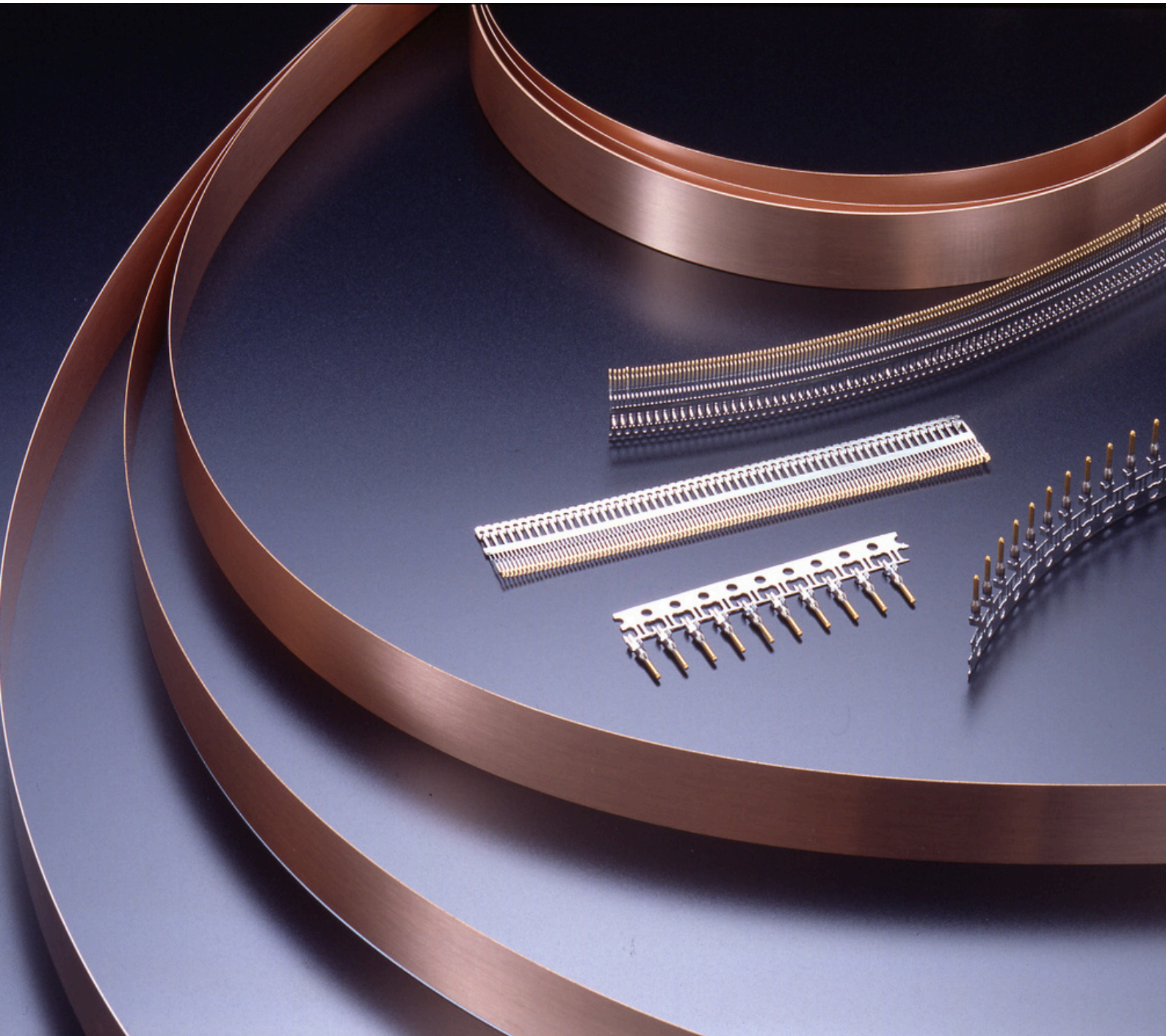
BeST
Beryllium Science & Technology Association

2024 - 2029

CHARTER FOR THE BERYLLIUM INDUSTRY

August 2024



Overview

The Beryllium sector is pleased to express its expectation for an industrial policy during the next five years of EU legislature that is based on three key principles: **competitiveness, sustainability and Health & Safety**.

