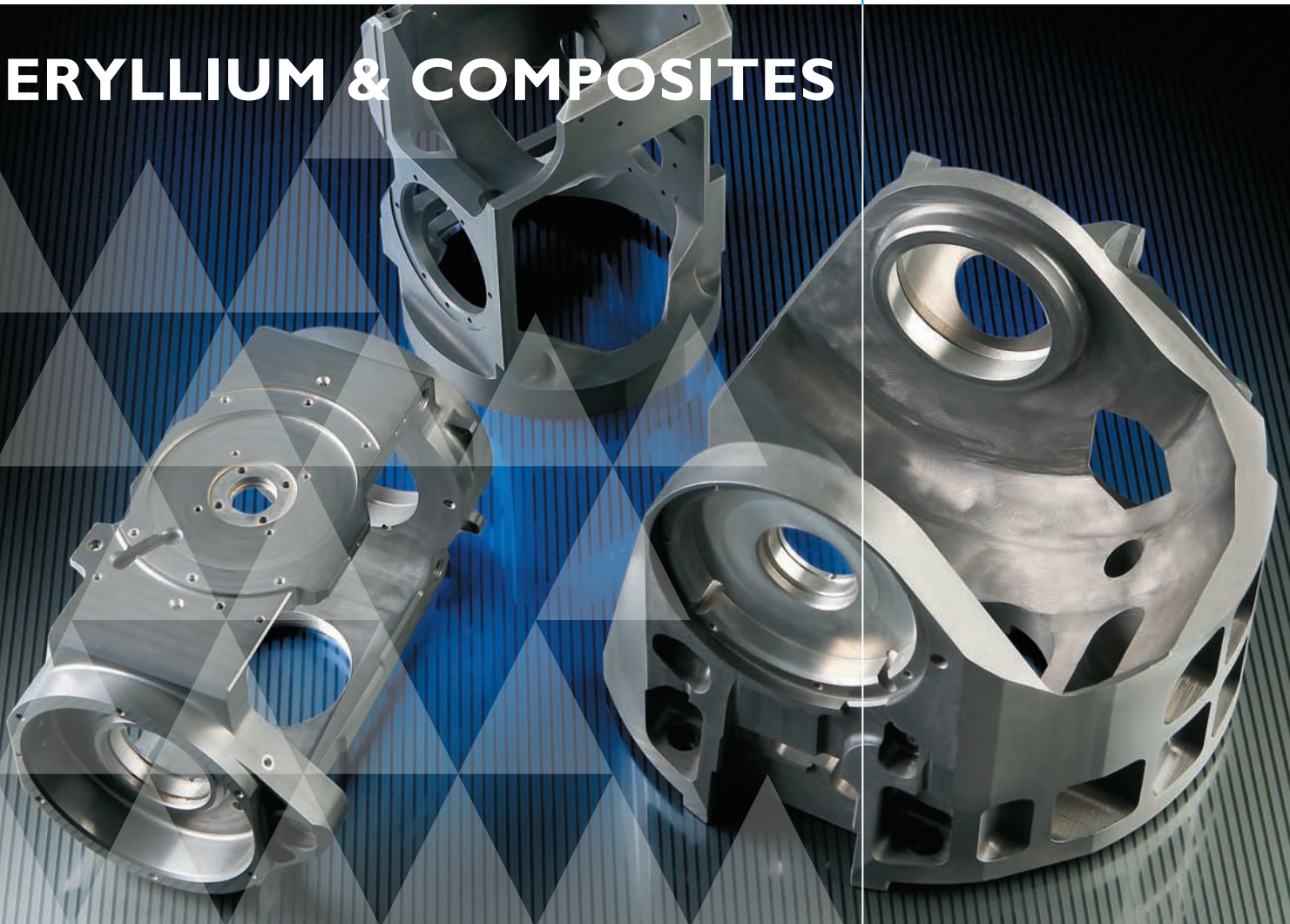




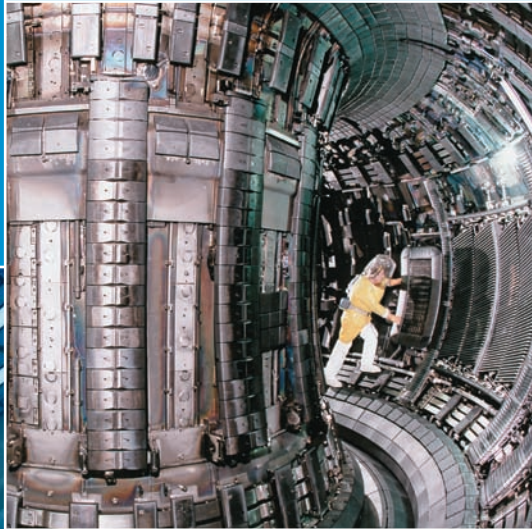
**MATERION**

# **BERYLLIUM & COMPOSITES**



**MATERION  
BERYLLIUM  
& COMPOSITES**

# SOLUTIONS DELIVERED



**BERYLLIUM** is an essential metal for a range of advanced technologies, including nuclear fusion, space telescopes, medical X-ray equipment, optical systems and defense applications. Beryllium was first discovered in 1797 by Louis Nicolas Vauquelin and with an atomic weight of 9.012. It is an extremely light metal, that can provide high stiffness and hardness, and reacts predictably in temperature extremes.

