SIGRAFLEX® Graphite Foil Type TF

PTFE-Coated Graphite Foil

Stuffing box packing rings made from graphite foil For many years now, compression-molded flexible graphite packing rings have proved successful as shaft seals in pumps and valves operated at elevated temperatures.

To meet an increasing demand for low emission and leakage rates, and also a frequent need for lower friction coefficients, the SGL Group has developed a special SIGRAFLEX® graphite foil with a thin PTFE coating on both sides.

SIGRAFLEX® foils with PTFE coating are particularly suitable for being processed into stuffing box packings. They offer clear advantages in terms of minimization of leakage and shaft friction.

Designation

SIGRAFLEX® foil type TF

F05007CTF or F05010CTF

Material data	
Thickness of foil type TF	0.50 mm
Thickness of PTFE coat	Ca. 5 µm (both sides)
Graphite density	0.7 or 1.0 g/cm³
Graphite ash content	≤ 2 %
Roll width	700 mm
Roll length	50 m
Max. service temperature	approx. 300 °C

Additional information except for max. service temperatures of SIGRAFLEX® graphite foil is given in our SIGRAFLEX® data sheets.

Test results of stuffing box packing rings made from SIGRAFLEX® foil type TF

The following is a comparative assessment of the sealing and friction properties of stuffing box packings made of SIGRAFLEX® graphite foil type F05007CTF and standard graphite foil type F05007C.

Characteristics of the tested sealing rings

Density:	1.6 g/cm³
Diameter, inside:	39.9 mm
Diameter, outside:	56.1 mm
Ring height:	8.2 mm
Packing height:	16.4 mm (2 rings)

Leakage behavior of compressed SIGRAFLEX® foil type F05007CTF graphite rings

The PTFE coat on the graphite foil improves the sealability of packing rings made from this material by a factor of about 2. In this assessment, however, the generally higher scatter in the leakage rate values of stuffing box packings needs be taken into account.

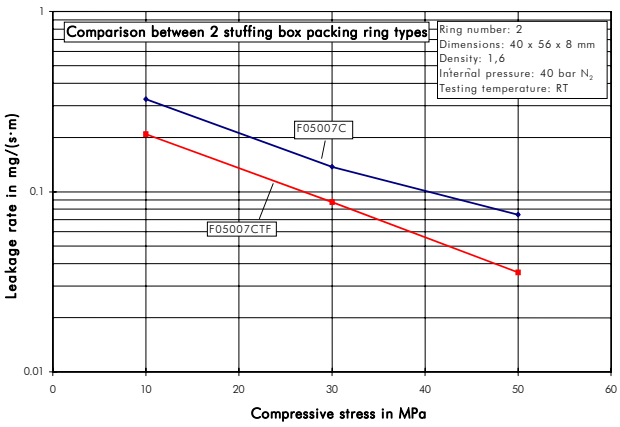

Fig. 1: Comparison between the leakage rates of stuffing box packings in type F05007C (without PTFE coating) and type F05007CTF (with PTFE coating) at 40 bar internal nitrogen pressure and different compressive stress points.

Lower shaft torque required for SIGRAFLEX® foil type TF packing rings

The PTFE coat on the graphite foil has a considerable influence on the frictional behavior of the packing. At equal compressive stress, the average

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shaft torque required is only half that of the uncoated graphite foil.

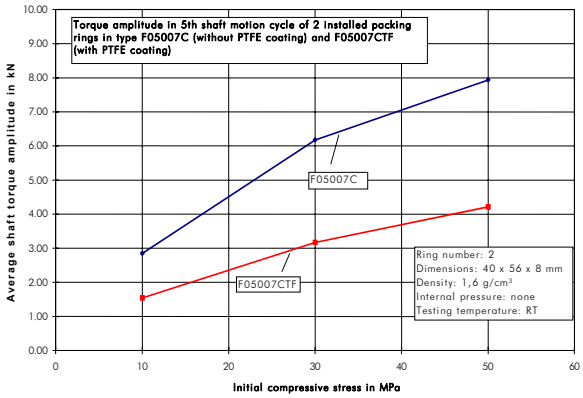

Fig. 2: Influence of PTFE-coated foil type F05007CTF on the required overage shaft torque amplitude in the 5th shaft motion cycle with two installed packing rings, as compared with packings of type F05007C (without PTFE coating).

Friction coefficient of SIGRAFLEX® foil type TF packing rings

As the PTFE coat is applied to the graphite foil before manufacture of the packing rings, the friction coefficient can be roughly halved. The values measured range between 0.11 and 0.07, depending on the compressive stress.

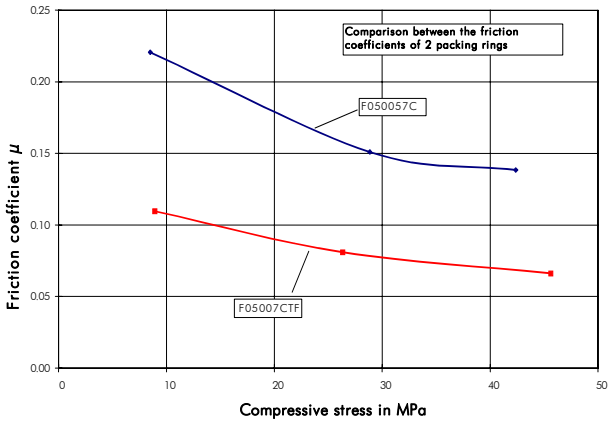

Fig. 3: Comparison between the friction coefficients of stuffing box packings in type F05007C (without PTFE coating) and type F05007CTF (with PTFE coating) as a function of compressive stress.

Conclusion

The PTFE coating on SIGRAFLEX® graphite foils makes for a substantial reduction in the leakage rate of stuffing box packings and markedly improves the frictional behavior of packing rings in particular.

As the service temperature limit for packings in SIGRAFLEX® foil type TF greatly depends on the particular installation and service conditions concerned, users are advised to consult the seal manufacturer for media temperatures of approx. 260 °C or higher.

As manufacturers of semi-finished products, we recommend that specific application-related questions be referred to the seal manufacturer concerned.

SIGRAFLEX® foil type TF sealing systems are supplied by all well-known seal manufacturers.

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Graphite Specialties | SGL CARBON GmbH
Phone +49 8271 83-2276 | expandedgraphite@sglcarbon.de
www.sigraflex.eu | **www.sglgroup.com**

SGL GROUP
THE CARBON COMPANY