



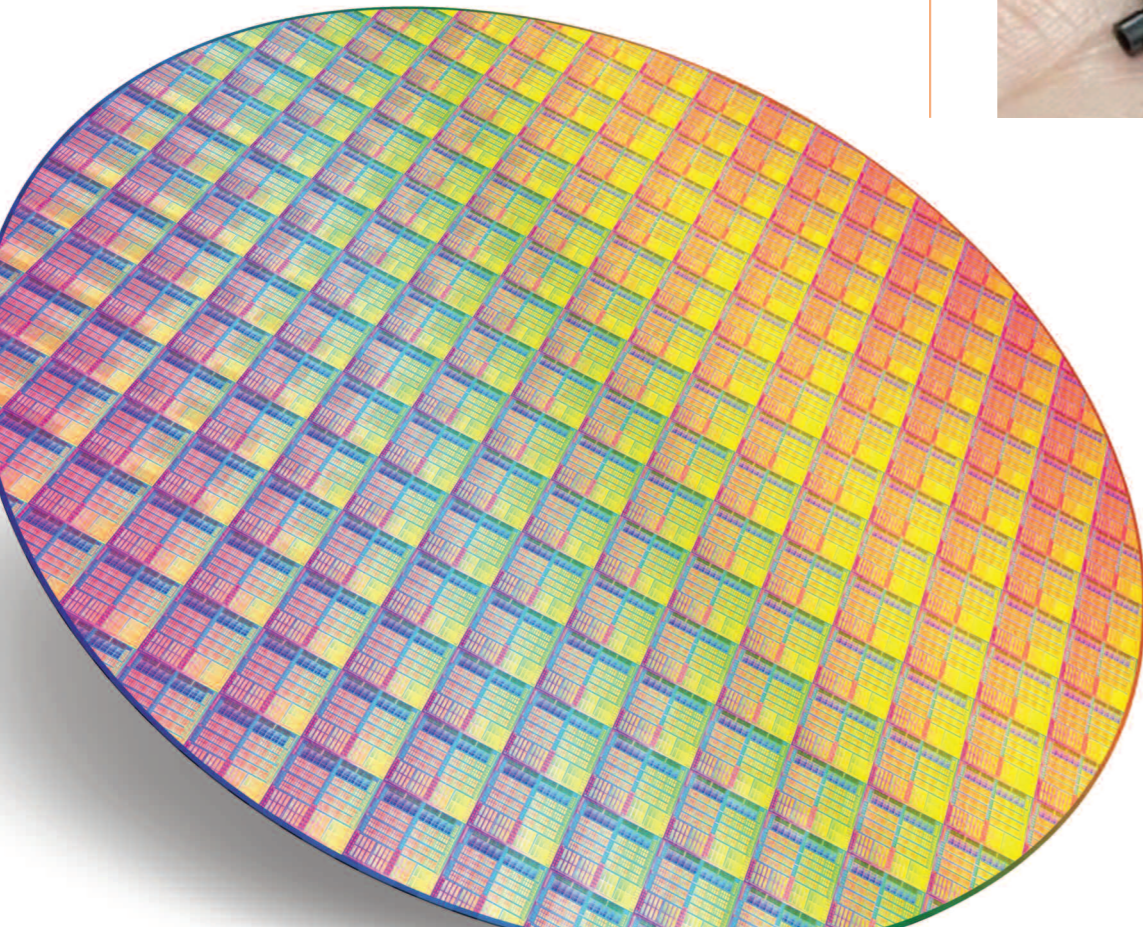
## Seals & Bearings

**in Semiconductor and Electronic applications**

The Seals and Bearings business of Morgan Advanced Materials produce components for use in applications with a focus on the control of friction and wear. These components are used in applications where the operating environment restricts the use of lubricants due to temperature, corrosion, hygiene or limited access during the lifetime.

Leveraging Morgan's material expertise to select the optimum material combination, we help our customers control friction and wear with self-lubricating materials, resulting in reduced energy consumption throughout the reliable lifetime of the product. Our 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 strategically positioned locations across the globe.

Additionally, we offer high purity magnesium oxide extruded tubes with exceptional process repeatability. Our MgO material is the material of choice and utilised within high end thermocouples, sensors, cartridge & tubular heaters for temperature management and heat generation within thermal devices all throughout the semiconductor process stream. Grades are available in type 2, 1 & 1P with approvals for ASTM standards E1625, E585, E235 & E2181.



### Multi-layer Ceramic Capacitor (MLCC) Inspection equipment

Small carbon graphite bearings within MLCC inspection equipment. Supports stringent quality control of MLCC production by ensuring correct electrical reading.

#### Advantages of Morgan solutions

- 3 - 4 times additional life compared to metal and alloy materials
- Self-lubricating materials
- Small parts manufacturable in high volume



### Sensors and Heaters

High purity MgO within sensors and heaters for temperature measurement, regulation, and heat generation throughout semiconductor process stream.

#### Advantages of Morgan solutions

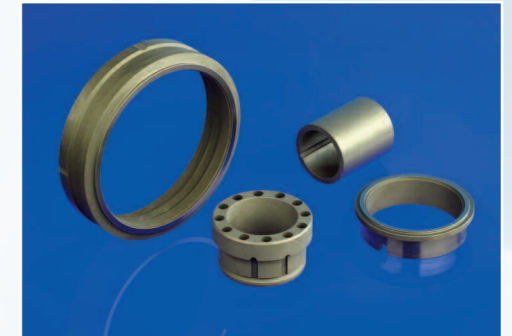
- High purity material (99.4%+) allowing for more sensitive & accurate readings
- High purity also allows for greater heat generation with less material so devices can be miniaturised
- Consistent production process allowing exceptional repeatability of products and performance

### Pumps, Seals and Rotary Union

Ceramic and carbon graphite seals and bearings within seal assemblies, rotary union and various pumps (vacuum/mag-drive). These pumps and seals support the wafer conditioning, cooling and material deposition processes.

#### Advantages of Morgan solutions

- Broad range of highly corrosion and wear resistant materials
- Long lifetime
- Self-lubricating materials
- Low volume machining as well as high volume production processes available



### Air Bearings - Linear Transfer Systems

Air bearings for contactless motion within linear systems which support transfer and movement of products within the semiconductor production process.

#### Advantages of Morgan solutions

- Tight tolerance precise machining for air bearings using orifice design
- Broad range of carbon graphite and iso graphite materials available with a range of porosity
- Strong application engineering to create contactless bearing for improved lifetime and reduced friction

### High End Computers

Small intricate carbon graphite bearings within cooling systems and pumps for high end computer.

#### Advantages of Morgan solutions

- Self-lubricating materials that reduce friction and heat generation
- Highly wear resistant materials with long lifetime
- Small parts manufacturable in high volume

## Morgan Advanced Materials

At Morgan Advanced Materials, our purpose is to use advanced materials to help make more efficient use of the world's resources and to improve the quality of life.

Morgan's highly experienced scientists and application engineers actively engage with our customers to find new solutions for complex and technologically demanding problems.

We are building distinctive competencies in:

- Leading technology and materials science capability and process know-how
- Application engineering
- Customer focus, reputation for quality and delivery and brand

Our core strength is our ability to get to grips with individual customer problems, apply the science and engineer elegant and reliable solutions.

For all enquiries, please contact our specialist sales and marketing offices:

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