industry, principally for silicones. In 2000, the demand growth rate in the chemicals sector was nearly 7% per year. Prior to that, it had averaged about 8%.

Domestic production in 2002, expressed in terms of contained silicon, is projected to have declined. For all silicon materials combined, the overall decline was 4% to the lowest level since 1982. Production was curtailed or stopped at some plants because of high power costs and/or slackening demand.

SILICON

Through the first 9 months of 2002, price trended upward in the U.S. market for silicon materials. Compared with those at the beginning of the year, prices as of the end of September were 16% to 22% higher for ferrosilicon and about 12% for silicon metal. Year-average prices were projected to be slightly lower for 50% ferrosilicon, about the same for 75% ferrosilicon, and slightly higher for silicon metal than those for 2001. At the end of September, the range in dealer import price, in cents per pound of contained silicon, was 44 to 46 for 50% ferrosilicon, 34.5 to 36.5 for 75% ferrosilicon, and 54 to 57 for silicon metal.

U.S. imports and exports of silicon materials in 2002, projected on the basis of data for the first 6 months of the year, were 4% less than those in 2001. The smallest overall percentage decline was for imports of silicon metal. Net import reliance declined significantly in comparison with that for recent years owing to a large increase in domestic ferrosilicon stocks.

World Production, Reserves, and Reserve Base:

	Production ^e		
	<u>2001</u>	2002	
United States	282	270	
Brazil	213	250	
Canada	66	69	
China	1,073	1,500	
France	139	140	
Iceland	46	47	
India	33	34	
Kazakhstan	95	99	
Norway	391	400	
Poland	47	46	
Russia	499	490	
Slovakia	33	34	
South Africa	110	110	
Spain	55	57	
Ukraine	211	200	
Venezuela	39	58	
Other countries	208	230	
World total (rounded)	3,500	4,100	

Reserves and reserve base³

The reserves and reserve base in most major producing countries are ample in relation to demand. Quantitative estimates are not available.

Production quantities given above are combined totals of estimated content for ferrosilicon and silicon metal, as applicable. For the world, ferrosilicon accounts for about four-fifths of the total. The leading countries for ferrosilicon production were China, Norway, Russia, Ukraine, and the United States, and for silicon metal Brazil, China, France, Norway, and the United States. China was by far the largest producer of both ferrosilicon and silicon metal. An estimated 340,000 metric tons of silicon metal is included in China's total silicon production for 2002.

<u>World Resources</u>: 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. The source of the silicon is silica in various natural forms, such as quartzite.

<u>Substitutes</u>: Aluminum, silicon carbide, and silicomanganese can be substituted for ferrosilicon in some applications. Gallium arsenide and germanium are the principal substitutes for silicon in semiconductor and infrared applications.

eEstimated.

¹Based on U.S. dealer import price.

²Defined as imports - exports + adjustments for Government and industry stock changes.

³See Appendix C for definitions.