

## Uses & Applications

Tungsten's unique properties make it excellent for industrial applications in the following sectors:

### By application:

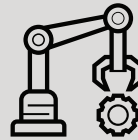
- Automotive parts
- Aerospace & Defense
- Industrial machinery
- Drilling
- Boring and cutting equipment
- Logging & Mining
- Electrical & electronics appliances

### Legend:

- Tungsten carbide
- Tungsten alloys & mill products

Scheelite (CaWO<sub>4</sub>) mineral ore is the preferred source of tungsten

### By end-use:



Automotive Manufacturing



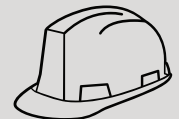
Aerospace & Defense



Electronics



Oil & Gas



Mining



# Tungsten - Why is it critical?

## Unique Characteristics

Tungsten is a rare, high-density metal with the highest melting point of all elements. It is incredibly durable due to its exceptional hardness, strength and resistance to corrosion.

### Melting point:

Highest melting point of any metal, with an approximate melting point of 3,422 °C (6,192 F)

3,422 °C

2,623 °C

1,668 °C

1,538 °C

1,370 °C

### Strength:

Strongest metal in nature with an ultimate tensile strength (UTS) of 1,500 to 2,000 megapascals (MPa).

2,000 UTS

1,500 UTS

1,200 UTS

700 UTS

370 UTS  
240 UTS

410 UTS  
370 UTS

800 UTS  
400 UTS



TUNGSTEN



MOLYBDENUM



TITANIUM



IRON



STAINLESS STEEL

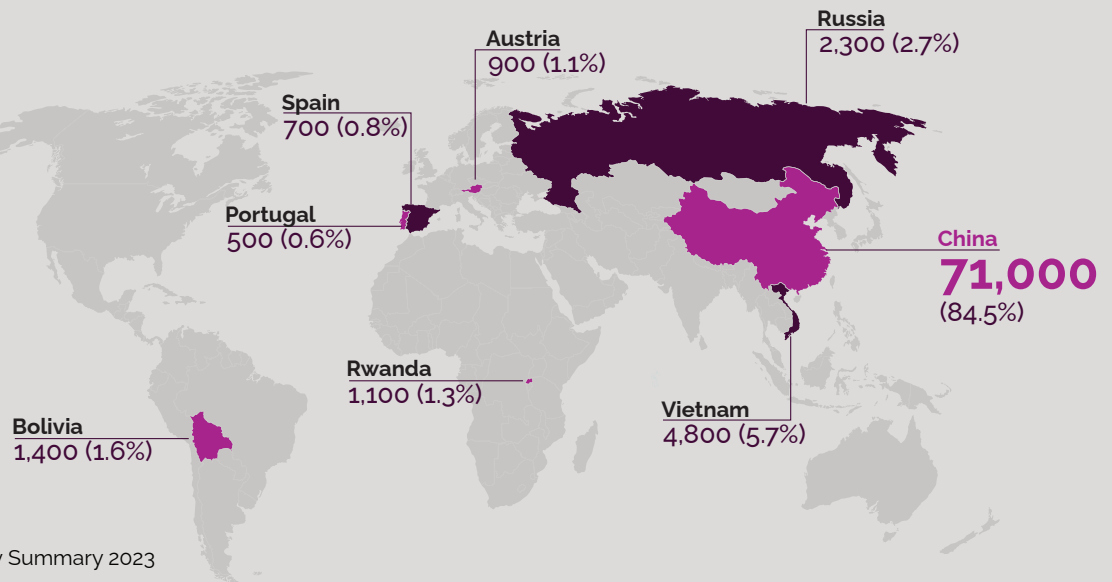
## Tungsten Supply

### Global production of tungsten in 2022, by country (Mt)\*

China is the world's largest tungsten producer and exporter, with

**84.5%**

of the world's tungsten in 2022.

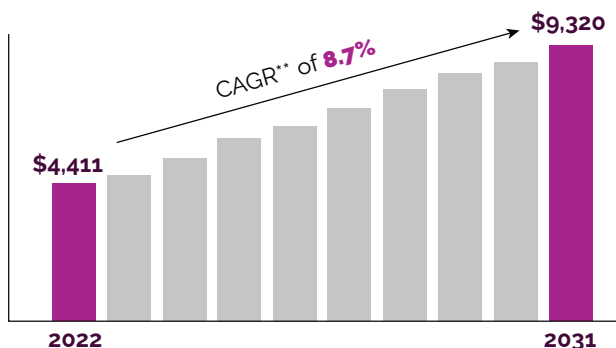


\*source: USGS Mineral Commodity Summary 2023

### Demand Outlook

Long-term demand for tungsten products is supported by automotive, mining and construction sectors, specifically in the form of wear-resistant tungsten carbides. Renewable energy, defense and aerospace are among the fastest growth segments.

### Global tungsten market size projection (in USD Million)\*



\*source: straitsresearch.com

\*\*compound annual growth rate

### Market Factors

#### No domestic tungsten sources

There has been no North American production of tungsten concentrates since 2015.

#### Potential supply disruptions

China's dominance of global tungsten primary production has raised concerns about western supply chain vulnerabilities in the event of conflict or embargo.

#### Critical and strategic



Tungsten has been added to the U.S. and Canada lists of critical metals because of its strategic importance to the countries' economies and national security.

The Canada-US Joint Action Plan on Critical Minerals Collaboration is a strategic plan aiming to advance bilateral interest in securing supply chains for the critical minerals needed for strategic manufacturing sectors, including communication technology, aerospace and defense, and clean technology.