

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, 74%; and superalloys, 26%. In 2009, the estimated value of niobium consumption was \$162 million and was expected to be about \$330 million in 2010, as measured by the value of imports.

| Salient Statistics—United States: | 2006 | 2007 | 2008 | 2009 | 2010^e |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Production: | | | | | |
| Mine | — | — | — | — | — |
| Secondary | NA | NA | NA | NA | NA |
| Imports for consumption ^{e, 1} | 10,500 | 10,120 | 9,230 | 4,400 | 8,500 |
| Exports ^{e, 1} | 561 | 1,100 | 781 | 195 | 170 |
| Government stockpile releases ^{e, 2} | 156 | — | — | — | — |
| Consumption: ^e | | | | | |
| Apparent | 10,100 | 9,020 | 8,450 | 4,210 | 8,300 |
| Reported ³ | 5,050 | 6,510 | 5,380 | 4,350 | 4,000 |
| Unit value, ferroniobium, dollars per metric ton ⁴ | 14,022 | 21,918 | 34,398 | 37,298 | 37,500 |
| 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 (2006–09): Niobium contained in niobium and tantalum ore and concentrate; ferroniobium; and niobium metal and oxide: Brazil, 84%; Canada, 9%; Germany, 2%; Estonia, 2%; and other, 3%.

| Tariff: | Item | Number | Normal Trade Relations 12-31-10 |
|----------------|---|---------------|--|
| | 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:⁷ 22% (Domestic), 14% (Foreign).

Government Stockpile: For fiscal year (FY) 2010, which ended on September 30, 2010, the Defense Logistics Agency, DLA Strategic Materials (formerly the Defense National Stockpile Center), disposed of no niobium materials. DLA Strategic Materials announced that maximum disposal limits for FY 2011 had not been approved. The DLA Strategic Materials' niobium mineral concentrate inventory was exhausted in FY 2007; niobium carbide powder, in FY 2002; and ferroniobium, in FY 2001.

| Material | Stockpile Status—9-30-10⁷ | | Disposal plan FY 2010^{8,9} | Disposals FY 2010 |
|-----------------|---|------------------------------------|--|------------------------------|
| | Uncommitted inventory | Authorized for disposal | | |
| Niobium metal | 10.1 | 10.1 | — | — |

NIOBIUM (COLUMBIUM)

Events, Trends, and Issues: Niobium principally was imported in the form of ferroniobium and niobium unwrought metal, alloy, and powder. United States niobium import dependence was expected to be the same as that of 2009, when Brazil was the leading niobium supplier. By weight in 2009, Brazil supplied 75% of total U.S. niobium imports, 69% of ferroniobium, 91% of niobium metal, and 86% of niobium oxide. The leading suppliers of niobium in ore and concentrate were Mozambique (48%) and Canada (32%). Financial market problems in 2008 and the subsequent economic slowdown resulted in reduced niobium material consumption in 2009. Niobium apparent consumption is believed to have increased significantly in 2010 compared with that of 2009.

World Mine Production and Reserves:

| | Mine production | | Reserves ⁹ |
|-----------------------|-----------------|-------------------------|-----------------------|
| | <u>2009</u> | <u>2010^e</u> | |
| United States | — | — | — |
| Brazil | 58,000 | 58,000 | 2,900,000 |
| Canada | 4,330 | 4,400 | 46,000 |
| Other countries | <u>530</u> | <u>600</u> | <u>NA</u> |
| World total (rounded) | 62,900 | 63,000 | 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 2010 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.

⁷[See Appendix B for definitions.](#)

⁸Actual quantity limited to remaining sales authority; additional legislative authority is required.

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