

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. Forty-three 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, 79%; and superalloys, 21%. In 2014, the estimated value of niobium consumption was \$500 million, as measured by the value of imports.

Salient Statistics—United States:	2010	2011	2012	2013	2014^e
Production:					
Mine	—	—	—	—	—
Recycling	NA	NA	NA	NA	NA
Imports for consumption ^{e, 1}	8,490	9,520	10,100	8,580	11,000
Exports ^{e, 1}	281	363	385	435	1,000
Government stockpile releases ^{e, 2}	—	—	—	—	—
Consumption: ^e					
Apparent	8,210	9,160	9,730	8,140	10,000
Reported ³	5,590	9,060	7,460	7,500	8,000
Unit value, ferroniobium, dollars per metric ton ⁴	37,781	41,825	43,658	43,415	42,000
Net import reliance ⁵ 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 (2010–13): Niobium ore and concentrate: Brazil, 30%; Canada, 18%; Australia, 11%; Rwanda, 8%; and other, 33%. Niobium metal and oxide: Brazil, 84%; Canada, 11%; and other, 5%. Total imports: Brazil, 84%; Canada, 11%; and other, 5%. Of the U.S. niobium material imports, 95% (by gross mass) was niobium metal and oxide.

Tariff:	Item	Number	Normal Trade Relations
			12–31–14
	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% of P or S, or less than 0.4% of Si	7202.93.4000	5.0% ad val.
	Other	7202.93.8000	5.0% ad val.
	Niobium, unwrought:		
	Waste and scrap ⁶	8112.92.0600	Free.
	Alloys, metal, powders	8112.92.4000	4.9% ad val.
	Niobium, other ⁶	8112.99.9000	4.0% ad val.

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

Government Stockpile: In the annual materials plan for FY 2015, the Defense Logistics Agency Strategic Materials announced a 2015–18 maximum acquisition limit of 104.5 t for ferroniobium.

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Stockpile Status—9–30–14⁷

Material	Inventory	Disposal Plan FY 2014	Disposals FY 2014
Niobium metal	10.0	—	—

Events, Trends, and Issues: Niobium principally was imported in the form of ferroniobium and niobium unwrought metal, alloy, and powder. U.S. niobium import dependence was expected to be the same in 2014 as in 2013, when Brazil was the leading niobium supplier. Based on data for part of 2014, U.S. niobium apparent consumption (measured in contained niobium) was estimated at 10,000 metric tons, 23% more than that of 2013. The unit value of U.S. imported ferroniobium between 1990 and 2005 declined from about \$20,000 per ton to about \$13,000 per ton. It then rose steadily to about \$44,000 per ton in 2012, and then declined to \$40,000 per ton in 2014, interrupted only in 2008–09 as a result of the global economic downturn. During the initial part of the value increase (2006–08), CBMM, the leading world ferroniobium producer, doubled its niobium production capacity. The value increase that started in 2006 appears to have been a market adjustment to structural undervaluing of ferroniobium. The price of ferroniobium appears to be demand inelastic as demonstrated by the minimal effect of global economic downturn on price in 2009.

Brazil is the world's leading niobium producer with 90% of production followed by Canada with 9%. Niobec mine, the sole niobium producer in Canada, was sold to a group of companies led by Magris Resources Inc (Hong Kong) [owned 50% by Cheung Kong (Holdings) Ltd and 50% by the Canadian Imperial Bank of Commerce] and Temasek (Singapore) for about \$500 million.

World Mine Production and Reserves:

	Mine production		Reserves ⁸
	<u>2013</u>	<u>2014^e</u>	
United States	—	—	—
Brazil	53,100	53,000	4,100,000
Canada	5,260	5,000	200,000
Other countries	<u>1,000</u>	<u>1,000</u>	<u>NA</u>
World total (rounded)	59,400	59,000	>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-identified resources, all of which were considered uneconomic at 2013 prices for niobium.

Substitutes: The following materials can be substituted for niobium, but a performance or cost penalty 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.

^eEstimated. NA Not available. — Zero.

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

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

³Includes ferroniobium and nickel niobium.

⁴Unit value is mass-weighted average U.S. import value of ferroniobium assuming 65% niobium content. To convert dollars per metric ton to dollars per pound, divide by 2,205.

⁵Defined as imports – exports + adjustments for Government and industry stock changes.

⁶This category includes other than niobium-containing material.

⁷See [Appendix B](#) for definitions.

⁸See [Appendix C](#) for resource/reserve definitions and information concerning data sources.