Know the metal: Beryllium's factsheet

Beryllium is a metal with **unique properties:**

- Even if **33% lighter than aluminium,** it is **6 times stiffer than steel.**
- It has a **high thermal conductivity.**
- Is **transparent to x-rays.**
- A stable metal under changing temperatures.
- High melting point (±1287 °C)**.**

And it has **many key applications:**

- **Connectors** of copper beryllium in **windmills, cars and planes a.o.**
- **Aerospace and aviation, electronics, automotive and defence** (light weight components).
- **X-ray windows** for high resolution imaging **(e.g: cancer detection)**

… and many others

Competitiveness

Innovation

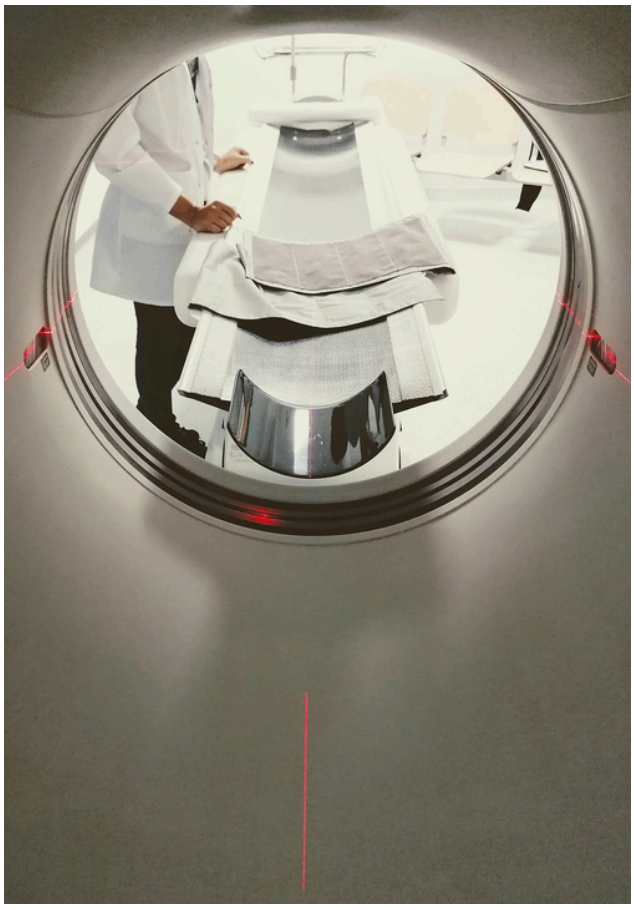
Like many other elements, beryllium has unique properties (see separate text box on this page), which enable the development of products that improve performance and accelerate innovation in a variety of sectors, including electronics, healthcare, renewable energies, mobility, aerospace, defence, and others.

Critical Raw Material

The importance of beryllium for industrial development has been recognised by the EU and other jurisdictions by giving beryllium the status of a critical and/or strategic material. At the same time, policies and regulations often undermine the application of beryllium and related R&D. We expect in the new legislature **a more consistent approach to beryllium** where for example health and safety policies or chemicals **legislation take into consideration the CRM status of beryllium** (Critical Raw Material).

Trade

The EU sources refined beryllium exclusively from the U.S. Kazakhstan and Japan. These are considered as reliable trade partners by the EU.
BeST recommends **reinforcing these strategic partnerships,** ensuring a global strategy for responsible imports, and **providing de-risking mechanisms for investments** in both EU and third countries.



A CT scanner from its interior. Beryllium remains indispensable for high-resolution medical radiography, including CT scanning and mammographies.