Today, Materion is the only integrated supplier, from mine to mill of beryllium metal, beryllium alloys and metal matrix composites. Our materials present designers with unique combinations of properties for use in a wide range of high-performance applications.





# BERYLLIUM'S REMARKABLE PROPERTIES

Among beryllium's many outstanding properties, it is one of the lowest density metals, has a very high melting point and maintains useful mechanical properties at higher temperatures when compared to alternative materials.

## THE WORLD LEADER IN BERYLLIUM-BASED METALS

For more than 80 years, Materion Beryllium & Composites has played a key role in the development of beryllium-based metals and composites. Beryllium's remarkable properties – including stiffness, high strength, low density, heat resistance and reflectivity – make it the material of choice for a wide range of demanding end-use applications. Beryllium provides the superior stability required by precision optics on satellites, fighter jets and research telescopes. Beryllium materials provide the strength and light-weight properties designers of space structures require. Beryllium's nuclear properties make it ideal for use in multiplying, moderating and reflecting neutrons in the design of scientific reactors.

## FULLY INTEGRATED FROM MINE TO MILL

Materion is the world's only fully integrated developer and supplier of engineered beryllium materials, from mining to mill products and value-added fabrication. We design and manufacture pure metallic beryllium and metal matrix composites (MMCs) at our flagship facility in Elmore, Ohio, where we recently brought on line a \$94 million primary beryllium production facility. The project was jointly funded by the U.S. Department of Defense to provide a secure, long-term source of beryllium products for strategic markets.

## COST-EFFECTIVE COMPOSITES

For applications that do not require the full complement of pure beryllium's properties, MMCs can be a cost-effective alternative. We offer several MMC product lines. E-Materials are high-performance MMCs with thermal, physical and mechanical properties ideally suited for electronic packaging applications. AlBeMet® is a composite of pure aluminum and beryllium which gives it the toughness, ductility and machinability of aluminum combined with the unique properties of beryllium. And we have expanded our materials technology beyond beryllium. SupremEX® is a non-beryllium MMC that combines pure aluminum with ultrafine reinforcements to increase the strength and stiffness.

## APPLICATION DEVELOPMENT ENGINEERING

Materion Beryllium & Composites' SPADE (Special Products and Applications Development Engineering) group can quickly react to customer needs and provide total product solutions from start to finish. Our engineers are happy to help with application design and development, concurrent engineering and fabrication support.

## RESPONSIBLE STEWARDSHIP

At Materion Beryllium & Composites, it is our policy to design, manufacture and distribute products and to manage, recycle and dispose of materials in a safe, environmentally responsible manner. The health and welfare of people and the environment are our highest priority, and we are proud of our world-class safety and environmental efforts.

## 50 PERCENT STIFFER THAN STEEL

Beryllium metal has a resistance to deformation almost 50% greater than that of steel with only about one-fourth the weight.

## 3 TIMES STIFFER THAN ALUMINUM

Aluminum-beryllium containing 62% beryllium has resistance to deformation almost three times that of aluminum and weighs approximately 25% less.

## 1.85 TIMES THE DENSITY OF WATER

Beryllium has a very low density, along with one of the highest melting points of light metals and exceptional flexural rigidity.

## 216 VALUE FOR THERMAL CONDUCTIVITY

High values for specific heat (1925 J/kg/K) and thermal conductivity (216 W/mK) make beryllium the metal with the best heat dissipation characteristics per unit weight.

## MARKETS SERVED

- Optics
- Nuclear
- Avionics / Electronics Packaging
- Space Structures
- Commercial

## KEY PRODUCTS

- Beryllium
- AlBeMet®
- E-Materials
- Ultra-high Pure Beryllium
- SupremEX®
- Beryllium & BeO Powder and Chemicals

## SERVICES & TECHNOLOGIES

- Near Net Shape Technology (NNS)
- Hot (HIP) & Cold (CIP) Isostatic
- Pressing Vacuum Hot Pressing (VHP)
- Hot Roll / Extrude / Investment Casting
- Container-less Zone Refining
- Electron Beam Welding (AlBeWeld®)



**MATERION**

#### **MATERION BERYLLIUM & COMPOSITES LOCATIONS**

Main Office and Production  
Elmore, Ohio

International Sales Offices  
Reading, England  
Shanghai, China  
Singapore  
Tokyo, Japan

#### **ABOUT MATERION**

Materion is among the world's premier providers of advanced materials solutions and services. Materion offers a broad scope of products, services and expertise needed to drive our customers' growth and profitability and become their first choice for a partner. Materion Corporation common stock trades on the New York Stock Exchange under the symbol MTRN.

#### **MATERION BERYLLIUM & COMPOSITES**

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