

## MANGANESE

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

**Domestic Production and Use:** Manganese ore containing 20% or more manganese has not been produced domestically since 1970. Manganese ore was consumed mainly by eight firms with plants principally in the East and Midwest. Most ore consumption was related to steel production, either directly in pig iron manufacture or indirectly through upgrading the ore to ferroalloys. Additional quantities of ore were used for such nonmetallurgical purposes as production of dry cell batteries, in fertilizers and animal feed, and as a brick colorant. Manganese ferroalloys were produced at two plants. Construction, transportation, and machinery end uses accounted for about 34%, 12%, and 11%, respectively, of manganese consumption on a manganese-content basis. Most of the rest went to a variety of other iron and steel applications. In 2018, the value of domestic consumption, estimated from foreign trade data on a manganese-content basis, was about \$1.3 billion.

<b>Salient Statistics—United States:</b> <sup>1</sup>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018<sup>e</sup></b>
Production, mine	—	—	—	—	—
Imports for consumption:					
Manganese ore	387	441	282	297	430
Ferromanganese	365	292	229	331	460
Silicomanganese <sup>2</sup>	448	301	264	351	420
Exports:					
Manganese ore	1	1	1	1	4
Ferromanganese	6	5	7	9	9
Silicomanganese	3	1	2	8	4
Shipments from Government stockpile: <sup>3</sup>					
Manganese ore	—	—	—	—	—
Ferromanganese	19	32	42	12	9
Consumption, reported:					
Manganese ore <sup>4</sup>	508	451	410	378	390
Ferromanganese	360	344	342	345	360
Silicomanganese	146	138	139	141	150
Consumption, apparent, manganese <sup>5</sup>	835	693	545	715	860
Price, average, 46% to 48% Mn metallurgical ore, dollars per metric ton unit, contained Mn:					
Cost, insurance, and freight (c.i.f.), U.S. ports <sup>e</sup>	4.49	3.53	3.41	6.19	9.60
China spot market (c.i.f.)	4.72	3.22	4.48	65.62	77.16
Stocks, producer and consumer, yearend: <sup>4</sup>					
Manganese ore	189	187	207	148	180
Ferromanganese	23	21	21	17	18
Silicomanganese	10	21	10	11	11
Net import reliance <sup>8</sup> as a percentage of apparent consumption	100	100	100	100	100

**Recycling:** Manganese was recycled incidentally as a constituent of ferrous and nonferrous scrap; however, scrap recovery specifically for manganese was negligible. Manganese is recovered along with iron from steel slag.

**Import Sources (2014–17):** Manganese ore: Gabon, 74%; South Africa, 13%; Australia, 8%; Mexico, 4%; and other, 1%. Ferromanganese: South Africa, 41%; Australia, 18%; Norway, 14%; Republic of Korea, 12%; and other, 15%. Silicomanganese: Georgia, 29%; South Africa, 26%; Australia, 18%; Mexico, 9%; and other, 18%. Manganese contained in principal manganese imports:<sup>9</sup> South Africa, 27%; Gabon, 21%; Australia, 14%; Georgia, 11%; and other, 27%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
			<b>12–31–18</b>
			Free.
	Ores and concentrates	2602.00.0040/60	4.7% ad val.
	Manganese dioxide	2820.10.0000	1.5% ad val.
	High-carbon ferromanganese	7202.11.5000	3.9% ad val.
	Ferrosilicon manganese (silicomanganese)	7202.30.0000	14% ad val.
	Metal, unwrought	8111.00.4700/4900	

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

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### Government Stockpile:<sup>10</sup>

Material	Inventory As of 9–30–18	FY2018		FY 2019	
		Potential Acquisitions	Potential Disposals <sup>11</sup>	Potential Acquisitions	Potential Disposals <sup>11</sup>
Manganese ore, metallurgical grade	292	—	292	—	292
Ferromanganese, high-carbon	203	—	45	—	45
Manganese metal, electrolytic	—	3	—	3	—

**Events, Trends, and Issues:** U.S. manganese apparent consumption was estimated to increase by 20% to 860,000 tons in 2018 compared with that in 2017. This was primarily a result of increases in U.S. ferromanganese and silicomanganese imports in response to the 6% increase in domestic steel production. In May 2018, the U.S. Department of the Interior, in coordination with other executive branch agencies, published a list of 35 critical minerals (83 FR 23295), including manganese. This list was developed to serve as an initial focus, pursuant to Executive Order 13817, “A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals” (82 FR 60835).

**World Mine Production and Reserves (manganese content):** Reserves for Australia, Brazil, China, Gabon, India, and South Africa were revised based on Government and industry sources.

	Mine production		Reserves <sup>12</sup>
	2017	2018 <sup>e</sup>	
United States	—	—	—
Australia	2,820	3,100	<sup>13</sup> 99,000
Brazil	1,160	1,200	110,000
China	1,700	1,800	54,000
Gabon	2,190	2,300	65,000
Ghana	810	850	13,000
India	734	770	33,000
Kazakhstan, concentrate	168	170	5,000
Malaysia	478	510	NA
Mexico	212	220	5,000
South Africa	5,400	5,500	230,000
Ukraine, concentrate	735	740	140,000
Other countries	898	940	Small
World total (rounded)	17,300	18,000	760,000

**World Resources:** Land-based manganese resources are large but irregularly distributed; those in the United States are very low grade and have potentially high extraction costs. South Africa accounts for about 74% of the world’s identified manganese resources, and Ukraine accounts for about 10%.

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

<sup>e</sup>Estimated. NA Not available. — 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>Imports more nearly represent amount consumed than does reported consumption.

<sup>3</sup>Defined as stockpile shipments – receipts, thousand tons, manganese content. If receipts, a negative quantity is shown.

<sup>4</sup>Exclusive of ore consumed directly at iron and steel plants and associated yearend stocks.

<sup>5</sup>Defined as imports – exports + adjustments for Government and industry stock changes, thousand tons, manganese content. To avoid double counting, manganese consumption is not calculated as the sum of manganese ore, ferromanganese, and silicomanganese consumption because manganese in ore is used to produce ferromanganese and silicomanganese.

<sup>6</sup>For average metallurgical-grade ore containing 44% manganese, as reported by CRU Group.

<sup>7</sup>Average weekly price through October 2018 for average metallurgical-grade ore containing 44% manganese, as reported by CRU Group.

<sup>8</sup>Defined as imports – exports + adjustments for Government and industry stock changes, thousand tons, manganese content.

<sup>9</sup>Includes imports of ferromanganese, manganese ore, silicomanganese, synthetic manganese dioxide, and unwrought manganese metal.

<sup>10</sup>See Appendix B for definitions.

<sup>11</sup>Disposals are defined as any barter, rotation, sale, or upgrade of National Defense Stockpile stock.

<sup>12</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>13</sup>For Australia, Joint Ore Reserves Committee-compliant reserves were about 46 million tons of manganese content.