



## China's export control measures for raw material

### Why in news?

The Chinese Ministry of Commerce announced that it would implement export controls on items related to gallium and germanium which led to a spike in the prices of essential raw materials.

### What are the curbs announced by China?

- According to China, the regulations were being imposed 'in order to safeguard national security interests'.
- These control measures will be enforced from August 1, 2023.
- **Impacts** - China's controls will apply to 8 gallium-related products and 6 germanium products.
- The export operators of gallium and germanium would now have to acquire a specific export licence.
- The application process requires operators to list the importers, end-users and end use.
- **Crime** - Exporting without permission will invite administrative penalties and the exporter will be held 'criminally responsible'.

### Why China imposed export controls?

- **Geopolitical backdrop** - China and the U.S. have been locked in a technology trade war that has been escalating since 2019.
- In October 2022, the U.S. Department of Commerce had implemented a series of export control measures to protect its 'national security and foreign policy interests'.
- These measures restrict China's ability to obtain advanced computing chips, develop and maintain supercomputers, and manufacture advanced semiconductors.
- The U.S. accused China that it was using the items and capabilities to produce advanced military systems.
- **Others** - Japan and the Netherlands followed suit this year and held that the measure was necessary on 'national security grounds'.
- **China** has used the same reasoning of 'safeguarding national security interests' for its latest order.

*The Netherlands is the home to the world's most important chip-making equipment manufacturer ASML.*

## Why is it a matter of concern?

- China is the world's leading producer of both germanium and gallium.
- China produces 60% of the world's germanium and 80% of gallium, according to the Critical Raw Materials Alliance.
- Germanium and gallium are key to the production of semiconductors and other high-tech products.
- Now semiconductors have become a flashpoint between the West and China in the ongoing chip-war.

## Countries' response

- The European Commission has recognised it as a '*critical raw material*'.
- The Commission's import dependency on China stands at 71% and 45% for gallium and germanium respectively.
- In India, the Ministry of Mines identified the two elements to be crucial for the country's economic development and national security.
- The U.S. has firmly opposed the export controls of China.

## How does China look at these allegations?

- **Chip war** - Few see these control measures as China's countermeasures to the U.S's decoupling through hegemonism.
- But, China has denied the assertions that the export measures were targeted at a specific country.
- China has stressed that it is fair, reasonable and non-discriminatory export control measures.

## How will India be affected?

- The restriction of the export of gallium and germanium will impact semiconductor manufacturing across the globe but the impact is limited.
- The Chinese export controls are expected to have a short-term impact on India and its industries due to the disruption in immediate supply chains.
- The price hike resulting from the export control order would affect the cost and availability of chips, potentially impacting India's chip-making plans.

*India is totally import-dependent for germanium and gallium.*

## What is the way ahead for India's Semiconductor industry?

- To ensure a reliable supply chain and long-term consequences for India's semiconductor industry few other factors has to be considered such as -
  - Alternative supply sources
  - Domestic semiconductor production capabilities
  - Strategic partnerships like the India-U.S. Initiative on Critical and Emerging Technology ([iCET](#))

- **Opportunity** - India can see this scenario as an opportunity to move from import-dependent.
- India can focus on waste recovery from zinc and alumina production to produce the 2 critical minerals which are by-products of the two elements.
- Substitutes as indium and silicon could also be considered.

## Quick Facts

### Gallium

- Gallium is a soft, silvery metal that is in a liquid state near room temperature.
- It has a low melting point which helps in the production of semiconductors and electronic components.
- Gallium is used to make gallium arsenide which forms the core substrate for semiconductors.
- It is used in the manufacture of integrated circuits, light-emitting diodes (LEDs), and solar cells.
- It also used in automotives and lighting, and for sensors in avionic, space and defence systems.
- There are some Gallium-based compounds which also have medical applications, including the treatment of certain types of cancers.

### Germanium

- Germanium is a soft, silvery semi-metal found as a by-product of processing bauxite and zinc ores.
- The semi-metal is a good element for use as semiconductors.
- It is used in a variety of applications, including fibre-optics, infrared optics (night vision goggles), and solar cell technologies, and infrared sensors.
- Germanium has also been found to have some medicinal uses and is sometimes used as a dietary supplement.

## References

1. [The Hindu - Why is China limiting exports of raw materials?](#)
2. [IE - China to restrict exports of chipmaking materials](#)
3. [Business Today - Why is China restricting 'germanium' and 'gallium' export?](#)
4. [CNBC - China curbs exports of metals critical to chips and other tech](#)



**IAS PARLIAMENT**  
*Information is Empowering*

A Shankar IAS Academy Initiative