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2023 Minerals Yearbook

MANGANESE [ADVANCE RELEASE]

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Manganese

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In 2023, U.S. manganese apparent consumption was estimated to be 653,000 metric tons (t) on a manganese content basis, a 19% decrease from consumption in 2022 (table 1). Exports of all types of manganese (gross weight) decreased to 18,700 t compared with 18,900 t in 2022 (table 4). Total manganese imports (gross weight) decreased by 35% to 884,000 t compared with 1,360,000 t in 2022 (table 5).

In 2023, average U.S. spot-market prices for high- and medium-carbon ferromanganese decreased by 44% and 50%, respectively, from those in 2022. The average U.S. spot-market price for silicomanganese decreased by 47% from that in 2022. The average domestic spot-market price for manganese metal decreased by 50% from that in 2022 (table 1).

World production of manganese ore (gross weight) decreased to 56.1 million metric tons (Mt) in 2023 from 56.4 Mt (revised) in 2022 (tables 1, 6). South Africa (34%), Gabon (18%), Australia (12%), and China (12%) were the leading producers of manganese ore on a gross-weight basis. Combined world production of ferromanganese and silicomanganese, excluding U.S. production, increased by 5% to 19.6 Mt on a gross-weight basis compared with 18.6 Mt (revised) in 2022. China was the leading producer of manganese ferroalloys, accounting for 69% of world production (table 7).

Manganese is essential to iron and steel production because of its sulfur-fixing, deoxidizing, and alloying properties. Steelmaking, including its ironmaking component, accounted for greater than 90% of the domestic manganese consumption (table 3). Among a variety of other uses, manganese was a key component of certain widely used aluminum alloys and was used in oxide or sulfate forms in batteries.

Government Actions and Legislation

Critical Minerals.—Manganese was included in the 2022 list of critical minerals published by the U.S. Geological Survey (USGS). The critical minerals list contains 50 mineral commodities critical to the domestic economy and national security based on a directive from the Energy Act of 2020 (U.S. Department of the Interior, 2022).

Stockpile.—The Annual Materials Plan (AMP) for fiscal year 2023 that the Defense Logistics Agency (DLA) Strategic Materials, U.S. Department of Defense, issued on October 4, 2022, covered the period from October 1, 2022, through September 30, 2023. Under this AMP, the maximum acquisition authority for manganese materials was 5,000 t of electrolytic manganese metal, and the maximum disposal authority for manganese materials was 151,000 t of manganese ore and 45,400 t of high-carbon ferromanganese (Defense Logistics Agency Strategic Materials, 2022a, b).

Production

Ore and Concentrate.—Manganese ore containing 20% or more manganese has not been produced domestically since 1970. The only mine production of manganese in the United States in 2023 consisted of small amounts of manganiferous material (clays or schists) that had a manganese content of less than 5%. This material was produced in South Carolina for use in coloring brick.

Chemicals and Ferroalloys.—Production statistics for these materials were withheld to avoid disclosing company proprietary data. Domestic producers of manganese ferroalloys and synthetic manganese dioxide in 2023 are listed in table 2.

Consumption

In 2023, reported domestic consumption of manganese ore was 321,000 t in 2023 compared with 357,000 t in 2022 (gross weight), and corresponding yearend stocks were estimated to be 233,000 t and 312,000 t, respectively (table 1). Reported consumption (gross weight) of ferromanganese was 336,000 t in 2023 compared with 339,000 t in 2022. Silicomanganese consumption decreased by 2% to 230,000 t in 2023 compared with 234,000 t in 2022. Reported manganese metal consumption was 21,800 t in 2023 (table 3).

Reported consumption statistics were derived from USGS voluntary surveys of U.S. operations. Data on domestic consumption of manganese ore, excluding that consumed by the steel industry, were collected by means of the "Manganese Ore and Products" survey. In 2023, six companies at seven locations were canvassed that processed ore or had processed ore in the past by such methods as grinding and roasting, or used manganese ore in the manufacture of dry cell batteries and manganese chemicals, ferroalloys, and metals. Of those seven facilities, five responded, and the data for the other two were estimated based on previous survey responses (table 1). The companies' collective consumption was considered to constitute all the manganese ore consumption in the United States, excluding that consumed directly by the steel industry.

A second survey covered a broad range of metal companies that consumed manganese metal, such as aluminum, nonferrous-alloy, and steel producers. More than 120 manganese consumers were canvassed on an annual basis in this survey. Reported consumption and stocks data for ferromanganese, silicomanganese, and manganese metal are reported in tables 1 and 3 and include estimates to account for nonrespondents.

Globally, steel production accounted for more than 90% of manganese consumption. Manganese consumption for battery materials has grown in recent years and accounted for almost 5% of global manganese consumption. High-purity manganese in the form of electrolytic manganese metal, electrolytic manganese dioxide, or manganese sulfate was used in battery

manufacturing. Relatively small quantities of manganese also were used for alloying with nonferrous metals, such as aluminum and copper. Nonferrous application alloys accounted for almost 3% of global consumption (Project Blue Group Ltd., 2024, p. 14–15). Other manganese uses included animal feed, fertilizers, and manganese chemicals.

Prices

Manganese Ore.—The only spot-market prices reported for manganese ore were for deliveries to China. In 2023, the average spot-market price for metallurgical-grade ore containing 44% manganese, based on weekly averages of China's cost, insurance, and freight transaction prices as reported by CRU Group, was $4.80 per metric ton unit, a 20% decrease from $5.97 per metric ton unit in 2022. [A metric ton unit is 1 t of ore containing 1% or 10 kilograms of manganese. The price of 1 t of ore (gross weight) is obtained by multiplying the metric-ton-unit price by the percentage manganese content of the ore; for example, multiplying by 46 when the manganese content is 46%.] The ore market consisted of a number of submarkets because of differences in ore-quality requirements by end use—blast furnace ironmaking, ferroalloys production, and manufacture of manganese chemicals.

