

Client Alert:

China announces export restrictions on two essential metals

July 13, 2023

U.S. says it opposes export controls by China on metals, will consult allies

State of Play:

Just days after the Netherlands announced [restrictions](#) on exports of critical semiconductor equipment to China, the Chinese-U.S. trade dispute has further escalated. The Chinese Communist Party (CCP) responded by [announcing](#) that, beginning in August 2023, export licenses will be required to acquire two metals from Chinese sellers: **gallium** and **germanium**.

The U.S. and its allies have so far focused on restricting exports to China of cutting-edge semiconductor-related equipment and intellectual property with the goal of throttling Chinese military advances. But this new escalation by China may have ramifications for more than just the semiconductor industry.

For decades, China has engaged in anticompetitive policies to control the global market for critical minerals. Intentional Chinese overproduction and CCP subsidization have squeezed other international suppliers out of markets, with many suppliers of gallium and germanium ceasing operation in the last decade and China seizing significant market share.

China has described the current export restrictions on gallium and germanium as intended to “safeguard national security interests.” China’s Ministry of Commerce (MOFCOM) will reportedly assess and grant or deny export license applications on a case-by-case basis.

Following [comments](#) from the international community, a MOFCOM spokesperson affirmed that the controls are not a complete ban and exports will be allowed—even for military purposes. Yet a senior Chinese trade advisor also [warned](#) that current restrictions could be



expanded. As such, it remains ambiguous how aggressively China will apply the restrictions, with potential for short-term supply chain disruption for both metals.

BEIJING/SHANGHAI, July 5 (Reuters) - China's export controls on metals used in semiconductors are "just a start", an influential Chinese trade policy adviser said on Wednesday, as Beijing ramps up a tech fight with Washington days before a visit from U.S. Treasury Secretary Janet Yellen.

Key points:

- Aside from semiconductors, gallium and germanium are used in components with wide application in **consumer electronics, fiber optics, infrared optics, and solar cells**. They are also key for various military applications, from **night vision goggles** to highly advanced **communications and sensor equipment** in aerospace and space platforms.
- Germanium:
 - Pre-emptive steps by the U.S. Defense Logistics Agency, including **stockpiling** and **recycling** initiatives, will limit the impact of germanium supply restrictions in the short term.
 - On a longer time frame, the **U.S. has the capability for full domestic production of germanium** due to significant zinc deposits in Alaska and its ability to expand processing capacity.
- Gallium:
 - Acquiring gallium will likely pose a bigger problem than germanium.
 - **In the U.S., gallium is nearly 100% sourced from imports. China has a dominant (95%) position** in the global market. Chinese overproduction has led to other international producers downscaling in the last decade.
 - Price increases may trigger former producers in **Germany** and **Kazakhstan** to restart commercial production, which could provide the U.S. with an estimated 15,000 tons of the metal.
 - Gallium can also be obtained from **bauxite**, an ore that is the world's main source of aluminum. Bauxite is mined in quantities matching Chinese output by countries like **Australia** and **Guinea**.



Expansion/Sources: Germanium

In 2021, China produced 95 of 140 megatons (68%) of germanium. China is home to the world's single largest producer: **Yunnan Germanium** with a 25% market share. Although the U.S. is a domestic producer of germanium at mines in **Alaska** and **Tennessee**, America still imports substantial amounts—**with over 50% of imports sourced from China**.

Source/Origin	Portion of Total U.S. Imports
China	54%
Belgium	27%
Germany	9%
Russia	8%
Other	2%

Germanium is widely used in consumer electronics and a key component for producing **fiber optics, solar cells, and infrared optics**. Germanium is also an important polymerization catalyst for the production of PET plastic, a type of strong and reusable plastic. For military purposes, germanium is used in sensors like **radar** and advanced **communications equipment** with naval, aerospace, and space applications.

Germanium is primarily acquired as a **byproduct of zinc processing**, and the **U.S. has substantial zinc deposits** in **Alaska, Tennessee, and Washington** estimated to contain ~2,500 tons of germanium. The U.S. consumes an estimated ~33 tons of germanium per year, double the Defense Logistics Agency's (DLA's) estimated strategic stockpile of ~17.6 tons. DLA initiated a program to **recycle** scrap germanium recovered from decommissioned military equipment with an expected yield of ~3.3 tons per year. In addition, the largest zinc smelter in the U.S. announced in 2022 a \$90 million germanium and gallium processing facility with an estimated capacity of ~44 tons of germanium per year.

It's probable that, in the short term, expansion of recycling programs would be able to supply the consumption of germanium for at least military, if not also commercial, use. With existing domestic deposits and expanding processing capacity, the U.S. will be capable of achieving full domestic production.



Figure 1: The windows of this Bradley Fighting Vehicle contain high-grade germanium, one of many sources of that could be recycled for reuse.

Expansion/Sources: Gallium

China and Russia are the leading producers of gallium, with **China accounting for 95% of global production.**

The vast majority of gallium imported into the U.S. is in the form of **gallium arsenide (GA)** wafers rather than raw gallium, with imports totaling \$170 million (GA) and \$700,000 (raw gallium).

Gallium arsenide is used in **integrated circuits and optoelectronic devices**, including **laser diodes and light emitting diodes (LEDs)**. The diodes are key for aerospace applications, consumer goods, and equipment spanning multiple industries, including medical and communications.