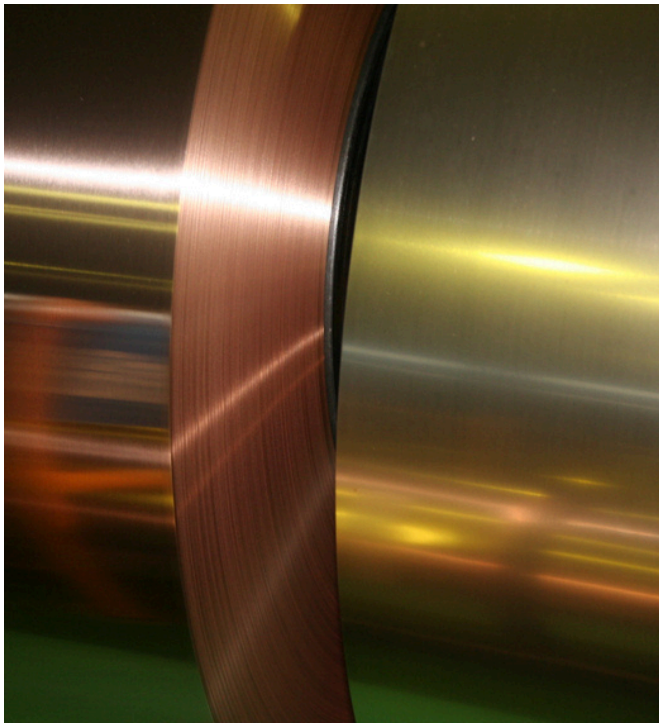
Actions

1) An EU plan on advanced materials:
This plan, announced for 2024, needs to promote the use of beryllium as a safe, sustainable, and circular advanced material required for the green and digital transition.

2) 2023 Recommendation on critical technology areas:
Initiatives following this recommendation, such as risk assessments, should recognise the importance of beryllium in many areas.

3) Implementation of the Critical Raw Materials Act
Implementing measures should promote the use and availability of beryllium, not include measures that lead to the opposite, such as unrealistic recycling targets.

4) The EU Defence and Space Strategy should highlight the important role of materials, including beryllium in the development of new generations of advanced armaments and space hardware such as satellites.



Copper-Beryllium (CuBe) alloy.
80% of beryllium metal is used as alloying element in copper.

Sustainability

Product durability and low energy consumption

Beryllium has unique and unmatched properties which make it the best suited material to achieve the desired performance and longevity of the product. Several studies performed on the performance benefits of beryllium-containing alloys have demonstrated that **potential substitutes do not provide the same level of performance, leading to reduced energy efficiency and product life.** Beryllium-containing copper alloys feature the best possible combination of performances in term of mechanical resistance, electrical conductivity and formability which fosters reliability, miniaturisation, low energy consumption and longevity of electronic devices.

Recycling

The relative high price of beryllium is an important driver for recycling. **Most of the beryllium put on the EU market is recycled.** Recycling beryllium scrap in pure form is possible and practiced in most cases. **Extracting beryllium from beryllium containing alloys is not practicable**. The percentage of beryllium in copper beryllium is low, 1-2% on average, and **the benefits of extraction will not outweigh the costs.** However, copper beryllium alloys, which represent the bulk of beryllium uses (est. >80%), is recycled as copper beryllium alloy and employed as such in the next use (est. 40-50%). The remaining copper beryllium (est. 50-60%) is reused as copper. As Copper beryllium represents only about 0.15% of all copper alloys, there are only traces of beryllium found in the recycled copper stream (1-2ppm) presenting no risk to recycling workers.

Beryllium is also used as an additive to both the production and recycling of aluminium magnesium (AlMg) and magnesium alloys. Used in small amounts for this application, 5-10 ppm parts per million, the beryllium acts as oxidation inhibitor. Without this addition of beryllium, there will be no recycling of these important materials, resulting in sharply increased carbon footprints, dependency of non-EU recycling activities, low yields and higher energy consumption and emissions.

Renewables

Beryllium ceramic is used in concentrator photovoltaic cells that generate electricity from solar power, boosting the efficiency of the cells by more than 40%. Alloys containing beryllium can be found in connectors used in thin film solar energy technologies. Beryllium metal is used to control the punishing high-temperature plasma found in fusion reactors, which may prove to be the clean, virtually unlimited energy source of the future.