Manganese Ferroalloys and Metal.—Prices for manganese ferroalloys tended to vary in response to changes in demand by the steel and ferrous foundry industries, whereas prices for manganese metal predominantly followed changes in demand by the aluminum industry. Manganese ferroalloy prices were influenced also by changes in the product mix of the world's suppliers because various manganese ferroalloys are largely interchangeable with each other.

Annual average prices for manganese ferroalloys were reported by S&P Global Platts Metals Week. These prices were based on free market spot prices per unit of measurement, duty-paid in a U.S. warehouse. Annual average prices were $1,333.33 per gross ton for high-carbon ferromanganese, 120.03 cents per pound for medium-carbon ferromanganese, and 64.78 cents per pound for silicomanganese. These prices were 44%, 50%, and 47% lower for high-carbon ferromanganese, medium-carbon ferromanganese, and silicomanganese, respectively, compared with those in 2022. The annual average North American transaction price for manganese metal as reported by CRU Group was 157.79 cents per pound, which decreased by 50% from that in 2022 (table 1).

Foreign Trade

The U.S. net import reliance as a percentage of apparent consumption was 100% for manganese ore containing greater than 20% manganese; this is the same as it had been since 1970. The ensuing comparisons of foreign trade data were made based on gross weight.

In 2023, U.S. exports (gross weight) of all manganese products decreased to 18,700 t compared with 18,900 t in 2022 (table 4). Exports of silicomanganese increased by 19% to 3,630 t. Exports of ferromanganese (all grades) decreased by 29% to 2,020 t; manganese dioxide exports decreased by 8% to 7,480 t; and manganese metal (including alloys and waste and scrap) exports decreased to 4,000 t from 4,020 t in 2022. Canada was the leading destination for most manganese product exports in 2023, accounting for 96% of ferromanganese, 99% of silicomanganese, 60% of manganese dioxide, and 58% of manganese ore. Manganese metal exports went to Malaysia (59%), India (11%), and Mexico (8%).

In 2023, U.S. imports (gross weight) of manganese products decreased by 35% to 884,000 t in 2023 compared with 1,360,000 t in 2022 (table 5). Imports of potassium permanganate increased by 192% to 3,430 t, and unwrought manganese metal increased by 30% to 53,600 t. Imports of manganese ore (all grades) decreased by 57% to 245,000 t; wrought manganese metal products decreased by 49% to 242 t; manganese waste and scrap decreased by 44% to 226 t; silicomanganese decreased by 39% to 257,000 t; manganese dioxide decreased by 11% to 3,500 t; and ferromanganese (all grades) decreased by 3% to 320,000 t.

World Industry Structure

World manganese ore production was 56.1 Mt (gross weight) in 2023 compared with 56.4 Mt (revised) in 2022 (table 6). On a manganese content basis, world manganese ore production was 19.5 Mt in 2023, a slight decrease compared with 20.0 Mt (revised) in 2022. On a gross-weight basis, the leading producing countries were South Africa (34%), Gabon (18%), and Australia and China (12% each). On a manganese-content basis, the leading producing countries of manganese ore were South Africa (37%), Gabon (23%), and Australia (15%), together accounting for 75% of world production.

Excluding the United States, total world manganese ferroalloy production was 19.6 Mt (gross weight) in 2023, 5% more than the 18.6 Mt (revised) in 2022 (table 7). On a gross-weight basis, the leading producer of manganese ferroalloys was China (69%), followed by India (8%) and Russia (4%).

The International Manganese Institute (IMnI) estimated that world apparent consumption of manganese ferroalloys (gross weight) increased by 10% to 22.8 Mt in 2023 compared with 20.8 Mt (revised) in 2022 (International Manganese Institute, 2024). Of the 22.8 Mt consumed in 2023, 17.5 Mt was silicomanganese, 3.90 Mt was high-carbon ferromanganese, and 1.50 Mt was refined (medium- and low-carbon) ferromanganese. IMnI's estimate for world manganese ferroalloys production in 2023 was 23.2 Mt, slightly more than its estimate for ferroalloys apparent consumption (22.8 Mt). The IMnI estimated world manganese ore apparent consumption in 2023 to be 47.7 Mt (gross weight), which was 8% less than the estimate of 51.9 Mt for 2022.

World Review

Australia.—Australia was the world's third leading producer of manganese ore in 2023, producing 6.93 Mt in gross weight (table 6). In December 2023, the United States enacted the National Defense Authorization Act of 2024, which amended the definition of a domestic source for Title III – Expansion of Productive Capacity and Supply of the U.S. Defense Production Act to include Australia and the United Kingdom. This amendment allowed Australia-based businesses to be eligible for loans, grants, and contracts directed by the U.S. Department

of Defense to support sectors critical to the United States' national security, which included critical-minerals supply chains (Australian Government Department of Defence, 2023; U.S. Congress, 2023, p. 415).

China.—China was the world's leading producer of ferromanganese and silicomanganese in 2023. China's ferromanganese production was estimated to be 2.16 Mt, and its silicomanganese production was 11.3 Mt, a 3% and 13% increase, respectively, from that in 2022 (table 7). China was also the world's leading producer of electrolytic manganese metal (EMM) and high-purity manganese sulfate monohydrate (HP MSM), which were used in the battery industry (International Manganese Institute, 2024).

The leading EMM producer in China, Ningxia Tianyuan Manganese Industry, declared bankruptcy in September 2023. The insolvency was a result of market instability and financial difficulties at the company (Cefai, 2023).

