

## MANGANESE

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

**Domestic Production and Use:** Manganese ore containing 35% or more manganese was not produced domestically in 2003. Manganese ore was consumed mainly by about eight firms with plants principally in the Eastern United States and the Midwestern United States. Most ore consumption was related to steel production, directly in pig iron manufacture and indirectly through upgrading ore to ferroalloys and metal. Additional quantities of ore were used for such nonmetallurgical purposes as production of dry cell batteries, as an ingredient in plant fertilizers and animal feed, and as a colorant for brick. Manganese ferroalloys were produced at two smelters. Leading identifiable end uses of manganese were in products for construction, machinery, and transportation, which were estimated to be 27%, 11%, and 11%, respectively, of total manganese demand. Most of the rest went to a variety of other iron and steel applications. The value of domestic consumption, estimated from foreign trade data, was about \$205 million.

<b>Salient Statistics—United States:</b> <sup>1</sup>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003<sup>e</sup></b>
Production, mine <sup>2</sup>	—	—	—	—	—
Imports for consumption:					
Manganese ore	460	430	358	427	390
Ferromanganese	312	312	249	275	240
Silicomanganese <sup>3</sup>	301	378	269	247	200
Exports:					
Manganese ore	4	10	9	15	9
Ferromanganese	12	8	9	9	9
Shipments from Government stockpile excesses: <sup>4</sup>					
Manganese ore	76	63	37	56	44
Ferromanganese	35	33	2	38	28
Consumption, reported: <sup>5</sup>					
Manganese ore <sup>6</sup>	479	486	425	360	410
Ferromanganese	281	300	266	253	266
Consumption, apparent, manganese <sup>7</sup>	719	768	692	689	610
Price, average value, 46% to 48% Mn metallurgical ore, dollars per mtu cont. Mn, c.i.f. U.S. ports	2.26	2.39	2.44	2.30	2.35
Stocks, producer and consumer, yearend:					
Manganese ore <sup>6</sup>	172	226	138	148	127
Ferromanganese	40	31	25	21	14
Net import reliance <sup>8</sup> as a percentage 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 (1999-2002):** Manganese ore: Gabon, 71%; South Africa, 13%; Australia, 9%; Brazil, 3%; and other, 4%. Ferromanganese: South Africa, 49%; France, 20%; Mexico, 7%; Australia, 6%; and other, 18%. Manganese contained in all manganese imports: South Africa, 34%; Gabon, 20%; Australia, 12%; Mexico, 7%; and other, 27%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/03</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	8111.00.4700/4900	14% ad val.

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

**Government Stockpile:** In addition to the quantities shown below, the stockpile contained 331,000 metric tons of nonstockpile-grade metallurgical ore, all of which was authorized for disposal.

## MANGANESE

Material	Stockpile Status—9-30-03 <sup>9</sup>			Disposal plan FY 2003	Disposals FY 2003
	Uncommitted inventory	Committed inventory	Authorized for disposal		
Battery:					
Natural ore	48	7	48	27	27
Synthetic dioxide	3	—	3	3	—
Chemical ore	84	28	84	36	—
Metallurgical ore	336	231	336	227	23
Ferromanganese, high-carbon	720	15	720	23	23
Electrolytic metal	0.5	0.03	0.5	2	2

**Events, Trends, and Issues:** The annual growth rate for manganese ferroalloy demand usually falls in the range of 1% to 2% and is tied to steel production. Through the first 8 months of 2003, however, domestic steel production was the same as that for the same period in 2002. Ferromanganese prices in the United States trended downward from those at the end of 2002, while silicomanganese prices increased owing to slight supply deficits. Manganese ore prices increased as a result of an increase in the international benchmark price for metallurgical-grade ore set between Japan and major suppliers in mid-2003. Manganese is an essential nutritional element for people, animals, and plants, but it can be harmful in excessive amounts. In July 2003, the U.S. Environmental Protection Agency determined that no regulatory action under the Safe Drinking Water Act was necessary for regulating manganese in drinking water because available data suggest it is generally not toxic when ingested with the diet, and drinking water accounts for a relatively small proportion of manganese intake.

**World Mine Production, Reserves, and Reserve Base (metal content):** Data for reserves and reserve base have been revised downward from those previously published for Brazil and upward for South Africa reserves based on information reported by the Government of Brazil and the major manganese producers of South Africa. Reserves for South Africa are based on reported company estimates of proven and probable reserves.

	Mine production		Reserves <sup>10</sup>	Reserve base <sup>10</sup>
	2002	2003 <sup>e</sup>		
United States	—	—	—	—
Australia	983	990	32,000	82,000
Brazil	<sup>e</sup> 1,300	950	23,000	51,000
China	<sup>e</sup> 900	900	40,000	100,000
Gabon	<sup>e</sup> 810	1,000	20,000	160,000
India	<sup>e</sup> 630	630	15,000	33,000
Mexico	88	85	4,000	9,000
South Africa	1,504	1,630	32,000	<sup>11</sup> 4,000,000
Ukraine	940	830	140,000	520,000
Other countries	<u>955</u>	<u>985</u>	<u>Small</u>	<u>Small</u>
World total (rounded)	<sup>e</sup> 8,100	8,000	300,000	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 accounts for more than 80 % of the world's identified resources, and Ukraine account for more about 10%.

**Substitutes:** Manganese has no satisfactory substitute in its major applications.

<sup>e</sup>Estimated. — Zero.

<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.

<sup>5</sup>Total manganese consumption cannot be approximated from consumption of manganese ore and ferromanganese because the ore is used to produce manganese ferroalloys and metal.

<sup>6</sup>Exclusive of ore consumed at iron and steel plants.

<sup>7</sup>Thousand 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>See Appendix C for definitions.

<sup>11</sup>Includes inferred resources.