The use of beryllia ceramic in early electronic ignition systems led to a 20% increase in automotive fuel efficiency. **That breakthrough**, in other words, **amounted to a savings equivalent to taking one of every five cars off the road.** More recently, alloys containing beryllium are enabling all-electric and hybrid electric vehicles to operate reliably at high voltages.

Actions

1) Recycling targets developed under the Critical Raw Materials Act **should be realistic** and should exclude material that is used in extreme low percentage in alloys.

2) The sustainable finance principles (taxonomy) should be **developed promoting those critical raw materials** that support innovation in renewable energies.

Beryllium ceramic is used as a photovoltaic concentrator, boosting the efficiency of the panel cells by more than 40%

Health & Safety

Occupational Exposure Levels

BeST is proactively engaged in supporting the implementation of the EU binding occupational exposure limit adopted for beryllium in July 2019. Moreover, **BeST supports the dissemination of best practices for the use of beryllium-containing alloys to workers** through its BeST's Voluntary Product Stewardship Program (VPSP) – Be Responsible – www.berylliumsafety.eu

Be 4 Responsible
Beryllium Product Stewardship

Risk-based approach for chemicals regulations and Chemicals Strategy for Sustainability

When considering regulatory measures applicable to raw materials, **a risk-based approach, where not only hazard but also exposure is considered, is the efficient streamlining tool to use**: **Risk = Hazard x Exposure.** On the contrary, the use of a mere hazard-based approach would jeopardise the performance of the end-products by promoting the phasing out of materials that are used safely based solely on their hazard classification. Regarding beryllium-containing materials, risk of exposure is limited to the workplace which is acknowledged by the REACH evaluation (Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation). The risk related to beryllium-containing products is controlled by risk management measures including a binding, harmonized occupational exposure limit (OEL) in EU and a Voluntary Product Stewardship Program initiated by the beryllium industry.

A Flexible framework to adapt to the material's specificities

BeST calls for flexibility in the benchmarks for sourcing, processing, and recycling of raw materials. **A balanced approach is necessary** to allow industry compliance with regulations without overburdening it, with market-based measures being preferred where feasible.

Hazard classification of substances

The classification of substances under the CLP regulation (Classification, Labelling & Packaging of chemicals) **should be made more efficient by allowing either stakeholders to propose a reassessment of an existing classification of a substance or a Member State to do so**. In the case of beryllium, a differentiation between the hazards of beryllium metal and soluble beryllium compounds, as done with Nickel, should be researched according to the most recent and reliable scientific evidence.

Due to its unique density and rigidity, as well as its thermal and magnetic properties, the mirrors of the James Webb telescope were made of beryllium using the highest health & safety standards.

Actions

REACH Review

a) The safe use concept is to be included. It stipulates that a substance proven to be safe should not be object of regulatory targeting, in line with EU regulatory principles which state that restrictive requirements must not go further than the necessary measures to achieve their objective.

b) Risk based approach must be preferred as streamlining tool. The implementation of the generic risk approach represents a departure from the current risk-based regulatory approach and will erase decades of risk management assessments and measures already implemented at EU level as well as result in duplication of efforts for both industry and authorities.

c) Obligations for lower tonnage substances. The inclusion of new obligations for lower tonnage substances will entail disproportionate administration and information requirements for small and highly specialised sectors, largely dominated by SMEs (Small and Medium Sized enterprises).

d) Industry engagement and consideration of industry data by authorities **should be improved.** Indeed, industry is best fit to provide the necessary data for assessments under REACH.

RoHS a.o.

Substances that have been reviewed should not been reviewed in either different legislative processes or review processes unless substantial new scientific data has become available. Repetitive reviews are time consuming and give an unwanted and unjustified signal to the markets.

Reassessment of outdated hazard classifications

Based on the most recent epidemiologic studies, a differentiation between the hazards of beryllium metal and soluble beryllium compounds, as done with Nickel, should be researched.

Contact information

Rue Belliard 205
1040 Brussels
Belgium

Telephone: +32 471 06 47 86
Email: info@beryllium.eu
Web: www.beryllium.eu / www.berylliumsafety.eu