Czechia.—Euro Manganese Inc. (Canada) announced the successful production of HP MSM at its Chvaletice demonstration plant in Czechia. According to the company, Chvaletice was the only large source of manganese in the European Union (Euro Manganese Inc., 2023).

Gabon.—Gabon was the world's second-ranked producer of manganese ore in 2023, producing 10.0 Mt on a gross-weight basis (table 6). On August 30, a military coup led to the removal of the President of Gabon. The coup caused only limited disruption in the country's manganese production because Eramet Group, a France-based company and leading producer of manganese ore in Gabon, temporarily suspended operations for just 1 day (Schulz, 2023). In December, Eramet announced a 10-year agreement to supply manganese ore from its Gabon mine to Vibrantz Technologies Inc. to produce HP MSM for electric vehicle batteries (Business Wire, 2023).

Guyana.—In 2023, Guyana produced 315,000 t of manganese ore (gross weight). In 2022, after nearly 54 years, Guyana Manganese Inc., a wholly owned subsidiary of Bosai Group (China), restarted production of manganese ore at the Matthews Ridge Mine in northwest Guyana. The company reported that the mine had a capacity of 2.5 million metric tons per year (Mt/yr) with an average manganese oxide content of 38% (table 6; Stabroek News, 2022; Bosai Minerals Group Co., Ltd., undated).

India.—India was the world's second-ranked producer of ferromanganese, producing 1.27 Mt in 2023, a 20% increase from that in 2022. India was the third-ranked producer of silicomanganese, producing 323,000 t in 2023 compared with 325,000 t in 2022 (table 7). India also produced 2.97 Mt (gross weight) of manganese ore in 2023, accounting for 5% of world production (table 6).

Morocco.—In March, Elcora Advanced Materials Corp. (Canada) received a manganese exploitation license from the Government of Morocco for the Atlas Fox deposit. The Atlas Fox deposit had been mined until the mid-1950s when French rule ended in Morocco. The new exploitation license allowed Elcora to mine, extract, process, and sell manganese from the area. Production capacity of the mine was estimated to be 2,500 metric tons per month with an average grade of 37% manganese. In June, Elcora delivered its first order of 500 t of manganese ore (Elcora Advanced Materials Corp., 2023; Global Newswire, 2023).

Namibia.—In June, the Government of Namibia banned the export of unprocessed critical minerals—lithium, cobalt, manganese, graphite, and rare-earth minerals—in order to maximize the value of its mineral resources (Shanghai Metals Market, 2023).

South Africa.—South Africa was the world's leading producer of manganese ore in 2023, producing 19.1 Mt (gross weight) compared with 19.0 Mt in 2022 (table 6).

Transnet SOC Ltd., a rail, port, and pipeline company, completed its evaluation to allocate 2 Mt/yr of manganese export capacity to six emerging mines through the Manganese Export Capacity Allocation (MECA) III process. This allocation was expected to increase the share for emerging mining companies to 25% from the previous 12.5%. The list of new emerging mining companies excluded major companies such as South32 Ltd. (Australia), Anglo American plc (United Kingdom), and Assmang Proprietary Ltd. (South Africa) (News24, 2022; Transnet SOC Ltd., 2023).

Ukraine.—Ukraine ferromanganese and silicomanganese production in 2023 decreased by 28% and 44%, respectively, compared with that in 2022 (table 7). JSC Nikopol Ferroalloy Plant temporarily suspended operations in November owing to damage to its facilities from Russian artillery (GMK Center, 2023). Additionally, Pokrovskiy HZK, Ukraine's leading manganese ore producer, suspended mining operations indefinitely owing to the rising costs of logistics amid the ongoing conflict with Russia (Ukrainian Journal, 2023).

Outlook

More than 90% of manganese consumption is by the steel industry. Global crude steel consumption in 2023 was 1.8 billion metric tons (Gt), unchanged from that in 2022 (World Steel Association, 2024). Future consumption of manganese is expected to continue to be determined largely by demand for steel, and 2024 consumption of steel is estimated to be 1.8 Gt.

The change of gross domestic product (GDP), used to measure a nation's economic activity, can be considered as an indicator of construction activity that is correlated with steel manufacturing industries. The global GDP growth was forecasted to be 2.6% for both 2023 and 2024, lower than the 3% growth in 2022 (World Bank, The, 2024 p. 4). The U.S. Federal Reserve projects domestic GDP growth to be 2.1% in 2024, lower than 3.1% in 2023 (Board of Governors of the Federal Reserve System, 2024). Further details of the outlook for the steel industry are discussed in the "Outlook" section of the Iron and Steel chapter of the 2023 U.S. Geological Survey Minerals Yearbook, volume I, Metals and Minerals.

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TABLE 1
SALIENT MANGANESE STATISTICS[1]

(Thousand metric tons, gross weight, unless otherwise specified)

		2019	2020	2021	2022	2023
United States:						
Manganese ore (20% or more manganese):						
Production		--	--	--	--	--
Exports		1	1	1	1	2
Imports for consumption		434	367	497	566	245
Consumption[e, 2]		442	378	399	357	321
Stocks, December 31, consumers[e, 2]		175	143	220	312	233
Ferromanganese:						
Production		W	W	W	W	W
Exports		5	5	9	3	2
Imports for consumption		332	223	329	330	320
Consumption[e]		336	325	335	339	336
Stocks, December 31, consumers and producers[e]		44	35	40	50 [r]	27
Silicomanganese:						
Production		W	W	W	W	W
Exports		2	2	5	3	4
Imports for consumption		351	269	313	420	257
Consumption[e]		143 [3]	229	237	234	230
Stocks, December 31, consumers and producers[e]		39	31	34	26	18
Consumption, apparent, manganese content[e, 4]		748	621	717	804 [5]	653 [5]
Price, average:						
Ferromanganese, high-carbon[6]	dollars per gross ton	1,311.14	1,145.92	2,024.53	2,369.74	1,333.33
Ferromanganese, medium-carbon[6]	cents per pound	109.70	90.93	164.66	239.96	120.03
Manganese metal[7]	do.	115.72	99.49	249.59	318.47	157.79
Manganese ore[8]	lollars per metric ton unit	5.63	4.59	5.27	5.97	4.80
Silicomanganese[6]	cents per pound	62.36	52.40	92.08	121.21 [r]	64.78
World, production of manganese ore[9]		60,700 [r]	59,100 [r]	59,200 [r]	56,400	56,100

