

Turcon[®] MC1 & MC2 Materials

UNIQUELY ELECTRICALLY CONDUCTIVE



Unique Electrically Conductive PTFE-Based Sealing Materials

Uniquely, Turcon® MC1 and Turcon® MC2 are the only PTFE-based electrically conductive materials suited for use in spring and O-Ring energized seals.

Though conductive elastomers are available, these are primarily only for static applications, while the conductive, injection-moldable plastic materials that exist have low flexibility and are less suited for sealing purposes and for installation in closed grooves.

The specialized compounds were developed in response to a strong market demand to support electrification of drives, eMobility, sensing and IoT solutions. With them, designers can take advantage of using a range of advanced PTFE-based sealing geometries and all the benefits that they offer in applications that require electrical conductivity through a hydraulic system or electric motor, for instance.

Opening
up
opportunities

For
dynamic
applications

Meeting
customer
needs

Unique
materials

Turcon® MC1 and Turcon® MC2 materials have been specifically engineered by Trelleborg Sealing Solutions for dynamic applications. Seals and bearings manufactured from the materials provide a reliable electric connection between moving parts.

OPTIMIZED SEALING PERFORMANCE

Virgin polytetrafluoroethylene (PTFE) is an excellent insulator with resistivity around 2×10^{17} Ohm x cm / 1×10^{17} Ohm x in.

For PTFE compounds to be able to conduct electricity, conductive fillers must be added, and these need to interconnect within the PTFE matrix. Historically, the only conductive PTFE-based materials were compounds with carbon filling above a “threshold value”.

Typical Material Data

Turcon®	MC1*	MC2*
Specific gravity	1.92–1.97 g/cm ³ 1.110–1.139 Oz/In ³	1.88–1.95 g/cm ³ 1.087–1.27 Oz/In ³
Min. tensile strength	16 Mpa / 2320 psi	12 MPa / 1740 psi
Min. elongation at break	160 %	150 %
Min. hardness (ball)	35 MPa / 5070 psi	35 MPa / 5070 psi

* Typical values, specifications are not final

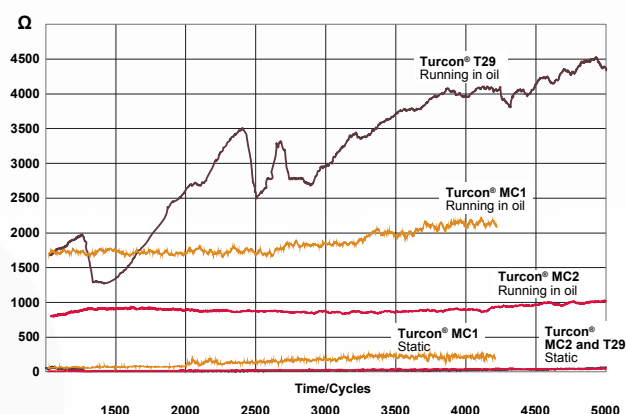
Turcon® MC1 and Turcon® MC2 have been specifically developed for electrical conductivity in dynamic sealing applications and therefore sealing performance is optimized in these situations.

EXTENSIVE TESTING PROVES PERFORMANCE

To prove the electrical conductivity of Turcon® MC1 and Turcon® MC2, the compounds underwent significant testing in Trelleborg's in-house laboratories, including in a specialized test rig that simulated real life conditions.

Results showed that Turcon® MC1 and Turcon® MC2 had a dry contact resistance that was negligible (highly conductive) even with low contact pressure and when running in oil, resistance was also low and thereby, conductivity was high.

Electric Resistance during Sldyring® test measured on test rig



Turcon® MC1 Medium-filled
material for dynamic
applications requiring medium
to high conductivity

Turcon® MC2 High-filled
material for dynamic
applications requiring
high conductivity

Industry Solutions



AEROSPACE: IMPROVING SAFETY

In aircraft, a worst-case scenario is that a plane is hit by lightning, which results in sparks over isolating areas. Less traumatic is the static buildup that occurs as a plane flies through the air that can cause electrical discharge.

ADVANTAGE

Electrically conductive seals in the landing gear, for instance, will ensure that electricity or static is safely dissipated.

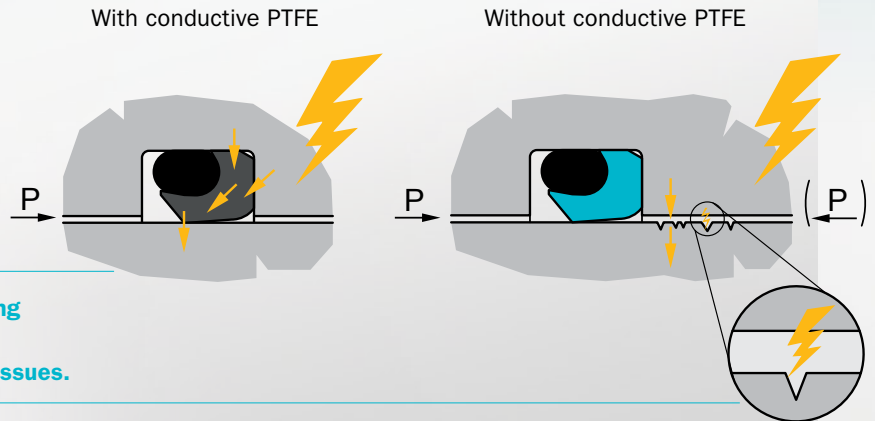


MACHINERY: PROTECTING HARDWARE

Electric charge that transfers through the gap between two components can cause sparks or stray current in machinery and systems, for example in electric motors. This can result in hardware pitting and carbonization of lubricant or grease.

ADVANTAGE

Use of an electrically conductive seal or bearing grounds the system by creating a clear path between two components, avoiding corrosion issues.



INTELLIGENT SYSTEMS: ENABLING AI

Sometimes intentionally a signal needs to be sent to or from a sensor in a system. This usually involves additional electric circuitry. Using an electrically conductive material is an alternative.

ADVANTAGE

Enables system manufacturers to develop more complex systems incorporating aspects of artificial intelligence without adding electrical circuitry.



E-MOBILITY: SUPPORTING ELECTRIC VEHICLE ADOPTION

Innovative sealing solutions are required to support mass adoption of electric vehicles.

ADVANTAGE

Guarantee important properties such as insulation, thermal and electrical conductivity, as well as electromagnetic shielding in e-motors.



Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Sealing Solutions is a leading developer, manufacturer and supplier of precision seals, bearings and custom-molded polymer components. It focuses on meeting the most demanding needs of aerospace, automotive and general industrial customers with innovative solutions.

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