

## 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 2002. Manganese ore was consumed mainly by about 15 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 one smelter. Leading identifiable end uses of manganese were in products for construction, machinery, and transportation, which were estimated to be 29%, 11%, and 12%, 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 \$265 million.

<b><u>Salient Statistics—United States:</u><sup>1</sup></b>	<b><u>1998</u></b>	<b><u>1999</u></b>	<b><u>2000</u></b>	<b><u>2001</u></b>	<b><u>2002<sup>e</sup></u></b>
Production, mine <sup>2</sup>	—	—	—	—	—
Imports for consumption:					
Manganese ore	332	460	430	358	550
Ferromanganese	339	312	312	249	220
Silicomanganese <sup>3</sup>	346	301	378	269	200
Exports:					
Manganese ore	8	4	10	9	16
Ferromanganese	14	12	8	9	10
Shipments from Government stockpile excesses: <sup>4</sup>					
Manganese ore	97	76	63	37	27
Ferromanganese	37	35	33	2	13
Consumption, reported: <sup>5</sup>					
Manganese ore <sup>6</sup>	499	479	486	425	301
Ferromanganese	290	281	300	266	275
Consumption, apparent, manganese <sup>7</sup>	776	719	768	692	700
Price, average value, 46% to 48% Mn metallurgical ore, dollars per mtu cont. Mn, c.i.f. U.S. ports	2.40	2.26	2.39	2.44	2.30
Stocks, producer and consumer, yearend:					
Manganese ore <sup>6</sup>	163	172	226	138	161
Ferromanganese	26	40	31	25	21
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 (1998-2001):** Manganese ore: Gabon, 70%; South Africa, 10%; Australia, 9%; Mexico, 5%; and other, 6%. Ferromanganese: South Africa, 47%; France, 22%; Mexico, 8%; Australia, 8%; and other, 15%. Manganese contained in all manganese imports: South Africa, 31%; Gabon, 21%; Australia, 13%; Mexico, 8%; and other, 27%.

<b><u>Tariff: Item</u></b>	<b><u>Number</u></b>	<b><u>Normal Trade Relations</u></b>
		<b><u>12/31/02</u></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:** 22% (Domestic), 14% (Foreign).

**Government Stockpile:** An uncommitted inventory of 331,000 tons of nonstockpile-grade metallurgical ore is contained in the data tabulated, all of which was authorized for disposal.

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### Stockpile Status—9-30-02<sup>9</sup>

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2002	Disposals FY 2002
Battery:					
Natural ore	76	27	76	27	27
Synthetic dioxide	3	—	3	3	—
Chemical ore	84	29	84	36	50
Metallurgical ore	689	322	689	227	158
Ferromanganese, high-carbon	742	43	742	68	29
Electrolytic metal	2	0.2	2	2	2

**Events, Trends, and Issues:** Through September, steel production, the principal determinant of manganese demand, was at about the same record level globally as in 2000 and 2001, but it remained significantly down in the United States. However, ferromanganese prices in the United States trended upward from those at the end of 2001 owing to shortages in supply. Manganese ore prices decreased as a result of a decrease in the international benchmark price for metallurgical-grade ore set between Japan and major suppliers in June 2002. Manganese is an essential nutritional 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):** Reserves and reserve base estimates for Brazil have been revised upward while estimates for India and South Africa have been revised downward based on information reported by the Governments of Brazil and India and the major manganese producers of South Africa.

	Mine production		Reserves <sup>10</sup>	Reserve base <sup>10</sup>
	2001	2002 <sup>e</sup>		
United States	—	—	—	—
Australia	948	890	32,000	82,000
Brazil	<sup>e</sup> 1,430	1,500	25,000	52,000
China	<sup>e</sup> 500	500	40,000	100,000
Gabon	<sup>e</sup> 830	860	20,000	160,000
India	<sup>e</sup> 600	630	15,000	33,000
Mexico	100	100	4,000	9,000
South Africa	1,479	1,300	18,000	<sup>11</sup> 4,000,000
Ukraine	<sup>e</sup> 930	960	140,000	520,000
Other countries	<sup>e</sup> 750	860	Small	Small
World total (rounded)	<sup>e</sup> 7,600	7,600	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 and Ukraine 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 Ukraine.

**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.