[e]Estimated. [r]Revised. do. Ditto. W Withheld to avoid disclosing company proprietary data. -- Zero.
[1]Table includes data available through August 14, 2024. Data are rounded to no more than three significant digits, except prices.
[2]Exclusive of iron and steel plants.
[3]U.S. Geological Survey evaluation indicates that silicomanganese consumption was considerably understated.
[4]Based on estimates of average content for all significant components.
[5]U.S. Government National Defense Stockpile inventory statistics are no longer available and are not included in the calculation of apparent consumption.
[6]Source: S&P Global Platts Metals Week based on monthly averages.
[7]Source: CRU Group North American transaction prices based on monthly averages.
[8]Source: CRU Group, cost, insurance, and freight, China, 44% manganese metallurgical ore.
[9]May include estimated data.

TABLE 2
DOMESTIC PRODUCERS OF PRINCIPAL MANGANESE PRODUCTS IN 2023

Company	Plant location	Products[1]			Type of process
		FeMn	SiMn	MnO_2	
Borman Specialty Materials	Henderson, NV			X	Electrolytic.
Energizer Holdings, Inc., Energizer Battery Inc.	Marietta, OH			X	Do.
Eramet Marietta, Inc.	do.	X	X		Electric furnace.
Felman Production, LLC	Letart, WV	X	X		Do.
Vibrantz Technologies Inc.	Baltimore, MD			X	Chemical.
Do.	New Johnsonville, TN			X	Electrolytic.

Do., do. Ditto.
[1]FeMn, ferromanganese; SiMn, silicomanganese; MnO_2, synthetic manganese dioxide.

TABLE 3
U.S. CONSUMPTION, BY END USE, AND INDUSTRY STOCKS OF MANGANESE FERROALLOYS AND METAL IN 2023[1, 2]

(Metric tons, gross weight)

End use	Ferromanganese		Silicomanganese	Manganese metal
	High carbon	Medium and low carbon		
Steel:				
Carbon	W	W	179,000	W
High-strength, low-alloy	W	W	(3)	--
Stainless and heat-resisting	6,430	W	14,900	992
Full alloy	W	W	15,800	W
Unspecified[4]	W	W	(3)	W
Total	W	W	230,000	W
Cast irons	6,180	W	W	W
Superalloys	W	W	--	105
Alloys (excluding alloy steels)	W	W	W	W [5]
Miscellaneous and unspecified	W	W	W	W
Grand total	W	W	230,000	21,800
Total manganese content[6]	W	W	152,000	21,800
Stocks, December 31, 2023, consumers and producers	W	W	18,200	W

W Withheld to avoid disclosing company proprietary data. -- Zero.
[1]Table includes data available through August 9, 2024. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes U.S. Geological Survey estimates.
[3]Included with "Steel: Total," to avoid disclosing company proprietary data.
[4]Includes electrical and tool steel.
[5]Primarily aluminum alloys.
[6]Estimated based on the following typical percentages of manganese content: high-carbon ferromanganese (80%); medium- and low-carbon ferromanganese (84%); silicomanganese (66%); and manganese metal (100%).

TABLE 4

U.S. EXPORTS OF MANGANESE ORE, FERROALLOYS, METAL, AND MANGANESE DIOXIDE, BY COUNTRY OR LOCALITY[1]

Country or locality	2022		2023	
	Gross weight (metric tons)	Value (thousands)	Gross weight (metric tons)	Value (thousands)
Ore and concentrates with 20% or more manganese:				
Canada	377	$280	931	$462
Guyana	56	139	170	101
Ireland	--	--	5	28
Korea, Republic of	220	189	313	678
Mexico	185	70	178	100
Netherlands	51	241	--	--
Sweden	--	--	7	4
United Kingdom	6	3	--	--
Total	895	921	1,600	1,370
Ferromanganese, all grades:[2]				
Australia	--	--	10	28
Canada	2,640	6,370	1,930	4,250
China	11	29	19	61
France	10	20	15	29
Guyana	12	34	11	32
Japan	--	--	1	8
Mexico	112	363	24	40
Poland	--	--	1	17
Slovenia	1	11	3	27
United Kingdom	12	22	4	7
Other [9 countries and (or) localities]	58 r	120 r	--	--
Total	2,860	6,970	2,020	4,490
Silicomanganese:				
Canada	3,020	5,250	3,610	4,960
Italy	--	--	8	11
Mexico	29	60	19	30
Total	3,050	5,310	3,630	5,000
Metal, including alloys and waste and scrap:[2]				
Brazil	1	51	38	14
Canada	405	2,180	229	962
China	204	5,480	152	1,510
Costa Rica	2	106	221	119
France	16	87	42	255
Germany	75	55	32	139
India	328	378	434	519
Japan	172	1,030	125	721
Malaysia	2,580	1,870	2,360	1,750
Mexico	158	549	303	768
Other [18 countries and (or) localities]	81 r	886 r	56	842
Total	4,020	12,700	4,000	7,600
Manganese dioxide:[2]				
Brazil	84	335	119	482
Canada	4,890	4,260	4,510	3,530
El Salvador	267	333	217	330
Guyana	3	26	126	168
India	7	32	762	370
Israel	553	744	228	499
Italy	379	741	168	670
Mexico	648	805	449	536
Poland	100	374	101	403
United Kingdom	575	842	679	836
Other [21 countries and (or) localities]	596 r	1,920 r	126	577
Total	8,100	10,400	7,480	8,400

rRevised. -- Zero.

