



# High Performance Polymer 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.**

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

**The Company thrives on breakthrough innovation. Our materials scientists and applications engineers work in close collaboration with customers to create outstanding, highly differentiated products that perform more efficiently, more reliably and for longer.**

**Morgan Advanced Materials has a global presence with more than 9,000 employees across 50 countries serving specialist markets in the energy, transportation, healthcare, electronics, security and defence, petrochemical and industrial sectors. It is listed on the London Stock Exchange in the engineering sector (ticker MGAM).**

## About our capabilities in Engineering Polymers

**Morgan provides high performance engineering polymers that include filled PTFE, resin bonded and PEEK based grades.**

**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.**

**Our know-how and experience covers wear part applications in both oil free and lubricated compressor applications. Using Morgan's technology in tribological materials enable us to supply most favourable solutions to customers.**

### Typical applications

- CYLINDER AND PACKING WEAR PARTS FOR OIL FREE AND LUBRICATED RECIPROCATING COMPRESSORS
- INTER-STAGE LABYRINTH SEALS OF ROTARY COMPRESSOR
- JOURNAL AND THRUST BEARINGS IN SUBMERSIBLE MOTORS
- APPLICATION IN PRODUCT LUBRICATED PUMPS
- PUMP „NECK“ RINGS
- SEATS AND BEARINGS IN VALVE APPLICATIONS
- BEARING PADS ON RAIL AND TRAM SYSTEMS
- BEARINGS AND SEALS IN WATER TURBINES



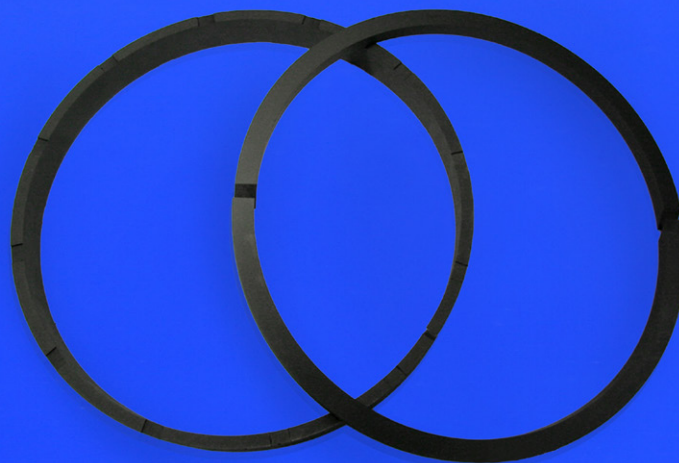
## MORGAN HIGH PERFORMANCE PTFE MATERIALS FOR EXTREME CONDITIONS

### **Advantages**

- EXCELLENT WEAR RESISTANCE
- AN OPERATING TEMPERATURE RANGE OF - 200°C TO +200°C
- THE ABILITY TO OPERATE IN DRY GASES
- LOW THERMAL EXPANSION WITHIN THE RANGE OF FILLED PTFE'S
- GOOD THERMAL CONDUCTIVITY
- CHEMICALLY INERT
- NON-TOXIC
- NON-HYDROSCOPIC

## Morgan Grade - Gas Chart

<b>GAS</b>	<b>FORMULA</b>	<b>WET GAS</b>	<b>DRY GAS</b>	<b>HIGH PRESSURE</b>
Air	-	MAT900/MAT901	MAT904	MAT903/MAT909
Ammonia	NH <sub>3</sub>	MAT900/MAT901	MAT904	-
Argon	Ar	MAT900/MAT901	MAT920	MAT904
Butane	C <sub>4</sub> H <sub>10</sub>	MAT900/MAT901	MAT904	MAT904
Butene	C <sub>4</sub> H <sub>8</sub>	MAT904	MAT904	MAT904
Carbon Dioxide	CO <sub>2</sub>	MAT900/MAT901	-	MAT904
Carbon Monoxide	CO	MAT906	MAT906	MAT906
Ethane	C <sub>2</sub> H <sub>6</sub>	MAT900/MAT901	MAT904	MAT904
Ethanol	C <sub>2</sub> H <sub>5</sub> OH	MAT904	MAT904	MAT904
Ethylene	C <sub>2</sub> H <sub>4</sub>	MAT904	MAT904	MAT904
Helium	He	MAT904	MAT920	MAT904
Heptane	C <sub>7</sub> H <sub>16</sub>	MAT900/MAT901	MAT904	MAT904
Hexane	C <sub>6</sub> H <sub>14</sub>	MAT900/MAT901	MAT904	MAT904
Hydrogen	H <sub>2</sub>	MAT904	MAT920	MAT904
Hydrogen Chloride	HCl	MAT900/MAT901	MAT904	MAT904
Hydrogen Sulphide	H <sub>2</sub> S	MAT900/MAT901	MAT904	MAT904
Landfill Gas	-	MAT900/MAT901	-	MAT904
Methane	CH <sub>4</sub>	MAT904	MAT920	MAT904
Methanol	CH <sub>3</sub> OH	MAT900/MAT901	MAT904	-
Methyl Chloride	CH <sub>3</sub> Cl	MAT900/MAT901	MAT904	MAT904
Nitrogen	N <sub>2</sub>	MAT900/MAT901	MAT920	MAT904
Oxygen	O	MAT910	MAT910	MAT910
Pentane	C <sub>5</sub> H <sub>12</sub>	MAT900/MAT901	MAT920	MAT904
Propane	C <sub>3</sub> H <sub>8</sub>	MAT904	MAT920	MAT904
Propylene	C <sub>3</sub> H <sub>6</sub>	MAT904	MAT904	MAT904



