

## 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. Domestic niobium resources are of low grade, some are mineralogically complex, and most are not commercially recoverable. Companies in the United States produced niobium-containing materials from imported niobium minerals, 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 reported niobium consumption was as follows: steels, about 76%, and superalloys, about 24%. In 2017, the estimated value of niobium consumption was \$290 million, as measured by the value of imports.

<b>Salient Statistics—United States:</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017<sup>e</sup></b>
Production, mine	—	—	—	—	—
Imports for consumption <sup>e, 1</sup>	8,580	11,100	8,520	9,580	11,300
Exports <sup>e, 1</sup>	435	1,110	1,430	841	1,500
Government stockpile releases <sup>2</sup>	—	—	—	—	—
Consumption: <sup>e</sup>					
Apparent <sup>3</sup>	8,140	10,000	7,080	8,740	9,800
Reported <sup>4</sup>	7,500	8,210	7,510	7,370	6,510
Unit value, ferroniobium, dollars per kilogram <sup>5</sup>	27	26	24	21	18
Net import reliance <sup>6</sup> 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 (2013–16):** Niobium ore and concentrate: Brazil, 47%; Rwanda, 21%; Australia, 11%; Canada, 5%; and other, 16%. Niobium metal and oxide: Brazil, 73%; Canada, 19%; Russia, 3%; and other, 5%. Total imports: Brazil, 72%; Canada, 18%; Russia, 3%; and other, 7%. Of the U.S. niobium material imports, 93% (by gross quantity) was ferroniobium and niobium metal and oxide.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–17</b>
	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 <sup>7</sup>	8112.92.0600	Free.
	Unwrought, powders	8112.92.4000	4.9% ad val.
	Niobium, other <sup>7</sup>	8112.99.9000	4% ad val.

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

**Government Stockpile:** In the annual materials plan for fiscal year (FY) 2018, the Defense Logistics Agency (DLA) Strategic Materials announced the 2018 maximum acquisition limit of 209 tons for ferroniobium. In FY 2017, 122 tons of ferroniobium was acquired for the stockpile. No disposals were planned.

### Stockpile Status—9–30–17<sup>8</sup>

<b>Material</b>	<b>Inventory</b>	<b>Disposal Plan FY 2017</b>	<b>Disposals FY 2017</b>
Ferroniobium	161	—	—
Niobium metal	10	—	—

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**Events, Trends, and Issues:** Niobium principally was imported in the form of ferroniobium. Based on data through August 2017, U.S. niobium apparent consumption (measured in contained niobium) was estimated to be 9,800 tons, 12% more than that of 2016. Brazil continued to be the world's leading niobium producer with 89% of global production, followed by Canada with 10%.

One domestic company continued to make progress with developing its Elk Creek project in Nebraska by receiving approval to continue initial planning and permitting. The project would be the only primary niobium processing facility in the United States and was expected to begin production after 2018.

In September 2016, a Chinese company acquired the niobium-phosphate business of a United Kingdom company. The niobium business was located in Goias State, Brazil, and consisted of the Boa Vista Mine, three processing facilities, two nonoperating mines, and two mineral deposits.

### World Mine Production and Reserves:

	Mine production		Reserves <sup>9</sup>
	2016	2017 <sup>e</sup>	
United States	—	—	—
Brazil	57,000	57,000	4,100,000
Canada	6,100	6,000	200,000
Other countries	800	800	NA
World total (rounded)	63,900	64,000	>4,300,000

**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 150,000 tons of niobium in identified resources, most of which were considered subeconomic at 2017 prices for niobium.

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

<sup>e</sup>Estimated. NA Not available. — Zero.

<sup>1</sup>Imports and exports include the estimated niobium content of niobium and tantalum ores and concentrates, niobium oxide, ferroniobium, niobium unwrought alloys, metal, and powder.

<sup>2</sup>Government stockpile inventory reported by DLA Strategic Materials is the basis for estimating Government stockpile releases.

<sup>3</sup>Defined as imports – exports.

<sup>4</sup>Includes ferroniobium and nickel niobium.

<sup>5</sup>Unit value is mass-weighted average unit value of gross quantity of U.S. ferroniobium trade. (Trade is imports plus exports.)

<sup>6</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>7</sup>This category includes materials other than niobium-containing material.

<sup>8</sup>See [Appendix B](#) for definitions.

<sup>9</sup>See [Appendix C](#) for resource and reserve definitions and information concerning data sources.