[1]Table includes data available through August 9, 2024. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Presentation of data is based on the 2023 annual quantities (gross weight) of the leading countries and (or) localities.

Source: U.S. Census Bureau.

TABLE 5

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY OR LOCALITY[1]

Country or locality	2022			2023		
	Quantity		Value, customs (thousands)	Quantity		Value, customs (thousands)
	Gross weight (metric tons)	Mn content (metric tons)		Gross weight (metric tons)	Mn content (metric tons)	
Ore and concentrates with 20% or more manganese:						
All grades:[2]						
Belgium	--	--	--	116	46	$54
Brazil	214	106	$137	155	75	243
China	--	--	--	84	39	21
France	16	9	25	17	8	25
Gabon	269,000	173,000	74,600	224,000	126,000	50,600
India	--	--	--	202	98	239
Malta	--	--	--	6	3	3
Mexico	77,600	29,400	15,100	15,000	5,930	2,460
Morocco	16	9	30	--	--	--
South Africa	219,000	85,000	36,300	5,600	2,610	1,550
Other [2 countries and (or) localities]	330	95	134	--	--	--
Total	566,000	287,000	126,000	245,000	135,000	55,200
More than 20% but less than 47% manganese:						
Belgium	--	--	--	116	46	54
China	--	--	--	84	39	6
Malta	--	--	--	6	3	3
Mexico	77,000	28,900	14,500	14,300	5,470	1,890
Netherlands	244	61	71	--	--	--
Slovakia	53	16	19	--	--	--
South Africa	215,000	83,500	35,200	3,740	1,650	1,090
Total	293,000	112,000	49,700	18,200	7,210	3,050
47% or more manganese:						
Brazil	214	106	137	155	75	243
China	--	--	--	(3)	(3)	15
France	16	9	25	17	8	25
Gabon	269,000	173,000	74,600	224,000	126,000	50,600
India	--	--	--	202	98	239
Mexico	679	467	624	700	456	573
Morocco	16	9	30	--	--	--
Netherlands	33	18	44	--	--	--
South Africa	3,100	1,520	1,140	1,860	961	461
Total	273,000	175,000	76,600	227,000	127,000	52,100
Ferromanganese:						
All grades:[2]						
Australia	53,100	40,600	119,000	43,000	32,900	42,200
Brazil	262	192	558	433	318	532
India	43,700	32,800	66,700	34,400	22,200	35,600
Japan	1,370	1,110	3,890	920	749	1,650
Korea, Republic of	47,000	37,500	117,000	33,800	27,500	55,200
Malaysia	70,200	53,200	139,000	105,000	79,600	125,000
Mexico	8,050	6,390	23,700	5,300	4,230	10,100
Norway	40,500	32,800	101,000	56,300	45,600	88,600
South Africa	43,800	34,300	119,000	38,300	30,300	66,700
Zambia	899	691	1,320	1,480	1,120	1,640
Other [16 countries and (or) localities]	21,200 r	16,200 r	43,000 r	1,160	887	2,370
Total	330,000	256,000	734,000	320,000	245,000	430,000
1% or less carbon:[2]						
Canada	15	12	39	13	11	50
India	--	--	--	63	51	93
Japan	1,370	1,110	3,890	920	749	1,650
Korea, Republic of	5,250	4,580	19,100	8,790	7,710	20,000
Mexico	3,900	3,150	12,800	3,800	3,070	6,780
Norway	32,800	26,600	84,900	28,700	23,200	48,100

See footnotes at end of table.

TABLE 5—Continued

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY OR LOCALITY[1]

Country or locality	2022			2023		
	Quantity		Value, customs (thousands)	Quantity		Value, customs (thousands)
	Gross weight (metric tons)	Mn content (metric tons)		Gross weight (metric tons)	Mn content (metric tons)	
Ferromanganese:—Continued						
1% or less carbon:[2]—Continued						
South Africa	3,220	2,630	5,190	2,360	2,020	6,700
Spain	370	299	1,160	61	50	291
Taiwan	--	--	--	3	3	12
Vietnam	--	--	--	80	75	187
Other [3 country and (or) locality]	334 r	271 r	975 r	1	1	4
Total	47,300	38,700	128,000	44,800	37,000	83,900
More than 1% but not more than 2% carbon:						
Canada	20	16	188	--	--	--
China	--	--	--	3	2	9
India	19	15	33	489	391	933
Italy	8	6	12	--	--	--
Korea, Republic of	30,600	24,500	77,900	20,000	16,000	29,700
Malaysia	--	--	--	2,340	1,730	3,160
Mexico	4,030	3,150	10,700	1,500	1,160	3,340
Norway	5,200	4,240	12,400	27,600	22,400	40,500
South Africa	19,000	15,000	59,700	21,500	17,200	37,400
Thailand	--	--	--	228	191	647
Total	58,800	47,000	161,000	73,600	59,000	116,000
More than 2% but not more than 4% carbon:						
China	--	--	--	27	21	28
India	--	--	--	108	82	106
South Africa	199	156	186	--	--	--
Total	199	156	186	135	103	134
More than 4% carbon:[2]						
Australia	53,100	40,600	119,000	43,000	32,900	42,200
Brazil	262	192	558	433	318	532
Canada	76	55	224	86	60	242
Georgia	--	--	--	324	235	292
India	43,700	32,800	66,700	33,700	21,700	34,500
Korea, Republic of	11,100	8,440	20,500	5,000	3,800	5,480
Malaysia	70,200	53,200	139,000	103,000	77,900	122,000
South Africa	21,400	16,500	54,000	14,500	11,100	22,700
United Arab Emirates	--	--	--	151	114	161
Zambia	899	691	1,320	1,480	1,120	1,640
Other [9 countries and (or) localities]	23,000 r	17,600 r	44,000 r	188	125	444
Total	224,000	170,000	445,000	202,000	149,000	230,000
Silicomanganese:[2]						
Australia	62,900	41,500	161,000	50,400	31,800	64,700
Georgia	114,000	82,300	246,000	36,800	25,500	44,900
India	33,700	21,800	48,700	3,250	1,830	4,950
Malaysia	46,200	30,300	94,900	30,700	20,500	35,600
Mexico	32,300	20,800	45,300	39,000	25,000	43,300
Norway	24,600	15,800	53,100	10,900	6,760	18,800
South Africa	89,800	58,300	98,900	85,800	55,700	93,000
Spain	3,340	2,170	6,500	160	104	226
Vietnam	--	--	--	50	33	56
Zambia	150	99	164	498	298	482
Other [8 countries and (or) localities]	13,100 r	4,700 r	26,000 r	29	18	53
Total	420,000	278,000	780,000	257,000	168,000	306,000

