PERFORMANCE MATERIALS

Materials Solutions that Fuel Innovation, Imagination, Performance & Profitability

Come explore new horizons with us.

MATERION

Materials that Stand Up to Your Designs

When it comes to ideas, the bigger, the better.

Engineers think big. The speed of technology doesn't scare them; nor do the demands of their respective markets. As they focus on new product designs, innovative applications and unprecedented performance, they should never be limited by the availability of appropriate materials.

Set them free with advanced materials solutions from Materion. We'll work with your team to identify or custom-engineer materials with all the properties and capabilities they need to bring their plans from concept to fruition.

Look through our e-book to experience the breadth and depth of solutions we offer. And please feel free to contact us anytime to discuss a particular challenge or design. We're here to help you succeed.

PERFORMANCE MATERIALS

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for profitable outcomes.

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Clad Metals

Custom clad metals open the door to bold new advances in technology and performance.

When a single metal simply won't deliver all of the properties your design demands, think of the advantages a clad metal could bring. We routinely work with more than 200 alloys — steel, copper, titanium, aluminum and refractory, as well as precious metals — and can join them in virtually limitless combinations to create solutions that maximize the benefits of each component material. This capability gives you the freedom to truly innovate.

Materion's custom clad metals support sophisticated electronic, mechanical, electrical and thermal applications in a variety of industries — automotive, consumer electronics, aerospace, medical, energy, mining and more. Need to add more strength or stiffness? Minimize corrosion? Increase conductivity? Our experience with virtually every base metal and cladding combination enables us to create your ideal material and help you bring your next-generation product designs to life.

Continuous coils of aluminum + copper clad can be stamped, formed and fitted to lithium-ion battery packs for EVs and hybrids. READ MORE >

DOVETAIL CLAD® METAL ENSURES SAFE, SECURE BATTERY CONNECTIONS

HIGH STRENGTH & STIFFNESS

Materion's clad metal capabilities offer engineers the opportunity to multiply strength and stiffness through strategic metal-alloy combinations.

HIGH CONDUCTIVITY

Electric current flows freely through our custom-engineered clad metals to ensure superior performance and exceptional efficiency.

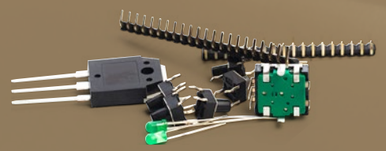
CUSTOMIZATION

Clad metals enable tremendous design flexibility, as engineers can spec any number of combinations to meet the needs of a particular application.

Clad Metals

Custom engineered clad metal strips encourage creative design

The new breed of electronic, mechanical and thermal applications requires a new mindset. Design teams are broadening the scope of their thinking to include imaginative combinations of metals that enhance performance, reliability, strength, stability and other desired properties. Materion's clad metal process joins dissimilar metals by using metallurgical diffusion without brazing alloys or adhesives to create versatile clad metal strips that fuel innovations.



Materion can provide a virtually infinite number of cladding options.

eStainless® Clad

Spread the heat without adding volume.

Smaller, thinner, lighter, hotter — as mobile technology continues to evolve, product development teams need materials that not only enable the technology but also manage the heat that's generated by these devices. eStainless clad combines the structural performance of steel with the conductivity of copper or aluminum, allowing heat spreading functionality to be designed directly into the structure of devices.

Our in-depth product brief details the exceptional properties of eStainless clad.
LEARN MORE >

