No matter where you look, beryllium improves the way we live.
Medicine
In early diagnosis and treatment of disease...
Safety

In saving lives and property...
Discovery

In the endless pursuit of knowledge...
Energy

In search of clean and affordable energy...
Communications

In communications that bring us closer together...
In the defense of our nation, and those who serve us...
Transportation

In getting us from here to there...
In our security here at home.
Widely used in products throughout our society, beryllium improves the way we live and work. A naturally occurring element, beryllium is one-third lighter than aluminum yet six times the specific stiffness of steel. Beryllium brings unrivaled advantages to its end-use applications, whether used in its pure metallic form, as a beryllia ceramic or as combined or alloyed in small amounts with other metals. In many instances, no other material can deliver the same performance and reliability demanded of today’s high technology products and systems.

Beryllium metal, beryllia ceramics and beryllium-containing alloys are making the world a better, more connected and safer place. You’ll find them at work helping to ensure our national defense and homeland security, and saving lives through use in air bag sensors, fire control sprinkler heads, mammography x-ray equipment and medical lasers.
No matter where you look, beryllium improves the way we live.

**In Medicine**

There is no substitute for beryllium metal x-ray windows used in high-resolution medical radiography. Medical lasers made with beryllia ceramic are providing the gift of restored or improved sight to millions around the world.

Beryllium’s unique transparency to x-rays makes it indispensable for use in biomedical research equipment. Doctors rely on the performance of surgical instruments constructed with copper beryllium connectors.

**Specific end uses and applications**
- Mammography x-ray and other medical imaging equipment
- Ultrasound diagnostic monitoring devices
- Argon-ion lasers for eye surgery
- Laser-based scientific and medical test equipment
- Electron microscopes
In Safety

The lifesaving technology behind automotive air bags relies on beryllium alloys to work in a fraction of a second. Anti-lock brakes trust beryllium alloys to transmit electrical signals through terminal connections when seconds make a critical difference in preventing a collision. Electrical relays made with beryllium alloys allow automotive emergency flashers to operate every time even after tens of thousands of on/off cycles over years of service.

Fire control equipment in buildings utilize beryllium alloys for reliability and constant readiness to protect people and property.

Non-sparking tools and equipment made with beryllium alloys protect workers from fire and explosion in hospital operating rooms, chemical plants and other potentially hazardous environments.

The reliability of firefighters’ supplied air equipment is enhanced by the use of alloys containing beryllium.

Weather forecasting systems designed with beryllium optical components predict and track weather patterns that can impact work, travel, leisure and public safety.

Specific end uses and applications

- Automotive air bag collision detection sensors and switches
- Braking system terminal connections
- Electrical relays in car and truck hazard lights
- Water release valve springs used in automatic fire sprinklers
- Safety tools including hammers, wrenches and scrapers
- Pressure sensing bellows in emergency breathing tanks
- Weather forecasting satellites
**In Discovery**

Since the early days of NASA, beryllium has had a mission-critical role in our exploration of space. Beryllium’s unique properties – stiffness, strength, lightweight, thermal management and reflectivity, allow for interplanetary discovery and the constant pursuit of scientific knowledge.

**In Energy**

Beryllium and beryllium alloys lower the cost of drilling and help lead the way to new and more affordable sources of oil and gas, easing our dependence on foreign energy. A breakthrough in the use of beryllia ceramic in early electronic ignition systems led to a 20% increase in automotive fuel efficiency.

Beryllium metal controls the punishing high temperature plasma found in fusion reactors, a promising non-fossil fuel energy source. Linear accelerators also rely on beryllium to evaluate new materials and advance the understanding of particle physics.

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**Specific end uses and applications**

- Space shuttle window frames and door systems
- Mars Rover
- Gravity Probe B Satellite
- Cassini Orbiter
- Spitzer Space Telescope, Hubble Space Telescope and its planned successor, the James Webb Space Telescope
- Joint European Torus test reactor
- International Thermonuclear Experimental Reactor
- CERN LHC and Brookhaven RHIC colliders

**Specific end uses and applications**

- Directional drilling tools and oil and gas well completion/production equipment
- Down hole geological x-ray sensors
- Non-sparking tools
In Communications

Strong and highly conductive, beryllium alloys allow for the electrical/mechanical contacts that enable the reliable transfer of power and signals in computers and computer peripherals.

Alloys containing beryllium make cellular phones work better, safer and more reliably, and, along with beryllia ceramic materials, have a critical role in the wireless infrastructure.

Beryllium alloys are essential components in global Internet technology. Through their use in the undersea cable network, beryllium alloys contribute to the speed and reliability of global telecommunications.