See footnotes at end of table.

TABLE 5—Continued

U.S. IMPORTS FOR CONSUMPTION OF MANGANESE ORE, FERROALLOYS, METAL, AND SELECTED CHEMICALS, BY COUNTRY OR LOCALITY[1]

Country or locality	2022			2023		
	Quantity		Value, customs (thousands)	Quantity		Value, customs (thousands)
	Gross weight (metric tons)	Mn content (metric tons)		Gross weight (metric tons)	Mn content (metric tons)	
Metal:						
Unwrought:[2, 4]						
Belgium	--	XX	--	44	XX	148
Canada	--	XX	--	40	XX	137
China	33,400	XX	131,000	43,500	XX	98,300
Germany	777	XX	4,020	197	XX	490
Indonesia	260	XX	1,130	2,100	XX	3,970
Japan	62	XX	6,820	68	XX	5,020
Mexico	102	XX	938	111	XX	652
Poland	--	XX	--	(3)	XX	3
South Africa	6,590	XX	38,200	7,520	XX	28,500
Spain	153	XX	342	--	XX	--
Other [1 country and (or) locality]	25 r	XX	148 r	--	XX	--
Total	41,400	XX	183,000	53,600	XX	137,000
Other manganese, wrought:						
Canada	--	XX	--	2	XX	28
China	44	XX	185	7	XX	68
Germany	157	XX	2,230	(3)	XX	26
India	(3)	XX	9	1	XX	38
Japan	(3)	XX	61	3	XX	82
Mexico	152	XX	1,170	198	XX	1,040
Sweden	121	XX	2,110	30	XX	545
United Kingdom	(3)	XX	6	(3)	XX	2
Total	474	XX	5,770	242	XX	1,830
Waste and scrap:						
Canada	397	XX	206	206	XX	135
China	(3)	XX	4	20	XX	46
India	(3)	XX	3	--	XX	--
Japan	6	XX	35	--	XX	--
Total	403	XX	247	226	XX	181
Manganese dioxide:[2]						
Belgium	65	XX	284	83	XX	142
Brazil	135	XX	178	290	XX	380
China	155	XX	294	49	XX	84
Colombia	17	XX	44	998	XX	2,390
Germany	11	XX	68	28	XX	70
Greece	990	XX	3,110	1,490	XX	3,980
Japan	2,340	XX	5,950	407	XX	930
Mexico	21	XX	35	37	XX	62
Morocco	--	XX	--	19	XX	25
Spain	130	XX	221	58	XX	98
Other [4 countries and (or) localities]	54 r	XX	92 r	42	XX	81
Total	3,920	XX	10,300	3,500	XX	8,240
Potassium permanganate:						
Canada	(3)	XX	2	--	XX	--
India	1,100	XX	3,220	3,360	XX	10,900
Japan	78	XX	150	--	XX	--
Malaysia	--	XX	--	68	XX	127
United Kingdom	--	XX	--	1	XX	4
Total	1,170	XX	3,370	3,430	XX	11,100

rRevised. XX Not applicable. -- Zero.

[1]Table includes data available through August 9, 2024. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Presentation of data is based on the 2023 annual quantities (gross weight) of the leading countries and (or) localities.

[3]Less than ½ unit.

[4]Imports of unwrought metal include flake, powder, and other.

Source: U.S. Census Bureau.

TABLE 6
MANGANESE ORE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1, 2]

(Thousand metric tons)

