Silicon Metal from Russia

Investigation No. 731-TA-991 (Second Review)

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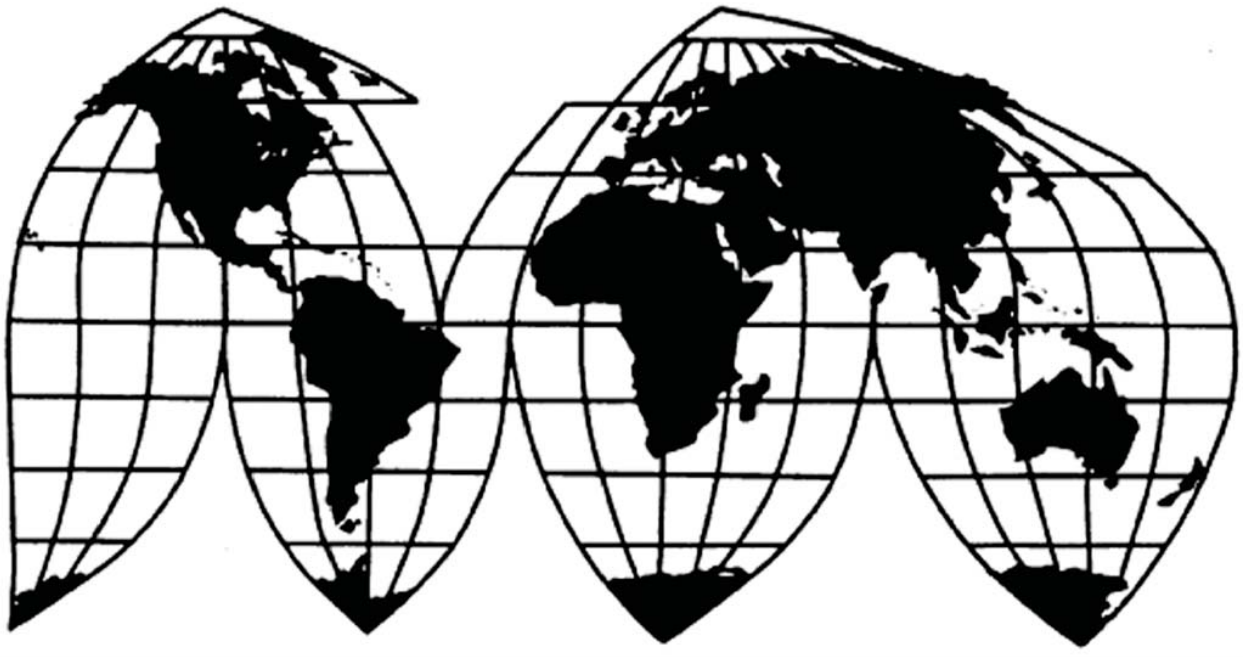
U.S. International Trade Commission



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combination with both oxygen and a metal in silicate minerals. Although commonly referred to as metal, silicon exhibits characteristics of both metals and nonmetals. Silicon metal is a polycrystalline material whose crystals have a diamond cubic structure at atmospheric pressure. Whether imported or domestic, it is usually sold in lump form typically ranging from 6 inches x ½ inch to 4 inches x ¼ inch.[36]

There are four broadly defined categories, or grades, of silicon metal, which are ranked in generally descending order of purity as: (1) semiconductor grade;[37] (2) chemical grade; (3) a metallurgical grade used to produce primary aluminum (aluminum produced from ore); and (4) a metallurgical grade used to produce secondary aluminum (aluminum produced from scrap).[38] However, higher grade silicon metal is frequently shipped to a purchaser with a lower specification requirement.[39] The silicon metal content for all four grades of silicon metal is typically at least 98.5 percent.

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[36] The dimensions refer to the maximum and minimum dimensions of the silicon metal lumps.

[37] Semiconductor-grade silicon, used in the electronics industry, is a high-purity product generally containing over 99.99 percent silicon and therefore not included within the scope of this investigation. Subject silicon metal may be used as a starting material for the manufacture of semi-conductor-grade silicon.

[38] Although silicon metal has been described in terms of different grades, there is no uniformly accepted grade classification system. Silicon metal "grades" actually refer to ranges of specifications that are typically sold to particular groups of customers. These specifications, which exist within very narrow bands and are often proprietary, establish the minimum amounts of silicon and the maximum amounts of impurities such as iron, calcium, aluminum, or titanium that the silicon metal may contain. Specifications for chemical-use silicon metal typically require silicon that contains less than 0.4 percent iron, less than 0.025 percent calcium, and less than 0.25 percent aluminum. Specifications for the metallurgical primary-aluminum use silicon metal typically require silicon that contains less than 0.5 percent iron (although some low-iron specifications call for less than 0.35 percent) and less than 0.07 percent calcium (although some specifications call for less than 0.015 percent). Specifications for silicon metal used in metallurgical secondary-aluminum product typically allow for no more than 1 percent iron and no more than 0.35 percent calcium. Chemical customers each have their own detailed specifications. Requirements also vary widely among primary aluminum customers. Even some secondary aluminum customers, whose product comes closest to representing a commodity, have differences in tolerances with regard to impurities.

The type and level of impurities rather than the precise silicon content (assuming it is near 99 percent) is the principal factor determining whether the silicon metal product can be used in a given application. As such, it is not possible to assume that silicon metal imported under HTS subheading 2804.69.10 (silicon containing by weight less than 99.99 percent but not less than 99.00 percent silicon) is necessarily better quality than silicon metal imported under HTS subheading 2804.69.50 (silicon containing by weight less than 99.00 percent silicon) even though the silicon content of the former is higher.

[39] According to petitioners in the original investigation on silicon metal from Russia, producers "make the best quality silicon metal they can possibly make and sell it down into the various chemical and aluminum applications" and "to the knowledge of domestic producers, no producer purposely sets out to produce a secondary aluminum product." U.S. producers of silicon metal produce silicon metal with specifications designed to meet the most stringent requirements of their customers (which is not

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