

More Degrees of Freedom for Seals Made of Thermoplastically Processed PTFE

In Good Shape



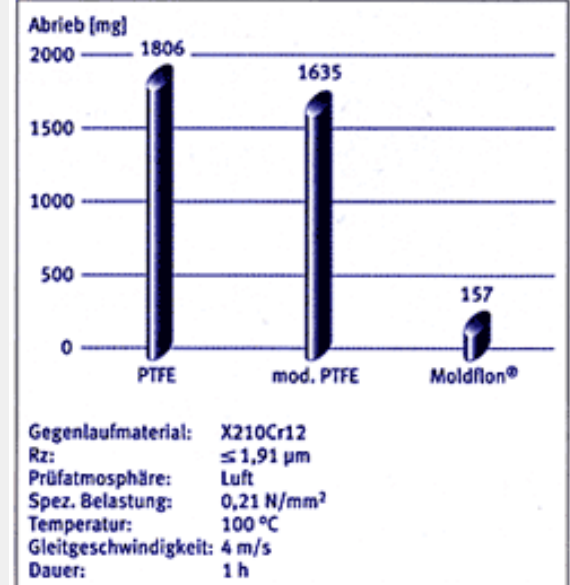
Injection-molded parts from Moldflon

The PTFE "Moldflon," which is suitable for thermoplastic processing, allows seals to be injection-molded. New degrees of freedom with regard to shaping enable complex assembly component geometries to be achieved. In the past, such geometries could only be manufactured by means of complex cutting or machining processes. In addition, the material offers benefits like improved cold flow and lower wear.

For over 40 years, Elring Klinger has been developing and producing customer-specific seals from PTFE as well as from proprietary special compounds and is one of the technology leaders in this field. As a result of its continuous product development process, the company is now in a position to offer the new, innovative "Moldflon" material for the first time. Moldflon is a thermoplastic material which, unlike conventional PTFE, lends itself to thermoplastic processing. This opens up new possibilities in terms of applications and even enables the fabrication of complex assembly component geometries while largely avoiding waste. These components are made using injection-molding technology. The original one-step process avoids additional complex cutting or machining processes, which provides major benefits in terms of economy and large production volumes.

Sliding Friction Behavior and Wear Resistance

Consistently increasing requirements like higher pressures and constantly rising temperatures make the highest demands on the concept design of seals. These challenges, as well, are being met by Moldflon thanks to its excellent sliding friction behavior (friction coefficients of 0.2) along with very good wear resistance. Particularly in the short-term wear test Moldflon exhibits significant benefits: compared to PTFE and modified PTFE, abrasion amounts to merely 10 %. Even a comparison with highly filled compounds based on PTFE reveals that Moldflon possesses higher pressure stability. This provides benefits in applications involving contact with foodstuffs and drinking water or in the presence of gaseous or liquid oxygen. Another aspect of particular interest is the fact that typical disadvantages of the compounds with fillers, which generally do not receive FDA or similar approvals, do not exist. In addition, components subjected to tribological loads exhibit a clearly longer service life. For high-pressure applications, for example, newly developed carbon-fiber-reinforced Moldflon compounds are used. The use of carbon fibers enables the level of abrasion, which is very low anyway, to be reduced even further. Here, the long-term wear test in comparison to PTFE-based compounds has shown that, as the content of filler increases, the abrasion-reducing effect of Moldflon compounds is higher than that of compounds based on standard PTFE.



Comparison of the abrasion of PTFE, modified PTFE and Moldflon

Moldflon offers:

- low abrasion and wear
- low cold flow
- excellent temperature resistance (permanent service temperature +260 C, short-term +290 C)
- good mechanical properties also at high temperatures
- very good sliding friction behavior (dry running conditions)
- nearly universal chemical resistance

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A Wide Range of Highly Different Media

Another requirement to be met by seals is their performance in a wide range of highly different media such as oils, acids, alkaline solutions or hydrocarbon additives. Due to the strong fluorocarbon bonding and the nearly complete shielding of the C-atoms by fluorine, Moldflon has nearly universal chemical resistance. Another major benefit compared to well-known high-performance thermoplastics is the preservation of the mechanical properties almost up to the melting point. This makes Moldflon the right material for seals where other thermoplastics or elastomers already fail on account of their low melting point and/or their low permanent service temperature.

In humid or wet environments the material exhibits its strengths as well. With polyamides, water absorption leads to adverse effects in terms of dimensional stability and reduces the material's mechanical properties. By contrast, Moldflon, whose degree of water absorption is negligible, can be used to produce precision parts whose dimensions remain stable even in humid environments.

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