Country or locality[3]	2019	2020	2021	2022	2023
Australia:[4, 5]					
Gross weight	7,545	7,976	7,900	7,169	6,926
Manganese (Mn) content, 37% to 53% Mn	3,177	3,331	3,252	3,044	2,856
Brazil:					
Gross weight	3,697 r	2,469	1,880 r	1,515 r	1,600
Mn content, 21% to 51% Mn	1,452	933	597 r	530 r	580 e
Bulgaria:[5]					
Gross weight	--	--	24	--	--
Mn content, 25% to 35% Mn	--	--	7	--	--
Burkina Faso:					
Gross weight	9 e	30 e	21 r	5 r	-- e
Mn content, 36% to 51% Mn	4 e	13	11 r	2 r	-- e
Burma:[5]					
Gross weight	1,100	630	515	518	585
Mn content, 39% to 40% Mn	430	250	155 r	155 r	175
China:[5, 6]					
Gross weight	10,325	12,856	8,000	6,500	6,710
Mn content, 13% to 20% Mn	1,311	1,670	880	715 r	767
Congo (Kinshasa), gross weight	11	--	21	15	7
Côte d'Ivoire:[5]					
Gross weight	1,175	1,280	905	986	892
Mn content, 41% to 45% Mn	482	525	362	394	357
Egypt:[5]					
Gross weight	36	15	54 r	62 r	12
Mn content, 30% to 40% Mn	12	5	18 r	20 r	4
Gabon:[5]					
Gross weight	6,169	7,916	9,643	10,375	9,968
Mn content, 45% to 53% Mn	2,759	3,572	4,354	4,671	4,490 e
Georgia, concentrate:[5]					
Gross weight	461	549	596	398 r	268
Mn content, 37% to 40% Mn	175	209	227	151 r	102
Ghana:					
Gross weight	5,383	2,358	3,336	3,172 r	3,002
Mn content, 27% to 30% Mn[5]	1,554	637	911	844	818
Guyana:					
Gross weight	--	--	--	278	315
Mn content, 38% Mn	--	--	--	106	120
India:					
Gross weight	2,975 r	2,316 r	2,899 r	2,525 r	2,974
Mn content, 10% to 58% Mn[5]	962	548	495	730 r	744
Indonesia:[5]					
Gross weight	--	158	19	138	41
Mn content, 28% to 44% Mn	--	55	6	48	14
Iran:					
Gross weight	131 e	25 [5]	106 [5]	77 [5]	193 [5]
Mn content, 30% to 43% Mn	53 e	7 [5]	29 [5]	21 [5]	52 [5]
Kazakhstan, concentrate:					
Gross weight	460	276	371	390	390 e
Mn content, 33% to 36% Mn	152 e	91 e	122	129	130
Malaysia:					
Gross weight	1,131	870	669 r	916 [5]	1,518 [5]
Mn content, 32% to 45% Mn	441 e	339 e	261 r, e	247 [5]	410 [5]
Mexico:					
Gross weight	576 e	575 e	580	582	568 [5]
Mn content, 34% to 38% Mn[7]	219	219	221	221	224 [5]

See footnotes at end of table.

TABLE 6—Continued
MANGANESE ORE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1, 2]

(Thousand metric tons)

Country or locality[3]	2019	2020	2021	2022	2023
Morocco:					
Gross weight	71	50 [5]	83 [r]	89 [r]	86 [5]
Mn content, 47% to 53% Mn[8]	38 [e]	24 [5]	35 [r, 5]	43 [r, 5]	38 [5]
Namibia:					
Gross weight[e]	92	106	88	66	12
Mn content, 35% Mn	32	37	31	23	4
Nigeria:					
Gross weight	1	20	57	57 [r, e]	57 [e]
Mn content, 25% to 37% Mn[e]	-- [r]	7	21	21 [r]	21
Oman:					
Gross weight	50	15	15	14 [r]	15
Mn content, 21% to 27% Mn[e]	13	4	4	4	4
Romania, ore:					
Gross weight	52	20	20	30	4 [5]
Mn content, 11% to 24% Mn	9	4	4	6 [r, e]	1 [5]
South Africa, metallurgical:					
Gross weight, all forms	17,002	16,199	19,063 [r]	18,967	19,078
Mn content, 30% to 48% Mn[e]	6,600	6,200	7,300	7,300	7,300
Sudan:[e]					
Gross weight	40	--	--	--	--
Mn content, 29% to 33% Mn	10	--	--	--	--
Thailand:					
Gross weight	5	1	--	1	3 [5]
Mn content, 44% to 50% Mn	2 [e]	1 [e]	--	-- [r, e]	1 [5]
Turkey:					
Gross weight	45 [5]	40 [5]	87 [r]	105 [r]	102
Mn content, 30% to 40% Mn	16 [5]	14 [5]	30 [r, e]	37 [r, e]	36 [e]
Ukraine:					
Gross weight	1,687	1,888	1,760	950 [e]	359 [5]
Mn content, 30% to 35% Mn	574 [e]	642 [e]	600 [e]	323 [e]	126 [5]
Uzbekistan, Mn content, 30% to 44% Mn	2	2	-- [r]	-- [r]	2 [5]
Vietnam:[5]					
Gross weight	246	279	339	362	237
Mn content, 43% Mn	106	120	146	155	102
Zambia:					
Gross weight[9]	257	186	132 [r]	159 [r]	171
Mn content, 27% to 44% Mn[e]	113	82	58 [r]	70 [r]	75
Total:					
Gross weight	60,700 [r]	59,100 [r]	59,200 [r]	56,400 [r]	56,100
Mn content	20,700	19,500	20,100 [r]	20,000 [r]	19,500

[e]Estimated. [r]Revised. -- Zero.

[1]Table includes data available through August 14, 2024. All data are reported unless otherwise noted; totals may include estimated data. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Data pertain to concentrates or comparable shipping product, possibly after some upgrading.

[3]In addition to the countries and (or) localities listed, Cuba, Greece, Pakistan, Panama, and Peru may have produced manganese ore and (or) manganiferous ore, but available information was inadequate to make reliable estimates of output.

[4]Metallurgical ore.

[5]Reported by the International Manganese Institute.

[6]Includes manganiferous ore.

[7]Mostly oxide nodules; may include smaller quantities of direct-shipping carbonate and oxide ores for metallurgical and battery operations, and sinter.

[8]Manganese content estimated to be 84% for manganese dioxide (MnO_2).

[9]Imports received by all countries from Zambia. Source: UN Comtrade.

