

NIOBIUM (COLUMBIUM)

(Data in metric tons, niobium content, unless otherwise specified)

Domestic Production and Use: Significant U.S. niobium mine production has not been reported since 1959. Companies in the United States produced niobium-containing materials from imported niobium concentrates, oxides, and ferroniobium. Niobium was consumed mostly in the form of ferroniobium by the steel industry and as niobium alloys and metal by the aerospace industry. Major end-use distribution of domestic niobium consumption was estimated as follows: steels, about 77%, and superalloys, about 21%. The estimated value of niobium imports was \$440 million.

<u>Salient Statistics—United States:</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024^e</u>
Production, mine	—	—	—	—	—
Imports for consumption ¹	7,170	8,230	9,110	10,100	8,900
Exports ¹	787	992	668	951	480
Shipments from Government stockpile ²	-88	-1	—	NA	NA
Consumption: ^e					
Apparent ³	6,300	7,240	8,440	9,100	8,400
Reported ⁴	6,190	6,110	7,230	7,110	6,400
Price, average unit value, ferroniobium, dollars per kilogram ⁵	21	21	25	25	26
Net import reliance ³ as a percentage of apparent consumption	100	100	100	100	100

Recycling: Niobium was recycled when niobium-bearing steels and superalloys were recycled; scrap recovery, specifically for niobium content, was negligible. The amount of niobium recycled was not available, but it may have been as much as 20% of apparent consumption.

Import Sources (2020–23): Niobium and tantalum ores and concentrates: Australia, 59%; Congo (Kinshasa), 12%; Mozambique, 6%; United Arab Emirates, 5%; and other, 18%. Niobium oxide: Brazil, 83%; Thailand, 6%; Estonia, 5%; India, 3%; and other, 3%. Ferroniobium and niobium metal: Brazil, 66%; Canada, 29%; Russia, 2%; Germany, 1%, and other, 2%. Total imports: Brazil, 66%; Canada, 27%; and other, 7%. Of U.S. niobium material imports (by niobium content), 71% was ferroniobium, 20% was niobium metal, 8% was niobium oxide, and 1% was niobium ores and concentrates.

<u>Tariff:</u>	<u>Item</u>	<u>Number</u>	<u>Normal Trade Relations</u> <u>12–31–24</u>
	Synthetic tantalum-niobium concentrates	2615.90.3000	Free.
	Niobium ores and concentrates	2615.90.6030	Free.
	Niobium oxide	2825.90.1500	3.7% ad valorem.
	Ferroniobium:		
	Less than 0.02% phosphorus or sulfur, or less than 0.4% silicon	7202.93.4000	5% ad valorem.
	Other	7202.93.8000	5% ad valorem.
	Niobium:		
	Waste and scrap ⁶	8112.92.0700	Free.
	Powders and unwrought metal	8112.92.4000	4.9% ad valorem.
	Other ⁶	8112.99.9100	4% ad valorem.

Depletion Allowance: 22% (domestic), 14% (foreign).

Government Stockpile:⁷

<u>Material</u>	<u>FY 2024</u>		<u>FY 2025</u>	
	<u>Potential</u> <u>acquisitions</u>	<u>Potential</u> <u>disposals</u>	<u>Potential</u> <u>acquisitions</u>	<u>Potential</u> <u>disposals</u>
Ferroniobium	136	—	136	—

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Events, Trends, and Issues: In 2024, U.S. niobium apparent consumption (measured in niobium content) was estimated to be 8,400 tons, an 8% decrease from that in 2023. One domestic company developing its project in Nebraska continued to secure financing in 2024. The project, would be the only niobium mine and primary niobium-processing facility in the United States. According to the company, it has secured all necessary construction permits and contracted 75% of its planned ferroniobium production for the first 10 years of operation. According to the results of a 2022 feasibility study, the facility was projected to produce 7,450 tons per year of ferroniobium over a 38-year mine life.

In September, the U.S. Department of Defense awarded \$26.4 million to a company with existing tantalum production operations in Boyertown, PA. The award supported establishing high-purity niobium oxide production capabilities. Once operational, the site would be the only high-purity-niobium-processing facility in the United States. High-purity niobium is required for specialty steels and alloys in aerospace applications.

Brazil continued to be the world's leading niobium producer, accounting for approximately 92% of global production, followed by Canada with about 7%. According to international trade statistics under the Harmonized System code 7202.93 (ferroniobium), Brazil's total exports in 2023 were 86,300 tons and were 65,600 tons from January through September 2024. Most of Brazil's exports were sent to China, followed by the Netherlands and the Republic of Korea.

World Mine Production and Reserves:

	Mine production		Reserves⁸
	<u>2023</u>	<u>2024^e</u>	
United States	—	—	210,000
Brazil	102,000	100,000	16,000,000
Canada	6,700	7,100	1,600,000
Congo (Kinshasa)	740	700	NA
Russia	353	350	NA
Rwanda	210	200	NA
Other countries	121	120	NA
World total (rounded)	<u>110,000</u>	<u>110,000</u>	<u>>17,000,000</u>

World Resources:⁸ World resources of niobium are more than adequate to supply projected needs. Most of the world's identified resources of niobium occur as pyrochlore in carbonatite (igneous rocks that contain more than 50%-by-volume carbonate minerals) deposits and are outside the United States.

Substitutes: The following materials can be substituted for niobium, but a performance loss or higher cost may ensue: ceramic matrix composites, molybdenum, tantalum, and tungsten in high-temperature (superalloy) applications; molybdenum, tantalum, and titanium as alloying elements in stainless and high-strength steels; and molybdenum and vanadium as alloying elements in high-strength low-alloy steels.

^eEstimated. NA Not available. — Zero.

¹Imports and exports include the estimated niobium content of ferroniobium, niobium and tantalum ores and concentrates, niobium oxide, and niobium powders and unwrought metal. Niobium content was estimated assuming the following: 28% niobium oxide (Nb₂O₅) content in niobium ores and concentrates; 16% Nb₂O₅ content in tantalum ores and concentrates and synthetic concentrates; 100% niobium content in unwrought niobium metal (powders and other); and 65% niobium content in ferroniobium. Nb₂O₅ is 69.904% niobium by weight.

²Defined for 2020–22 as change in total inventory from prior yearend inventory. If negative, increase in inventory. Beginning in 2023, Government stock changes no longer included.

³Defined for 2020–22 as imports – exports ± adjustments for Government and industry stock changes. Beginning in 2023, Government stock changes no longer included.

⁴Only includes ferroniobium and nickel niobium.

⁵Unit value is weighted average unit value of gross weight of U.S. ferroniobium trade (imports plus exports).

⁶This category includes niobium-containing material and other material.

⁷See Appendix B for definitions.

⁸See Appendix C for resource and reserve definitions and information concerning data sources.