

## The Benefits That Beryllium Brings To Society

Beryllium brings unrivalled advantages to its end-use applications, whether used in its pure metallic form, combined or alloyed in small amounts with other metals or as a beryllia ceramic. The use of beryllium has improved safety and enabled technological breakthroughs previously thought unattainable. Products containing beryllium are everywhere you are – improving your life at home, at work, on the road, at the airport or while undergoing medical procedures. Beryllium is lightweight and recyclable, important to the environmental impact of any of its end-use applications. You'll also find it at the centre of exciting developments in alternative energy.



Products containing beryllium are everywhere you are, for example, improving your life while undergoing medical procedures

Because of its unmatched combination of qualities, beryllium has become an increasingly important material for a wide range of commercial and governmental applications.

### Critical-Strategic Material

Beryllium has been designated as a critical material ([European Commission Critical Raw Materials for the EU – Report of the Ad-hoc Working Group on defining critical raw materials, 2010](#)). Raw materials are designated as being “critical” when the risks for supply shortage and their impacts on the economy are higher compared to other raw materials.

According to the European Commission “The most significant threats originate from perceived risks associated with the use of beryllium in electronic products. EU regulatory fears and NGO propagated “banning” of the use of materials containing beryllium lead to unwarranted attempts to find substitutes **that do not offer the same qualities with respect to performance, sustainability and environmental protection**. The data that authorities rely on is not current and does not reflect the most recent scientific studies. In general, authorities are reluctant to break from the past and are not open to new scientific studies even if they are conducted in accord with OECD guidelines or originate from proven workplace strategies. Because the cost of beryllium is high compared with that of other materials, it is used in applications in which its properties are crucial. In some applications, certain metal matrix or organic composites, high-strength grades of aluminium, pyrolytic graphite, silicon carbide, steel, or titanium may be substituted for beryllium metal or beryllium composites. Copper alloys containing nickel and silicon, tin, titanium, or other alloying elements or phosphor bronze alloys (copper-tin-phosphorus) may be substituted for beryllium-copper alloys, but these substitutions can result in substantially reduced performance.” (European Commission Critical Raw Materials for the EU – Report of the Ad-hoc Working Group on defining critical raw materials, 2010).

Beryllium has also been determined to be the only critical metal by the United States Department of Defense (Office of the Under Secretary of Defense Acquisition, [Report of Meeting Department of Defense The Strategic Materials Protection Board, December 12, 2008](#)). Their decision was based on the fact that “high purity beryllium is essential for important defense systems and unique in the function it performs” and that full involvement and support is necessary to sustain and shape the strategic direction of the market such that there must not be a significant and unacceptable risk of supply disruption.” “High purity beryllium possesses unique properties that make it indispensable in many of today’s critical U.S. defense systems, including sensors, missiles and satellites, avionics, and nuclear weapons.”



The US Department of Defense says that beryllium's properties make it indispensable in many of today's critical U.S. defense systems.

It has been well established that the substitution of beryllium is generally not possible. The United States Geological report on Beryllium (2010) states: “**Due to its high costs beryllium is only used in applications where its properties are crucial. Therefore, it is hard to substitute. Nevertheless,**

*certain metal matrix or organic composites, high-strength grades of aluminum, pyrolytic graphite, silicon carbide, steel, or titanium may be substituted for beryllium metal or beryllium composites. There are some more possible substitutes in specific alloys, but often combined with a loss in performance.”*

Beryllium is critical to the Galileo project. According to the European Commission’s Directorate General (DG) Enterprise & Industry: “Galileo will underpin many sectors of the European economy through its services: electricity grids, fleet management companies, financial transactions, shipping industry, rescue operations, peace-keeping missions, all depend heavily on satellite navigation technology. Galileo will make Europe independent in a technology that is becoming critical, including for strategic areas such as electricity distribution and telecommunication networks. Galileo is expected to deliver EUR 60 billion to the European economy over a period of 20 years in terms of additional revenues for the industry and in terms of public and social benefits, not counting the benefit of independence.”



Beryllium is critical to the Galileo project - Europe's global navigation satellite system