Beryllium Products

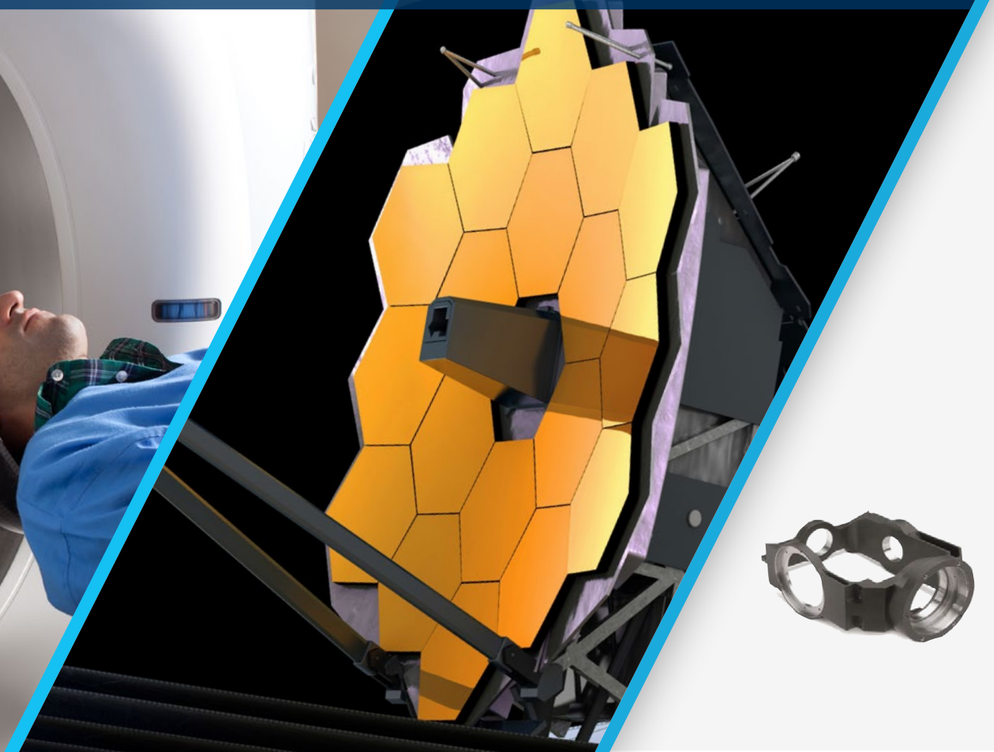
Materion is a world leader in developing beryllium and beryllium-based materials that drive innovation.

Recognizing its exceptional potential more than 80 years ago, Materion led the way in developing beryllium materials to support a broad range of technologies. Today, beryllium is the go-to solution for applications requiring outstanding strength-to-weight and stiffness-to-weight ratios, as well as high conductivity. Materion is the only fully integrated provider — from mining to milling, production and fabrication — to ensure supply stability.

Working closely with our customers, Materion has developed high-purity beryllium products to advance medical devices, nuclear technologies, space exploration, military aircraft and much more. Whatever your needs may be, we will help you improve the cost-effectiveness of your designs. We understand the unique properties of beryllium metals and components, and can help you leverage them to their fullest.

Beryllium metal is ideal for advanced technologies that require specific stiffness, fatigue strength and wear resistance. READ MORE >

BERYLLIUM METALS FOR AEROSPACE, MEDICAL IMAGING AND MILITARY/DEFENSE



VIBRATION DAMPING

A high vibration loss factor results in faster stabilization than other structural materials.

THERMAL CONDUCTIVITY & ISOTROPIC THERMAL EXPANSION

Unique properties ensure that Materion's beryllium products perform reliably in extreme temperature environments.

HIGH STIFFNESS

The high rigidity of beryllium makes it ideal for aerospace, defense and nuclear applications.

Beryllium Products

IF-1® X-ray window assemblies ensure image fidelity

For medical and industrial applications ranging from CT scan systems to handheld XRF analyzers to baggage inspection equipment, Materion's beryllium X-ray components take clarity to the next level. Our diffusion bonding process ensures high-temperature performance without compromising beryllium strength for superior results.

Varex Imaging Corporation streamlined production of advanced X-ray systems with our high-purity beryllium X-ray windows. SEE HOW >

Beryllium is stronger than steel and lighter than aluminum.

