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 2007 was about \$500 million. Four companies produced silicon materials in six plants. Of those companies, three produced ferrosilicon in four plants. Silicon metal was produced by two companies in four plants. Two of the four companies in the industry produced both products at two plants. 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 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 small percentage of silicon demand.

Salient Statistics—United States:	<u>2003</u>	<u>2004</u>	<u>2005</u>	2006	2007 ^e
Production:					
Ferrosilicon, all grades ¹	117	128	125	146	156
Silicon metal	136	147	145	W	W
Imports for consumption:					
Ferrosilicon, all grades ¹	189	173	197	223	203
Silicon metal	126	165	152	146	152
Exports:					
Ferrosilicon, all grades ¹	6	6	8	5	6
Silicon metal	20	18	23	27	27
Consumption, apparent:					
Ferrosilicon, all grades ¹	304	297	317	360	354
Silicon metal	240	291	275	W	W
Price, ² average, cents per pound Si:					
Ferrosilicon, 50% Si	47.7	58.2	55.0	62.9	73.0
Ferrosilicon, 75% Si	45.3	55.4	48.0	54.9	65.0
Silicon metal	61.3	81.9	76.2	79.3	105
Stocks, producer, yearend:					
Ferrosilicon, all grades ¹	17	15	13	16	14
Silicon metal	5	7	6	W	W
Net import reliance ³ as a percentage					
of apparent consumption:					
Ferrosilicon, all grades ¹	62	57	61	59	56
Silicon metal	43	50	47	<50	<50

Recycling: Insignificant.

Import Sources (2003-06): Ferrosilicon: China, 35%; Venezuela, 18%; Russia, 16%; Norway, 7%; and other, 24%. Silicon metal: Brazil, 39%; South Africa, 25%; Canada, 16%; Norway, 6%; and other, 14%. Total: Brazil, 18%; China, 13%; South Africa, 11%; Canada, 11%; and other, 47%.

Tariff: Item	Number	Normal Trade Relations 12-31-07	
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.

SILICON

Events, Trends, and Issues: Domestic ferrosilicon production in 2007, expressed in terms of contained silicon, was expected to increase by 7% from that of 2006. Because the number of silicon metal producers in the United States declined to two in 2006, U.S. silicon metal statistics have been withheld to avoid disclosing company proprietary data. Through the first 10 months of 2007, spot market prices trended upward in the U.S. market for silicon materials owing to increased demand for ferrosilicon as a substitute for high-priced silicomanganese in steelmaking, increased Chinese ferrosilicon export prices, and increased demand for silicon metal production.

Demand for silicon metal comes primarily from the aluminum and chemical industries. In the first 9 months of 2007, domestic chemical production was nearly unchanged compared with that in 2006. Domestic primary aluminum production was projected to increase by 11% in 2007. Domestic apparent consumption of ferrosilicon in 2007 was projected to decrease by 3% compared with that of 2006. 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, but through the first 8 months of 2007, domestic steel production was 3% lower than that for the same period in 2006.

Two developments affected the global supply of silicon materials. Production of silicon materials in Norway decreased to an estimated 160,000 tons in 2007 from 210,000 tons (revised) in 2006, owing to the indefinite closure of a ferrosilicon plant in 2005 and the permanent closure of two silicon metal plants in 2006. This was offset by the significant (22%) increase in Chinese ferrosilicon and silicon metal production compared with that of 2006.

World Production, Reserves, and Reserve Base:

	Production ^{e, 4}	
	2006	<u>2007</u>
United States	⁶ 146	156
Brazil	226	230
Canada	66	66
China	2,900	2,900
France	124	170
Iceland	74	75
India	38	38
Kazakhstan	68	68
Norway	150	160
Russia	541	540
South Africa	144	140
Spain	55	55
Ukraine	84	120
Venezuela	60	60
Other countries	<u> 297</u>	<u>300</u>
World total (rounded)	4,970	5,100

Reserves and reserve base⁵

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

Ferrosilicon accounts for about four-fifths of world silicon production (gross-weight basis). The leading countries for ferrosilicon production, in descending order of production, were China, Russia, Ukraine, the United States, and Brazil, and for silicon metal, China, Brazil, and Norway. China was by far the leading producer of both ferrosilicon and silicon metal. An estimated 570.000 tons of silicon metal is included in China's production of silicon materials for 2007.

<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. W Withheld to avoid disclosing company proprietary data.

¹Ferrosilicon grades include the two standard grades of ferrosilicon—50% and 75%—plus miscellaneous silicon alloys.

²Based on U.S. dealer import price.

³Defined as imports – exports + adjustments for Government and industry stock changes.

⁴Production quantities are combined totals of estimated silicon content for ferrosilicon and silicon metal, as applicable, except as noted.

⁵See Appendix C for definitions.

⁶Ferrosilicon only.