

## MANGANESE

(Data in thousand metric tons, gross weight, unless otherwise noted)

**Domestic Production and Use:** Manganese ore containing 35% or more manganese was not produced domestically in 1999. Manganese ore was consumed mainly by about 15 firms with plants principally in the Eastern and Midwestern United States. The majority of ore consumption was related to steel production, directly in pig iron manufacture and indirectly through upgrading ore to ferroalloys and metal. Ore was used otherwise for such nonmetallurgical purposes as producing dry cell batteries, as an ingredient in plant fertilizers and animal feed, and as a colorant for brick. Manganese ferroalloys were produced at one smelter. Leading identifiable end uses of manganese were in products for construction, machinery, and transportation, which were estimated to be 24%, 14%, and 13%, respectively, of total manganese demand. Most of the rest went to a variety of other iron and steel applications. Value of domestic consumption was estimated from foreign trade data as about \$380 million.

<b>Salient Statistics—United States:</b> <sup>1</sup>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999<sup>e</sup></b>
Production, mine <sup>2</sup>	—	—	—	—	—
Imports for consumption:					
Manganese ore	394	478	355	332	535
Ferromanganese	310	374	304	339	325
Silicomanganese <sup>3</sup>	305	323	306	346	265
Exports:					
Manganese ore	15	32	84	8	2
Ferromanganese	11	10	12	14	14
Shipments from Government stockpile excesses: <sup>4</sup>					
Manganese ore	115	128	115	97	81
Ferromanganese	18	(2)	31	37	28
Consumption, reported: <sup>5</sup>					
Manganese ore <sup>6</sup>	486	478	510	499	500
Ferromanganese	348	326	337	<sup>e</sup> 340	330
Consumption, apparent, manganese <sup>7</sup>	676	776	628	776	745
Price, average value, 46% to 48% Mn metallurgical ore, dollars per mtu cont. Mn, c.i.f. U.S. ports	2.40	2.55	2.44	2.40	2.26
Stocks, producer and consumer, yearend:					
Manganese ore <sup>6</sup>	309	319	275	196	210
Ferromanganese	33	27	21	<sup>e</sup> 26	30
Net import reliance <sup>8</sup> as a percent of apparent consumption	100	100	100	100	100

**Recycling:** Scrap recovery specifically for manganese was negligible, but a significant amount was recycled through processing operations as a minor component of ferrous and nonferrous scrap and steel slag.

**Import Sources (1995-98):** Manganese ore: Gabon, 56%; Australia, 14%; Mexico, 14%; Brazil, 7%; and other, 9%. Ferromanganese: South Africa, 39%; France, 25%; Australia, 9%; Mexico, 8%; and other, 19%. Manganese contained in all manganese imports: South Africa, 28%; Gabon, 16%; Australia, 14%; France, 11%; and other, 31%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/99</b>
Ore and concentrate	2602.00.0040/60	Free.
Manganese dioxide	2820.10.0000	4.7% ad val.
High-carbon ferromanganese	7202.11.5000	1.5% ad val.
Silicomanganese	7202.30.0000	3.9% ad val.
Metal, unwrought	8111.00.4500	14% ad val.

**Depletion Allowance:** 23% (Domestic), 15% (Foreign).

**Government Stockpile:** In addition to the data tabulated, the stockpile contained additional uncommitted inventories of nonstockpile-grade materials, as follows, in tons: natural battery ore, 16,800; chemical ore, 81; and metallurgical ore, 331,000.

## MANGANESE

### Stockpile Status—9-30-99<sup>9</sup>

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 1999	Disposals FY 1999
Battery: Natural ore	95	1	95	27	4
Synthetic dioxide	3	—	3	3	—
Chemical ore	143	1	143	36	3
Metallurgical ore	602	114	602	227	46
Ferromanganese:					
High-carbon	862	28	673	45	45
Electrolytic metal	6	0.5	6	2	1

**Events, Trends, and Issues:** The late 1998 linking of Australian and South African manganese production facilities was followed in 1999 by another major consolidation that combined Gabonese ore production with smelter production in Norway and the United States. Trends through the first three quarters of 1999 indicated decreases in year-average prices for manganese ferroalloys in the same range as the decline of 7% in f.o.b. ore price. Manganese is an essential element for people, animals, and plants, but it can be harmful in excessive amounts. Thus, manganese can be an industrial poison, but generally is not a hazard.

### World Mine Production, Reserves, and Reserve Base (metal content):<sup>10</sup>

	Mine production		Reserves <sup>11</sup>	Reserve base <sup>11</sup>
	1998	1999 <sup>e</sup>		
United States	—	—	—	—
Australia	729	800	28,000	75,000
Brazil	<sup>e</sup> 819	600	21,000	56,000
China	<sup>e</sup> 1,200	1,200	40,000	100,000
Gabon	<sup>e</sup> 966	1,000	45,000	150,000
India	<sup>e</sup> 610	600	24,000	36,000
Mexico	<sup>e</sup> 187	180	4,000	9,000
South Africa	<sup>e</sup> 1,300	1,270	370,000	4,000,000
Ukraine	<sup>e</sup> 755	570	135,000	520,000
Other countries	<sup>e</sup> 472	515	Small	Small
World total (rounded)	<sup>e</sup> 7,040	6,740	680,000	5,000,000

**World Resources:** Land-based resources are large but irregularly distributed; those of the United States are very low grade and have potentially high extraction costs. South Africa and the Former Soviet Union (FSU) account for more than 80% of the world's identified resources; South Africa accounts for more than 80% of the total exclusive of China and the FSU.

**Substitutes:** There is no satisfactory substitute for manganese in its major applications.

<sup>e</sup>Estimated.

<sup>1</sup>Manganese content typically ranges from 35% to 54% for manganese ore and from 74% to 95% for ferromanganese.

<sup>2</sup>Excludes insignificant quantities of low-grade manganiferous ore.

<sup>3</sup>Imports more nearly represent amount consumed than does reported consumption; internal evaluation indicates that reported consumption of silicomanganese is considerably understated.

<sup>4</sup>Net quantity. Data in parentheses denote increases in inventory.

<sup>5</sup>Total manganese consumption cannot be approximated from consumption of manganese ore and ferromanganese because of the use of ore in making manganese ferroalloys and metal.

<sup>6</sup>For 1996-99, exclusive of that at iron and steel plants.

<sup>7</sup>Thousand metric tons, manganese content; based on estimates of average content for all significant components except imports, for which content is reported.

<sup>8</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>9</sup>See Appendix B for definitions.

<sup>10</sup>Thousand metric tons, manganese content.

<sup>11</sup>See Appendix C for definitions