TABLE 7
FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Metric tons, gross weight)

Country or locality[2]	2019	2020	2021	2022	2023
Australia:[3]					
Ferromanganese	114,000	84,000	90,000 r	123,000 r	60,000
Silicomanganese	95,000	101,000 r	99,000 r	94,000 r	81,000
Total	209,000	185,000 r	189,000 r	217,000 r	141,000
Brazil:[3]					
Ferromanganese	120,000	85,000	80,000	72,000 r	87,000
Silicomanganese	216,000	206,000	202,000 r	205,000	197,000
Total	336,000	291,000	282,000 r	277,000 r	284,000
China:					
Ferromanganese[e]					
Blast furnace	290,000	281,000	294,000	294,000 r	301,980
Electric furnace	1,770,000	1,730,000	1,810,000	1,809,000 r	1,860,000
Silicomanganese	12,600,000	11,380,000	10,650,000	10,010,000	11,300,000
Total	14,660,000	13,391,000	12,754,000	12,113,000 r	13,461,980
Egypt, ferromanganese[3]	12,000	6,000	19,000 r	23,000 r	5,000
France:[3]					
Ferromanganese	115,474 r	68,281 r	108,000	119,000 r	74,000
Silicomanganese	67,665 r	62,052 r	68,000 r	46,000	41,000
Total	183,139 r	130,333 r	176,000 r	165,000 r	115,000
Gabon, silicomanganese	43,000 3	38,000 3	44,000 3	43,000 3	39,100
Georgia, silicomanganese	291,600	217,500	356,300	397,700	274,000
India:					
Ferromanganese[3]	542,000	567,000	1,033,000 r	1,061,000 r	1,269,000
Silicomanganese	322,966 r	324,748 r	347,963 r	325,337 r	322,890
Total	864,966 r	891,748 r	1,380,963 r	1,386,337 r	1,591,890
Indonesia, silicomanganese[3]	22,000	61,000	33,000	24,000	46,000
Japan:					
Ferromanganese	462,740	400,331	440,173	405,899	408,000 3
Silicomanganese[3]	31,000	16,000	14,000	17,000	14,000
Total	493,740	416,331	454,173	422,899	422,000 3
Kazakhstan, silicomanganese	123,464	122,743	132,119	191,945 r	190,000 e
Korea, Republic of:					
Ferromanganese	317,478	258,787	407,516	372,490 r	193,446
Silicomanganese	137,852	149,196	146,289	151,263 r	113,045
Total	455,330	407,983	553,805	523,753 r	306,491
Malaysia:[3]					
Ferromanganese	266,000	215,000	173,000 r	249,000 r	278,000
Silicomanganese	312,000	302,000	335,000 r	328,000	373,000
Total	578,000	517,000	508,000 r	577,000 r	651,000
Mexico:[3]					
Ferromanganese	73,000	58,000	72,000	73,000	54,000
Silicomanganese	154,000	148,000	171,000	175,000 r	149,000
Total	227,000	206,000	243,000	248,000 r	203,000
Norway:[3]					
Ferromanganese	337,000	278,000	303,000	278,000	310,000
Silicomanganese	287,000	262,000	307,000	342,000 r	295,000
Total	624,000	540,000	610,000	620,000 r	605,000
Russia:					
Ferromanganese	273,000	238,000	208,000 r, 3	203,000 3	172,000 3
Silicomanganese	51,774	--	406,000 3	454,000 r, 3	527,000 3
Total	324,774	238,000	614,000 r, 3	657,000 r, 3	699,000 3
Saudi Arabia:[3]					
Ferromanganese	12,000	9,000	9,000	9,000	9,000
Silicomanganese	63,000	35,000	48,000	40,000	56,000
Total	75,000	44,000	57,000	49,000	65,000

See footnotes at end of table.

TABLE 7—Continued
FERROMANGANESE AND SILICOMANGANESE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Metric tons, gross weight)

Country or locality[2]	2019	2020	2021	2022	2023
Slovakia:					
Ferromanganese	46,513	24,046	30,929	19,127 r	15,000 e
Silicomanganese	26,187	33,812	48,590	5,402 r	4,000 e
Total	72,700	57,858	79,519	24,529 r	19,000 e
South Africa:[3]					
Ferromanganese	232,000	122,000	102,000 r	88,000 r	99,000
Silicomanganese	172,000	109,000	151,000	134,000	98,000
Total	404,000	231,000	253,000 r	222,000 r	197,000
Spain:[3]					
Ferromanganese	55,500	28,000	48,000	22,000	26,000
Silicomanganese	98,400	84,000	77,000 r	52,000 r	13,000
Total	153,900	112,000	125,000 r	74,000 r	39,000
Ukraine:					
Ferromanganese	151,090	122,960	100,600	20,690 r	15,000 e
Silicomanganese	804,680	559,880	662,700	356,500 r	200,000 e
Total	955,770	682,840	763,300	377,190 r	215,000 e
United States:					
Ferromanganese	W	W	W	W	W
Silicomanganese	W	W	W	W	W
Total	W	W	W	W	W
Grand total	21,100,000 r	18,800,000 r	19,600,000 r	18,600,000 r	19,600,000
Of which:					
Ferromanganese	5,190,000	4,580,000	5,330,000 r	5,240,000 r	5,240,000
Silicomanganese	15,900,000 r	14,200,000 r	14,300,000 r	13,400,000 r	14,300,000

eEstimated. rRevised. W Withheld to avoid disclosing company proprietary data: not included in "Grand total." -- Zero.

[1]Table includes data available through August 13, 2024. All data are reported unless otherwise noted; totals may include estimated data Grand totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the countries and (or) localities listed, Iran may have produced ferromanganese, but available information was inadequate to make reliable estimates of output.

[3]Reported by the International Manganese Institute.