## Morgan Grade Data

Grade	Filler	Filler Content	Density (g/cm <sup>3</sup> )	Tensile strength (MPa)	Elongation (%)	Porosity (%)	Thermal Expansion (10E-6/°C)	
							Radial	Axial
MAT900	Carbon/Graphite	medium to high	2,09	15,3	36	0,18	54	108
MAT901	Carbon/Graphite	medium to high	2,05	15,4	18	0,50	48	90
MAT902	Carbon/Graphite	very high	1,95	10,4	1	0,83	19	40
MAT903	Bronze/MOS <sub>2</sub>	medium	3,86	15,5	85	0,05	98	124
MAT904	Glass Fiber/Carbon Alloy	medium	2,09	13,7	100	0,14	100	140
MAT905	Glass Fiber/MoS <sub>2</sub> /Graphite	medium	2,25	17,5	180	0,45	78	126
MAT906	Glass Fiber	medium	2,24	18,0	200	0,20	85	132
MAT907	Carbon/Graphite	medium	2,15	14,5	100	0,10	85	122
MAT908	Carbon/Graphite	high	2,02	11	2	0,50	25	44
MAT909	Bronze/MOS <sub>2</sub> /ZnO	high	3,9	16,8	15	0,2	58	116
MAT910	Glass Fiber /Copper	medium	2,35	15	200	0,10	80	117

## Filled PEEK Grade

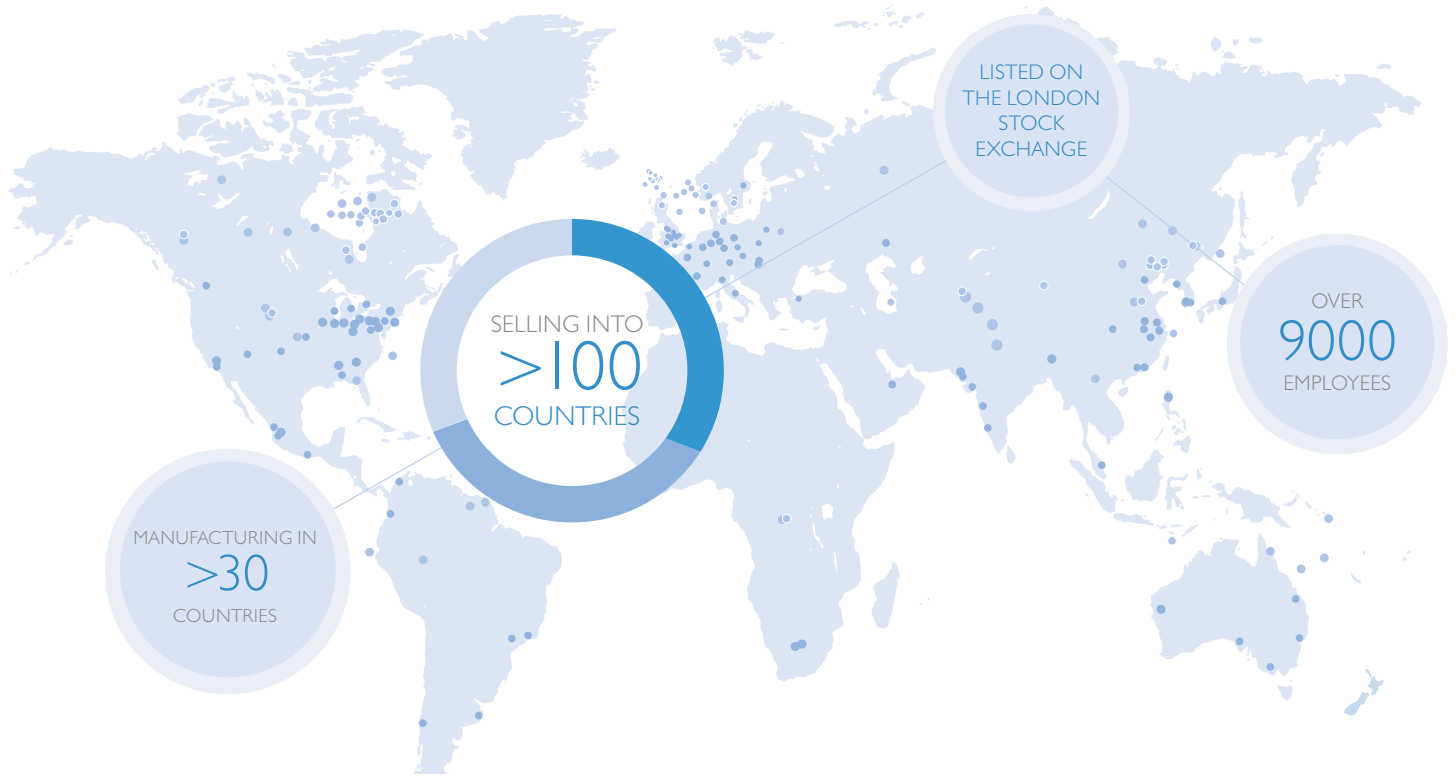
MAT921	PTFE/CF/Graphite	low	1,48	130	1,5	0,11	82	88
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## Resin Bonded Grade

Grade	Filler	Filler Content	Density (g/cm <sup>3</sup> )	Bending strength (MPa)	Hardness (shore D)	Porosity (%)	Thermal Expansion (10E-6/°C)	
							Radial	Axial
MAT920	Graphite/PTFE/MOS <sub>2</sub>	very high	1,85	24	35	0,50	25	38



MORGAN ADVANCED MATERIALS



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