50%

stiffer than steel

Truextent® Acoustic Beryllium

Domes and cones for studio-quality sound

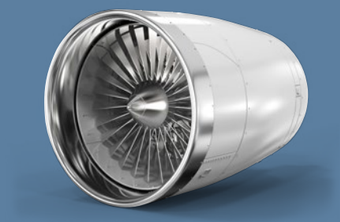
The clean, clear, detailed sound of speakers and headphones built with Truextent acoustic beryllium domes and cones is extraordinary. Lighter, stiffer and better damped than other materials, our genuine beryllium offers virtually distortion-free sound reproduction and captures subtle nuances of sound with unparalleled precision.

See why Truextent acoustic beryllium outperforms aluminum and titanium for high-clarity sound.
LEARN MORE >

Metal Matrix Composites

When conventional metals fall short, Materion creates composites that are truly greater than the sum of their parts.

Designing and engineering components for aerospace, astronomy, automotive, defense and space applications can be challenging, particularly when the available materials don't adequately fulfill your design requirements. Materion brings powerful materials together to create high-performing metal matrix composites (MMCs) that possess all of the mechanical and physical properties you need.



Choose from AlBeMet® aluminum-beryllium composites, AlBeCast® investment casting alloy composites, and SupremEX® aluminum-silicon-carbide composites. Each composite delivers its own set of benefits, ranging from weight reduction to high strength and stiffness. We'll work with you to identify the unique formulation that's ideal for your design.

SupremEX aluminum-silicon-carbide composites improve wear resistance and offer high tensile and fatigue strength. READ MORE >

HIGH STIFFNESS & STRENGTH

MMCs offer the opportunity to lightweight structural designs.

HIGH FATIGUE STRENGTH

When compared to monolithic aluminum alloys, Materion MMCs have higher fatigue strength for extended product life and lightweighted designs.

FINER PARTICLE SIZE

Finer particles increase strength and enable use of conventional high-speed machining manufacturing methods.

