

**QUARTZ CRYSTAL (INDUSTRIAL)**

(Data in metric tons unless otherwise noted)

**Domestic Production and Use:** Lascas<sup>1</sup> mining and processing in Arkansas was stopped at the end of 1997, and in 2004, no U.S. firms reported the production of cultured quartz crystals. Cultured quartz crystal production capacity still exists in the United States using imported and stockpiled lascas as feed material. In the past several years, cultured quartz crystal was increasingly produced overseas, primarily in Asia. Electronic applications accounted for most industrial uses of quartz crystal; other uses included special optical applications.

Virtually all quartz crystal used for electronics was cultured rather than natural crystal. Electronic-grade quartz crystal was essential for making filters, frequency controls, and timers in electronic circuits employed for a wide range of products, such as communications equipment, computers, and many consumer goods, such as electronic games and television receivers.

**Salient Statistics—United States:** Production statistics for cultured quartz crystals were withheld to avoid disclosing company proprietary data. Trade data for cultured quartz crystal and devices with mounted quartz crystal are available, but lascas import data are not available. Exports of cultured quartz crystals (excluding mounted quartz crystals) totaled about 92 tons, and imports (excluding mounted quartz crystals) totaled about 3 tons in 2004. The average value of exports and imports was \$133,000 per ton and \$1.3 million per ton<sup>2</sup>, respectively. Other salient statistics were not available.

**Recycling:** None.

**Import Sources (2000-03):** The United States is 100% import reliant. Brazil, Germany, and Madagascar are reportedly the major sources for lascas with Canada becoming an increasingly important supplier. Other possible sources of lascas include China, South Africa, and Venezuela.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations</b> <b><u>12-31-04</u></b>
	Sands:		
	95% or greater silica	2505.10.10.00	Free.
	Less than 95% silica	2505.10.50.00	Free.
	Quartz (including lascas)	2506.10.00.50	Free.
	Piezoelectric quartz	7104.10.00.00	3% ad val.

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

**Government Stockpile:**

<b>Material</b>	<b>Stockpile Status—9-30-04<sup>3</sup></b>				
	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>	<b>Disposal plan FY 2004</b>	<b>Disposals FY 2004</b>
Quartz crystal	7	43	7	68	54

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**Events, Trends, and Issues:** Trends indicate that demand for quartz crystal devices should continue to grow, and consequently, quartz crystal production should remain strong well into the future. Growth of the consumer electronics market (for products such as personal computers, electronic games, and cellular telephones), particularly in the United States, will continue to promote global production. The growing global electronics market may require additional production capacity worldwide.

**World Mine Production, Reserves, and Reserve Base:** This information is unavailable, but the global reserve base for lascalas is thought to be large.

**World Resources:** Limited resources of natural quartz crystal suitable for direct electronic or optical use are available throughout the world. World dependence on these resources will continue to decline because of the increased acceptance of cultured quartz crystal as an alternative material; however, use of cultured quartz crystal will mean an increased dependence on lascalas for growing cultured quartz.

**Substitutes:** Quartz crystal is the best material for frequency-control oscillators and frequency filters in electronic circuits. Other materials, such as aluminum orthophosphate (e.g., the very rare mineral berlinite) and lithium tantalate, which have larger piezoelectric coupling constants, have been studied.

<sup>1</sup>Lascalas is a nonelectronic-grade quartz used as a feedstock for growing cultured quartz crystal and for production of fused quartz.

<sup>2</sup>The quartz crystal import value in the Mineral Commodity Summaries 2004, \$208,000, was based on U.S. Census Bureau data that include zirconia.

<sup>3</sup>See [Appendix B](#) for definitions.