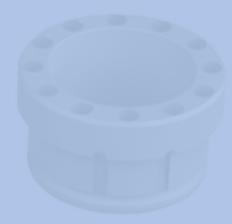


# Seals and Bearings from Morgan Advanced Materials



## Morgan Advanced Materials

**Morgan Advanced Materials is a global materials engineering company which designs and manufactures a wide range of high specification products with extraordinary properties, across multiple sectors and geographies.**

**We produce components, assemblies and systems that deliver significantly enhanced performance for our customer's products and processes from an extensive range of advanced materials. Our engineered solutions are produced to very tight tolerances and many are designed for use in extreme environments.**

**The Company thrives on breakthrough innovation. Our material scientists and application engineers work directly with customers to create outstanding highly differentiated products that enhance reliability and improve efficiency.**

**Morgan Advanced Materials has a global presence with over 10,000 employees across 50 countries serving specialist markets in the energy, transport, healthcare, electronics, security and defense, petrochemical and industrial sectors. We are listed on the London Stock Exchange in the engineering sector, ticker symbol MGAM.**

## Our Seals and Bearings Capabilities

**Morgan products are an intrinsic part of everyday life. Our tribologically superior materials are an integral part of a wide range of domestic and industrial products in mechanical systems where components are exposed to the effects of friction and erosion. The high quality of our technologically advanced materials has been established over generations and is sold worldwide with production activities in over 40 countries.**

- **We offer the most extensive portfolio of carbon-graphite, graphite, and silicon carbide materials**
- **Special Sprinter Service for customer specific products**
- **High Volume Capabilities - Processed-to-size / Injection molding**
- **Rapid Prototyping**
- **Broad range of impregnation capabilities including various resins, metals, ceramics and oxidation inhibitors**

**Our manufacturing sites are ISO 9001 accredited, and where required ISO 13485 certified, for the production of components for medical applications. We are also AS9100C certified where required for the production of components for aerospace applications.**

**Morgan continues to develop new materials and value added assemblies to meet the rapidly expanding opportunities in these markets.**

## Materials

Our carbon materials provide exceptional standards of performance in seal and bearing applications. These grades have been developed and engineered to meet individual specifications by both precision machining and mass production techniques such as processed-to-size and injection molding. We have developed improved graphite loaded grades of silicon carbide in partnership with our customers to provide survivability in marginal lubrication conditions.

### Carbon - Graphite

Carbon is self lubricating at high and low temperatures and has distinctive advantages for Seals and Bearings.



#### Advantages

- Approved for food contact
- Chemically inert
- Dimensional stability
- Electrically conductive
- High thermal conductivity
- Low dynamic friction coefficient
- Low thermal expansion coefficient
- Oxidation resistant
- Thermal shock resistant
- Wear resistant

#### Typical Applications

- Bearings operating immersed in fuels, such as petrol, paraffin, kerosene, etc.
- Canned motor pump bearings
- Glass production components
- Mechanical seal components for a wide variety of sealing applications in low and high volumes

### Silicon Carbide

Silicon carbide offers a unique combination of hardness, strength, and resistance to high temperatures, abrasive conditions, and caustic chemicals.



#### Advantages

- Abrasion resistance
- Approved for food contact
- Exceptional corrosion resistance
- Extreme hardness
- High mechanical strength and modulus
- High thermal conductivity
- Improved thermal shock resistance
- Increased PV capability
- Low thermal expansion coefficient
- Wear resistant

#### Typical Applications

- High duty mechanical seals operating in aggressive media
- Installations where there is a risk of intermittent dry running
- Shaft and Mag drive bearings subject to high loads and extreme operating conditions
- Thrust bearings requiring exceptional wear resistance in marginally lubricated applications

## High Performance Engineered Polymers

For a range of applications, the filled PTFE family provide a superior self-lubricated material with excellent strength, high hardness and improved wear resistance by combining PTFE with carbon, graphite, glass fibre, molybdenum disulphide, bronze & copper. For extreme conditions, dry gases and high pressure, the resin-bonded grade, together with the PEEK based material are available.

## Products

Morgan Advanced Materials applies their large portfolio of carbon and silicon carbide materials in rotating equipment that delivers enhanced performance even under extreme conditions.

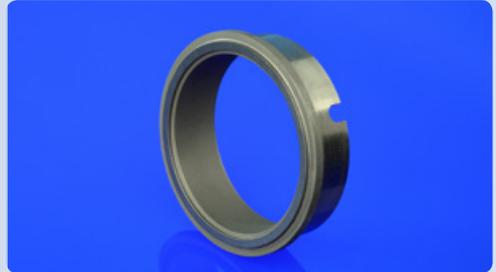
### Components for Mechanical Seals

#### Face Seals

- Contacting faces
- Non-contacting faces

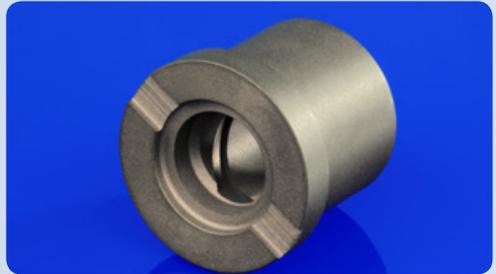
#### Shaft seals

- Circumferential seals
- Gap Seals
- Segmented seals



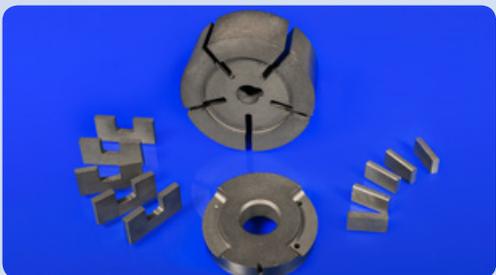
### Sliding Bearings

- Axial
- Radial
- Flange
- Helical groove
- Segmented



### Rotors and Vanes

- Endplates
- Liners
- Rotors
- Vanes



### Structural Components

- Abrasion resistant nozzles
- Glass manufacturing components
- Valve components



## Markets

Morgan is a leader in the design and manufacture of carbon-graphite, graphite, and silicon carbide materials used in:

### Petrochemical

- Oil & Gas extraction
- Petrochemical industries
- Chemical process industries



### Industrial

- Food & Drink processing
- Water processing
- Pharmaceutical
- HVAC



### Energy

- Nuclear
- Solar
- Land based turbines
- Hydroelectric



### Healthcare

- Blood separation
- Dialysis equipment
- Diagnostic equipment



### Transportation

- Aerospace
- Marine
- Automotive
- Locomotive



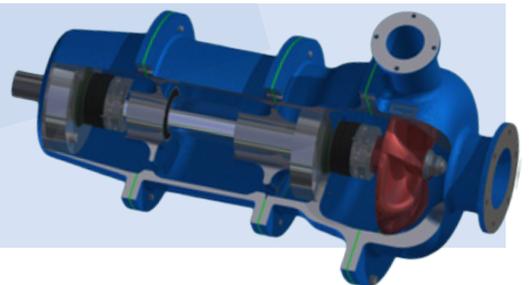
### Security and Defense

- Missiles
- Marine
- Aircraft



## Applications

Morgan Advanced Materials manufactures and supplies tribological components such as mechanical seal faces, radial and axial bearings, and rotors and vanes for use in rotating equipment.



MORGAN ADVANCED MATERIALS  
MANUFACTURING LOCATIONS



Our manufacturing sites are ISO 9001 and where applicable ISO 13485 certified

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