Beryllium in the Global Positioning System’s satellite network helps precisely track and guide backpackers, farmers, trucking and shipping fleets, boaters and motorists.

Specific end uses and applications

- Network, data processing and storage area servers, workstations, notebooks, sub-notebooks, and PDAs
- Cell phone battery contacts and electrical connectors
- Micro-magnetic radiation shielding in cell phones
- Wireless base stations
- Fiber optic communications equipment
- Hubs, routers and other Internet infrastructure equipment; local area networks that support the Internet
- Repeater housings for undersea fiber optic telecommunication systems
- NAVSTAR Global Positioning System
In National Defense

Our nation’s military jets “own the night” in aerial combat because beryllium-containing materials make them lighter, more maneuverable and highly precise in targeting, striking and eluding the enemy. The use of beryllium to supply real-time imagery from unmanned surveillance and reconnaissance flight vehicles allows a crucial battlefield advantage. Mast-mounted beryllium optical systems in attack and reconnaissance helicopters provide greater surveillance and weapons targeting at increased “stand off” range, keeping pilots and crews from harm’s way.

In our nation’s emerging guided missile defense system, beryllium is widely used to assure a first line of defense in detecting, targeting and ultimately destroying missile threats. Beryllium has no substitute in our nation’s strategic missile arsenal and overall deterrent capabilities. For battle tanks on the move, beryllium mirrors dampen vibration to provide an accurate optical path for the commander’s sight and fire controls.

Specific end uses and applications

- Fasteners, equipment supports and structural components including rudders and wing leading edges
- Infrared sensors for fighter jet optical targeting, radar and navigation/guidance systems including the F-15 Strike Eagle, F-16 Fighting Falcon, F-18 Superhornet and the F-22 Raptor
- Optical sensors for unmanned aerial vehicles
- AH-1Z SuperCobra, AH-64 Apache and OH58D Kiowa Warrior helicopters
- Infrared and optical sensors for the Ground Based Interceptor and launch detection satellites
- Optical systems on various air-launched missiles
- Submarine-launched intercontinental missiles and other ballistic missile systems
- Structures, mechanisms, electronic housings, heat sinks and sensory equipment in military communications satellites
- M60 and M1A2 Abrams main battle tanks
In Transportation

Beryllium-containing alloy connectors are essential to the electronics of today’s cars and trucks, making driving more comfortable, convenient and reliable. Engineering advances are allowing for the replacement of bulky and less versatile hydraulic and mechanical components with purely electrical devices using beryllium alloy connectors.

There’s no better choice than beryllium alloys to minimize strength loss and ensure highly reliable electrical contacts in components throughout a commercial aircraft’s service life.

The unique combination of strength, low friction and superior machinability make beryllium alloys the ideal material for critical mechanical components in aircraft. Diaphragms made of beryllium alloys permit aircraft instrumentation to accurately measure and respond to changes in atmospheric and barometric pressures.

Specific end uses and applications

- Engines, braking systems, integrated traction control systems and transmissions
- Electric motors and connectors for windows, seats, mirrors, door/window locks, fuel pumps
- Electrical terminals used in “drive by wire” power steering, braking and throttle systems
- Instrument and radar connectors
- Ground wiring connections to all electrical equipment on aircraft
- Brake bushings
- Landing gear bushings and bearings
- Door and hatch components
- Engine attachment assemblies
- Wing sliding track assemblies
- Altimeters and barometers, and altitude fuel mixture instruments
In Homeland Security

Beryllium plays a vital and strategic role in our security at home, where the threat of terrorism challenges our military and law enforcement authorities to devise new means and methods to protect against cyber warfare, or chemical, biological or nuclear attack. It’s also in place behind the scenes in airports and in the protection of potential infrastructure targets such as bridges, power transmission systems, dams and public facilities.

Specific end uses and applications

- Air traffic control radar
- Air route surveillance radar
- Airport x-ray inspection of checked and carry-on baggage
- Military microwave communications
- Computer servers and routers
- Global Positioning Systems
- Military and commercial satellites
- Wireless communications
Materion Brush Inc. is the global leader in high performance beryllium, beryllium alloys and beryllia ceramic. As the only fully integrated beryllium producer in the world, Materion Brush supplies materials that provide the strength, performance, reliability and weight-saving properties that today’s leading edge manufacturers demand.

The company was founded in 1931 to develop innovative applications for beryllium based on the pioneering work started by Brush Laboratories in the 1920s.

Headquartered in Mayfield Heights, Ohio, the company operates production and service center facilities in the United States, Europe and Asia.

Materion Brush Inc. is a wholly owned subsidiary of Materion Corporation, which is traded on the New York Stock Exchange under the symbol MTRN.