

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 ferroniobium and niobium compounds, metal, and other alloys 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, 76%; and superalloys, 24%. In 2008, the estimated value of niobium consumption was \$324 million and was expected to be about \$108 million in 2009, as measured by the value of imports.

Salient Statistics—United States:	2005	2006	2007	2008	2009^e
Production:					
Mine	—	—	—	—	—
Recycling	NA	NA	NA	NA	NA
Imports for consumption ^{e, 1}	7,610	10,500	10,120	9,230	2,800
Exports ^{e, 1}	337	561	1,100	781	600
Government stockpile releases ^{e, 2}	152	156	—	—	—
Consumption: ^e					
Apparent	7,430	10,100	9,020	8,450	2,200
Reported ³	4,600	5,050	6,510	6,000	3,000
Price, ferroniobium, dollars per pound ⁴	6.58	NA	NA	NA	NA
Unit value, ferroniobium, dollars per metric ton ⁵	13,197	14,022	21,918	34,398	39,000
Net import reliance ⁶ 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 (2005-08): Niobium contained in niobium and tantalum ore and concentrate; ferroniobium; and niobium metal and oxide: Brazil, 85%; Canada, 8%; Germany, 2%, Estonia, 2%; and other, 3%.

Tariff:	Item	Number	Normal Trade Relations
			12-31-09
	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 ⁷	8112.92.0600	Free.
	Alloys, metal, powders	8112.92.4000	4.9% ad val.
	Niobium, other ⁷	8112.99.9000	4.0% ad val.

Depletion Allowance:⁸ 22% (Domestic), 14% (Foreign).

Government Stockpile: For fiscal year (FY) 2009 (October 1, 2008, through September 30, 2009), the Defense National Stockpile Center (DNSC), Defense Logistics Agency, disposed of no niobium materials. The DNSC's niobium mineral concentrate inventory was exhausted in FY 2007; niobium carbide powder, in FY 2002; and ferroniobium, in FY 2001. The DNSC announced maximum disposal limits for FY 2009 of about 9 tons⁹ of niobium metal ingots.

Material	Stockpile Status—9-30-09⁸			
	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2009	Disposals FY 2009
Niobium metal	10.1	10.1	⁹	—

NIOBIUM (COLUMBIUM)

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 about the same as that of 2008, when Brazil was the leading niobium supplier. By weight in 2008, Brazil supplied 87% of total U.S. niobium imports, 91% of ferroniobium, 87% of niobium metal, and 63% of niobium oxide. The leading suppliers of niobium in ore and concentrate were Australia (73%) and Canada (22%). Niobium apparent consumption is believed to have decreased in 2009 compared with that of 2008. Financial market problems and the subsequent economic slowdown were expected to result in reduced niobium material consumption and production.

World Mine Production and Reserves: Reserves for Brazil were revised based on new information published by the Brazilian Government. Reserves for Canada were revised based on new information published by a mining company.

	Mine production		Reserves ¹⁰
	<u>2008</u>	<u>2009^e</u>	
United States	—	—	—
Brazil	58,000	57,000	2,900,000
Canada	4,380	4,300	46,000
Other countries	<u>483</u>	<u>400</u>	<u>NA</u>
World total (rounded)	62,900	62,000	2,900,000

World Resources: World resources are more than adequate to supply projected needs. Most of the world's identified resources of niobium occur mainly as pyrochlore in carbonatite [igneous rocks that contain more than 50% by volume carbonate (CO₃) minerals] deposits and are outside the United States. The United States has approximately 150,000 tons of niobium resources in identified deposits, all of which were considered uneconomic at 2009 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 releases are the uncommitted inventory change as reported by the Defense National Stockpile Center.

³Includes ferroniobium and nickel niobium.

⁴Price is time-weighted (by week) average of trade journal reported ferroniobium price per pound of contained niobium, standard (steelmaking) grade. Ferroniobium price was discontinued in 2005; columbite price was discontinued in 2000; and pyrochlore price was discontinued in 1993.

⁵Unit 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.

⁶Defined as imports – exports + adjustments for Government and industry stock changes.

⁷This category includes other than niobium-containing material.

⁸[See Appendix B for definitions.](#)

⁹Actual quantity limited to remaining sales authority; additional legislative authority is required.

¹⁰[See Appendix C for definitions.](#) Reserve base estimates were discontinued in 2009; see [Introduction](#).