Metal Matrix Composites

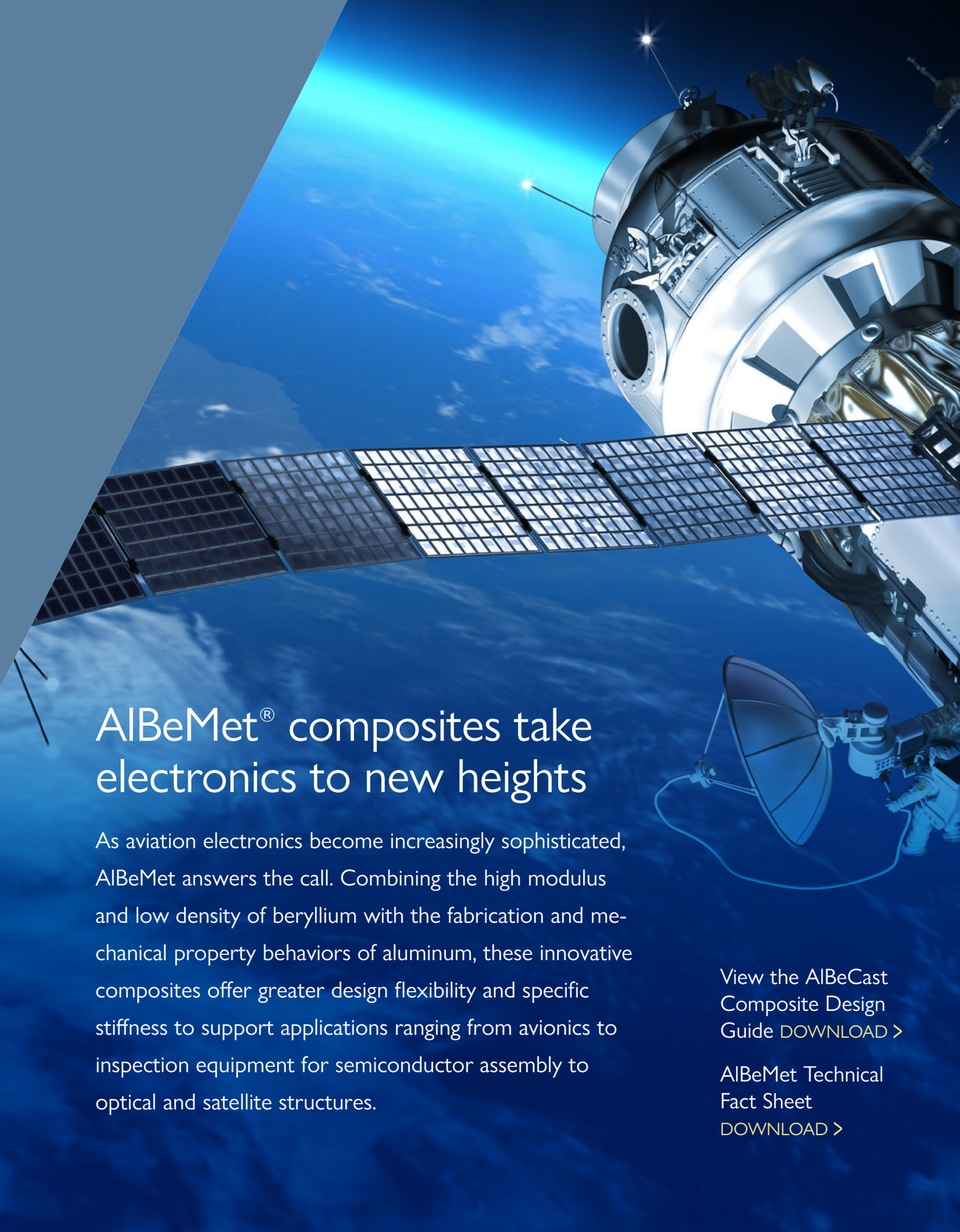
AlBeCast® Composites

A cost-effective alternative for aerospace applications

AlBeCast investment cast aluminum-beryllium composites provide many of the same mechanical properties as AlBeMet composite but, because they are cast through a near net-shape process that results in less material waste, they can be a more cost-effective option for certain applications. AlBeCast's high specific stiffness and low density make it an ideal choice for lightweighting aerospace components and aviation electronics housings.

SupremEX composite is 60% lighter than steel and 36% lighter than titanium.

60%
lighter than steel



AlBeMet® composites take electronics to new heights

As aviation electronics become increasingly sophisticated, AlBeMet answers the call. Combining the high modulus and low density of beryllium with the fabrication and mechanical property behaviors of aluminum, these innovative composites offer greater design flexibility and specific stiffness to support applications ranging from avionics to inspection equipment for semiconductor assembly to optical and satellite structures.

View the AlBeCast Composite Design Guide DOWNLOAD >

AlBeMet Technical Fact Sheet DOWNLOAD >

High Performance Alloys

Put these heavy hitters to work in harsh environments and demanding technology applications.

Industries that are exacting in their physical and mechanical property requirements — aerospace, automotive, construction and mining, consumer electronics, defense, oil and gas, manufacturing and industrial, and telecom, to name a few — inspire Materion to continue developing high performance alloys that help engineers meet challenges head-on.

Among our most popular high performance alloys are ToughMet®, for aerospace, heavy equipment, oil and gas equipment, and automotive; C-103 niobium alloy for satellite, rocket and jet propulsion applications; copper-beryllium alloys for electronic applications; PerforMet for powertrain and EV components; ULTRA 76 Plus tantalum alloy for performance in hydrochloric and sulfuric acid environments; and Alloy 360, whose high resistance to wear, corrosion, thermal shock and oxidation make it ideal for high-temperature applications in electrical and electronic systems.

For high strength, low friction and outstanding galling, wear and corrosion resistance – nothing else comes close.

