NIOBIUM (COLUMBIUM)

(Data in metric tons of niobium content unless otherwise noted)

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. In 2019, there was a decrease in reported consumption of niobium for high-strength low alloy steel and superalloy applications. Major end-use distribution of reported niobium consumption was as follows: steels, about 78%, and superalloys, about 22%. The estimated value of niobium consumption was $460 million, as measured by the value of imports.

Salient Statistics—United States:	2015	2016	2017	2018	2019[e]
Production, mine	—	—	—	—	—
Imports for consumption[1]	8,520	8,250	9,330	11,200	11,000
Exports[1]	1,430	1,480	1,490	955	570
Shipments from Government stockpile	—	—	—	—	—
Consumption:[e]					
Apparent[2]	7,080	6,730	7,780	10,100	9,900
Reported[3]	7,510	7,370	7,640	7,130	6,000
Unit value, ferroniobium, dollars per kilogram[4]	24	21	20	21	23
Net import reliance[2] 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 is not available, but it may be as much as 20% of apparent consumption.

Import Sources (2015–18): Niobium ore and concentrate: Rwanda, 39%; Brazil, 19%; Australia, 16%; Congo (Kinshasa), 10%; and other, 16%. Niobium oxide: Brazil, 48%; Russia, 25%; Thailand, 10%; Estonia, 9%; and other, 8%. Ferroniobium and niobium metal: Brazil, 70%; Canada, 26%; Germany, 2%; and other, 2%. Total imports: Brazil, 67%; Canada, 23%; Russia, 3%; Germany, 2%; and other, 5%. Of the U.S. niobium material imports (by contained weight), 75% was ferroniobium, 14% was niobium metal, 10% was niobium oxide, and 1% was niobium ores and concentrates.

Tariff: Item	Number	Normal Trade Relations 12–31–19
Synthetic tantalum-niobium concentrates	2615.90.3000	Free.
Niobium ores and concentrates	2615.90.6030	Free.
Niobium oxide	2825.90.1500	3.7% ad val.
Ferroniobium:		
Less than 0.02% P or S, or less than 0.4% Si	7202.93.4000	5% ad val.
Other	7202.93.8000	5% ad val.
Niobium:		
Waste and scrap[5]	8112.92.0600	Free.
Powders and unwrought metal	8112.92.4000	4.9% ad val.
Niobium, other[5]	8112.99.9000	4% ad val.

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

Government Stockpile:[6]

		FY 2019		FY 2020	
Material	Inventory As of 9–30–19	Potential Acquisitions	Potential Disposals	Potential Acquisitions	Potential Disposals
Ferroniobium (gross weight)	407	209	—	—	—
Niobium metal (gross weight)	10	—	—	—	—

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NIOBIUM (COLUMBIUM)

Events, Trends, and Issues: Niobium principally was imported in the form of ferroniobium. Based on data through August 2019, U.S. niobium apparent consumption (measured in contained niobium) for 2019 was estimated to be 9,900 tons, slightly less than that of 2018. Brazil continued to be the world's leading niobium producer with 88% of global production, followed by Canada with 10%. Global niobium production is thought to have increased in 2019 owing to anticipated growing demand for ferroniobium from steel manufacturers in China following the country's implementation of higher rebar strength standards beginning in November 2018. Niobium was increasingly substituted for vanadium as a microalloying additive in high-strength rebar owing to the supply deficit and high price volatility of ferrovanadium. Based on data through August 2019, ferroniobium imports into China were estimated to have increased by 50% in 2019 compared with the previous year.

One domestic company developing its Elk Creek project in Nebraska announced a new mine design that was expected to increase the mine life by 4 years and reduce the environmental impacts of its operation. The new design included an onsite water treatment system that would eliminate the need to discharge excess process water into the nearby Missouri River, more efficient recycling of mineral-processing reagents, and the use of advanced emission control technologies that would result in reduced air emissions. The company submitted its construction air permit to the State of Nebraska in July. The project would be the only niobium mine and primary niobium processing facility in the United States. It was expected to begin production after 2020.

In January, a leading niobium producer in Brazil announced plans to increase its annual ferroniobium production capacity by 50% to 150,000 tons (approximately 98,000 tons of contained niobium). The company expected to invest $200 million in the expansion which would be completed before the end of 2020.

World Mine Production and Reserves: The reserves data for the United States and Brazil were revised based on information reported by niobium-producing companies and the Governments of those countries.

	Mine production		Reserves[7]
	2018	2019[e]	
United States	—	—	210,000
Brazil	59,000	65,000	11,000,000
Canada	7,700	7,600	1,600,000
Other countries	1,460	1,500	NA
World total (rounded)	68,200	74,000	>13,000,000

World Resources: 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. The United States has approximately 1,400,000 tons of niobium in identified resources, most of which were considered subeconomic at 2019 prices for niobium.

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.

[e]Estimated. NA Not available. — Zero.

[1]Imports and exports include the estimated niobium content of ferroniobium, niobium and tantalum ores and concentrates, niobium oxide, and niobium powders and unwrought metal.

[2]Defined as imports – exports + adjustments for Government stock changes.

[3]Only includes ferroniobium and nickel niobium.

[4]Unit value is weighted average unit value of gross weight of U.S. ferroniobium trade. (Trade is imports plus exports.)

[5]This category includes niobium-containing material and other material.

[6]See Appendix B for definitions.

[7]See Appendix C for resource and reserve definitions and information concerning data sources.