The U.S. currently imports around 50% of its gallium from China:

Source/Origin	Portion of Total U.S. Imports
China	50%
United Kingdom	18%
Germany	10%
Ukraine	9%



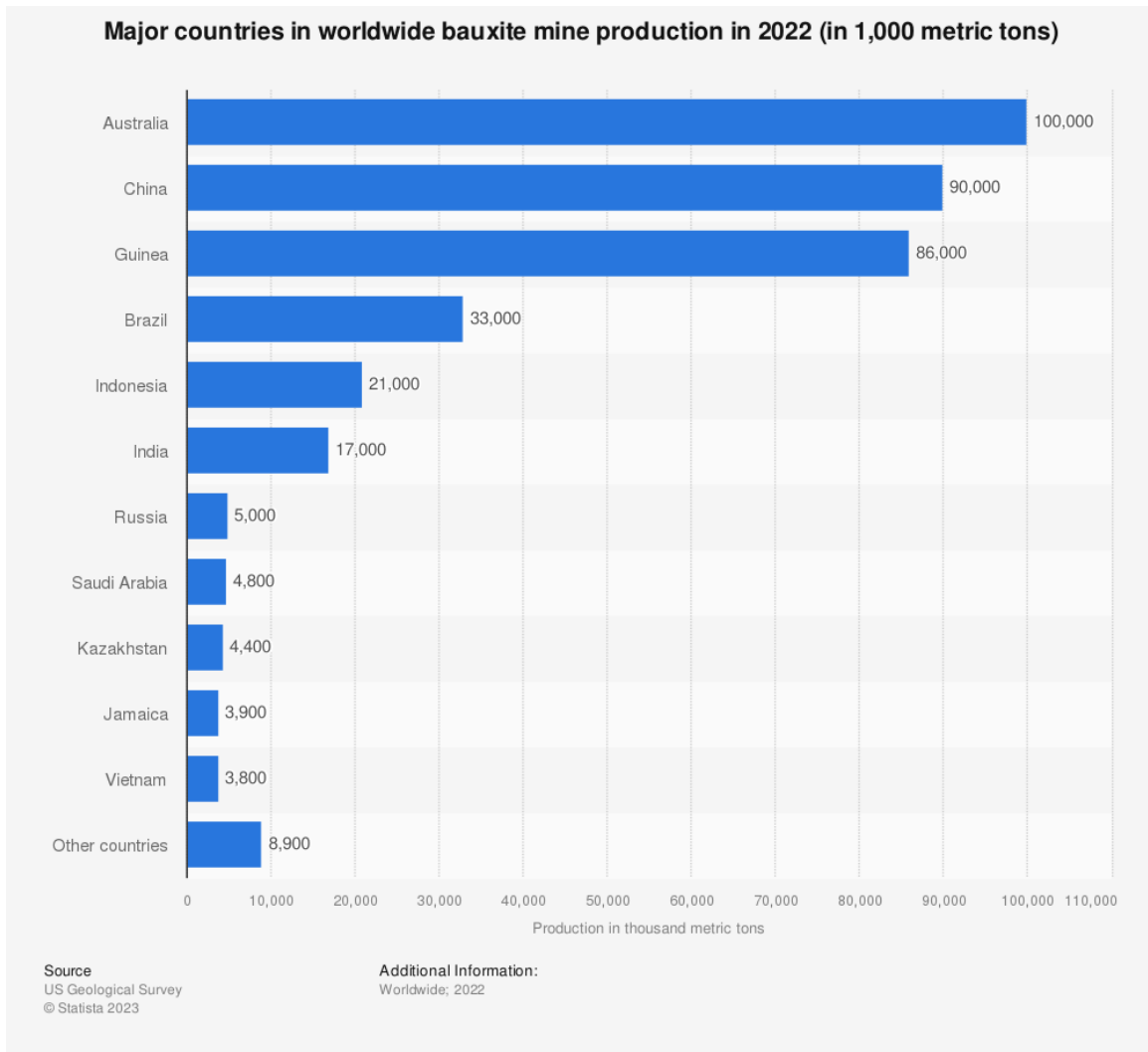
Other	13%
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While China currently produces 95% of the world’s **low-grade gallium**, this is likely due to other producers scaling down because of Chinese oversupply. **Germany and Kazakhstan** effectively ceased production in 2016 and 2013, respectively.

China is also the leading producer of **high-grade gallium**, alongside **Japan, Slovakia, and the U.S.**, with the UK ceasing production in 2018.

Most gallium is produced as a byproduct of processing **bauxite**—an ore that is the world’s main source of aluminum—and as a residue from the processing of zinc. The leading producers of bauxite are **Australia, China, and Guinea**. Gallium exists in bauxite at 50 parts per million, which means the U.S. has an estimated 15,000 metric tons of gallium that is not currently extracted but may be economically viable if Chinese restrictions result in price increases.

Figure 2: Leading Bauxite exporters, via Statista.



Notably, U.S. suppliers stockpiled gallium before the Chinese introduced tariffs in 2018, and recycling capacity has expanded in recent years with an American company in Utah recovering and refining high-purity gallium from scrap.

The aggressiveness with which China will restrict imports is still unknown. Although the potential upward price movement could make production more economically viable for non-Chinese producers, it could take months to retool and add refining lines at existing facilities, and even longer for former producers to restart production.

Additional sources: [U.S. Secretary of Defense for Acquisition, Technology and Logistics](#); [U.S. Geological Survey on Gallium and Germanium](#); [Statista for Imports/Production](#)



How Exiger Can Help

Trade restrictions are becoming some of the more unpredictable and acute risks that complex supply chains face. Exiger's integrated products can help identify and mitigate this risk by monitoring global trends and providing in depth knowledge of parts and suppliers across the entire supply chain.

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This client alert was compiled by [Adam Wren](#) of Exiger Government Solutions.



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