THE UNCOMPROMISING PERFORMANCE OF TOUGHMET ALLOYS

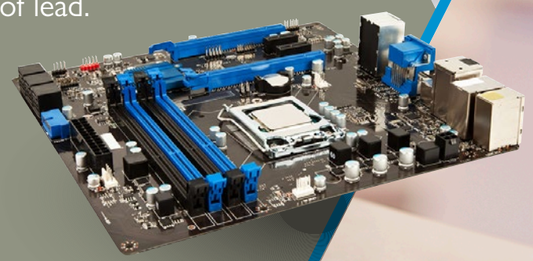
Conditions known for chewing up and spitting out parts as fast as they can be replaced have finally met their match. ToughMet copper-nickel-tin alloys bolster run times and reduce downtime, saving companies precious time and money.

See why L&H Industrial uses ToughMet alloy for its mining customers. WATCH NOW >

High Performance Alloys

M25 alloy – performance and reliability superior to any free machining copper alloy

Alloy M25 is a free machining, high-performance copper alloy that offers similar strength to that of Alloy 25, but provides greater machinability with the addition of lead. M25's properties minimize signal distortion in coaxial RF connectors and reduce power loss in circular connectors and contact probes and is ideal for contacts for electronics, aircraft and automotive applications.



Copper-Beryllium

… for energy efficiency and longer product life

Copper-beryllium alloys such as Alloy 25 and 174 are essential to today's dynamic mobility and electronics applications, helping designers build in higher electrical and thermal conductivity, enhanced functional performance and miniaturization of components and products, plus high strength, excellent stress relaxation and exceptional durability. In microelectronic devices, these alloys can also help improve energy efficiency and extend product life.

View our 84-page Guide to High Performance Alloys
DOWNLOAD >

Technical Ceramics

When thermal conductivity and heat dissipation are critical, think beryllium oxide and aluminum oxide industrial ceramics.

Need components that run cooler, perform better and last longer? Demanding industries are increasingly turning to technical ceramics for these advantages and more. And you can count on Materion to engineer these materials to fit virtually any application. Tell us the size, shape and quantity you need, and we'll make the parts to your print. We can collaborate with you to improve the design, too, effectively improving the manufacturability.

The world's only fully integrated developer and supplier of beryllium oxide (BeO) ceramics, from mining and R&D to component production and support, Materion has been the go-to source for BeO for more than 60 years. Our BeO ceramics help you achieve superior levels of thermal management, product strength, reliability, miniaturization and weight savings. And our Durox® aluminum oxide (Al2O3) industrial ceramics offer a cost-effective solution for designing components with high tensile and dielectric strength.

BeO consistently outperforms aluminum nitride (AlN) in thermal conductivity and is second only to diamond among insulating materials. READ MORE >

BERYLLIUM OXIDE: THE ULTIMATE IN THERMAL CONDUCTIVITY

THERMAL CONDUCTIVITY

Electronic design requires superior thermal management, particularly when devices are small and airflow or liquid cooling is not practical or affordable.

LIGHT WEIGHT

In applications where weight savings is a priority, Materion technical ceramics can be an excellent solution.

HIGH STRENGTH

The high compressive strength of technical ceramics enables them to withstand extremely high loads.

Technical Ceramics

Intense localized heat demands a high performance ceramic.

Whatever industry you're in — aerospace electronics, consumer electronics, energy, medical, microwave communications, etc. — BeO thermal ceramics can offer you unparalleled solutions. Some common uses? High-performance semiconductor applications, crucibles, RF/microwave devices, power electronics, lasers and nuclear power.

BeO is up to

80% more thermally conductive than AIN

LEARN MORE >

Durox® Alumina Ceramics

Cost-effective solutions in a range of purities and shapes

Durox aluminum oxide (Al2O3) technical ceramics are ideal for building parts and components that are subjected to high-temperature environments. With high resistance to corrosion and wear, alumina ceramics provide dimensional stability, high thermal stability and low thermal expansion in a form that can be made to very tight tolerances in a range of purities and shapes.