

Kegel-Rotations-Tribometer zur Untersuchung des tribologischen Verhaltens von Kunststoffen im dynamischen Linienkontakt

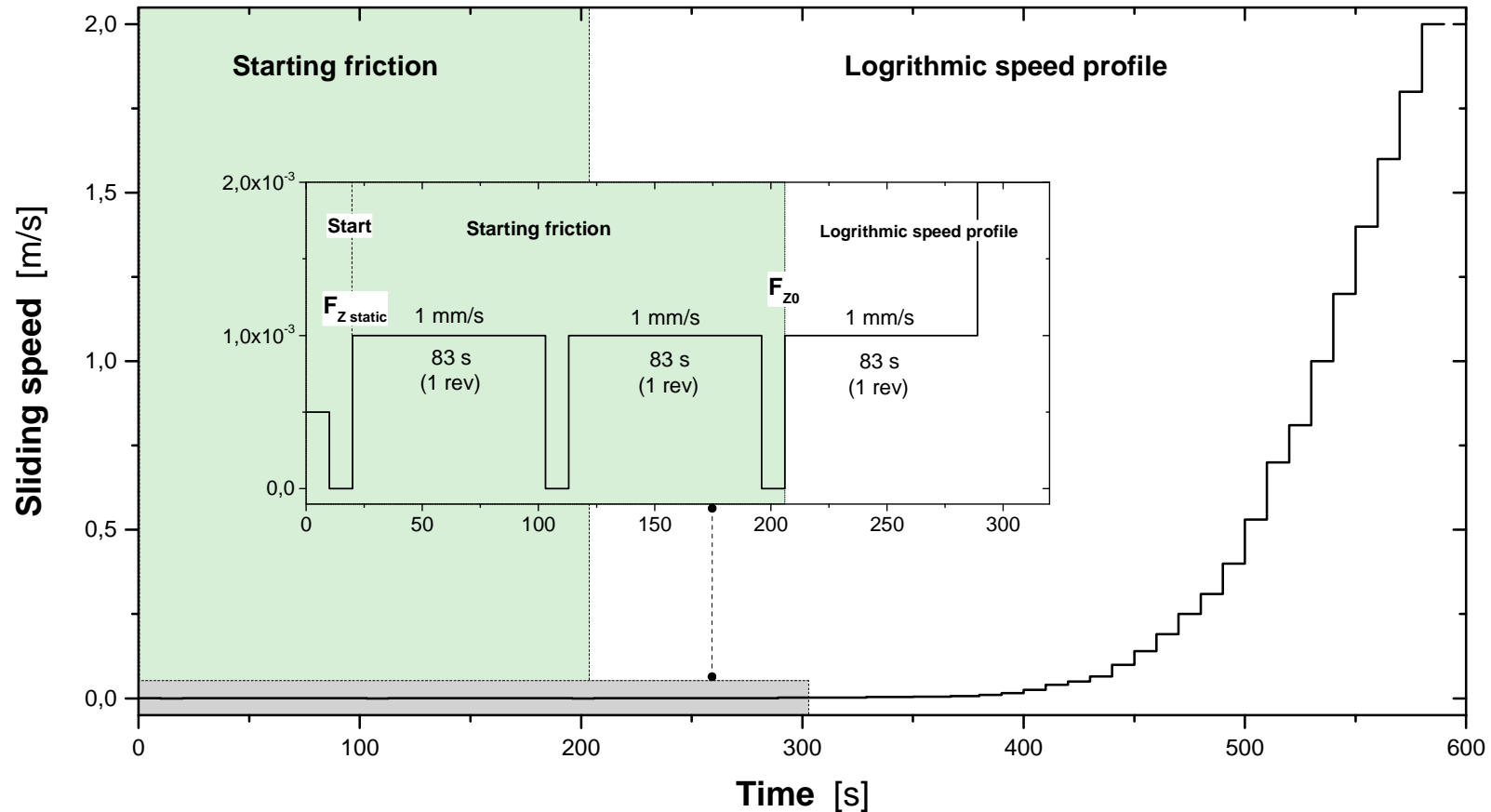
A novel Rotational Cone Tribometer (RCT) to approach the tribological contact between polymers and a rotational shaft

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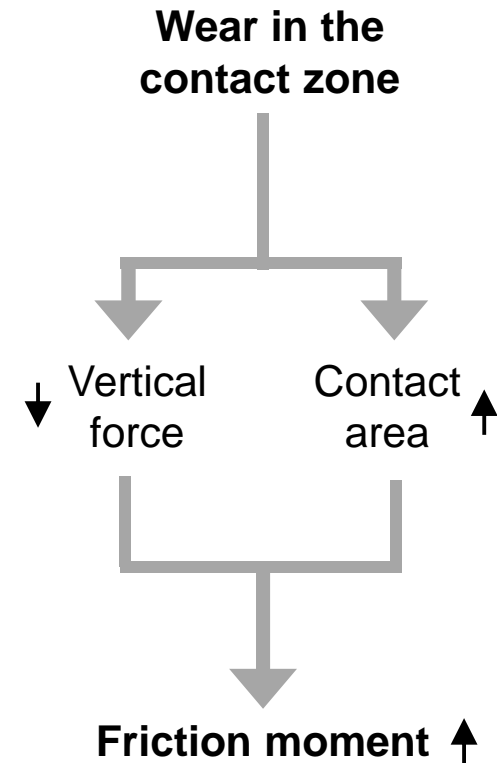
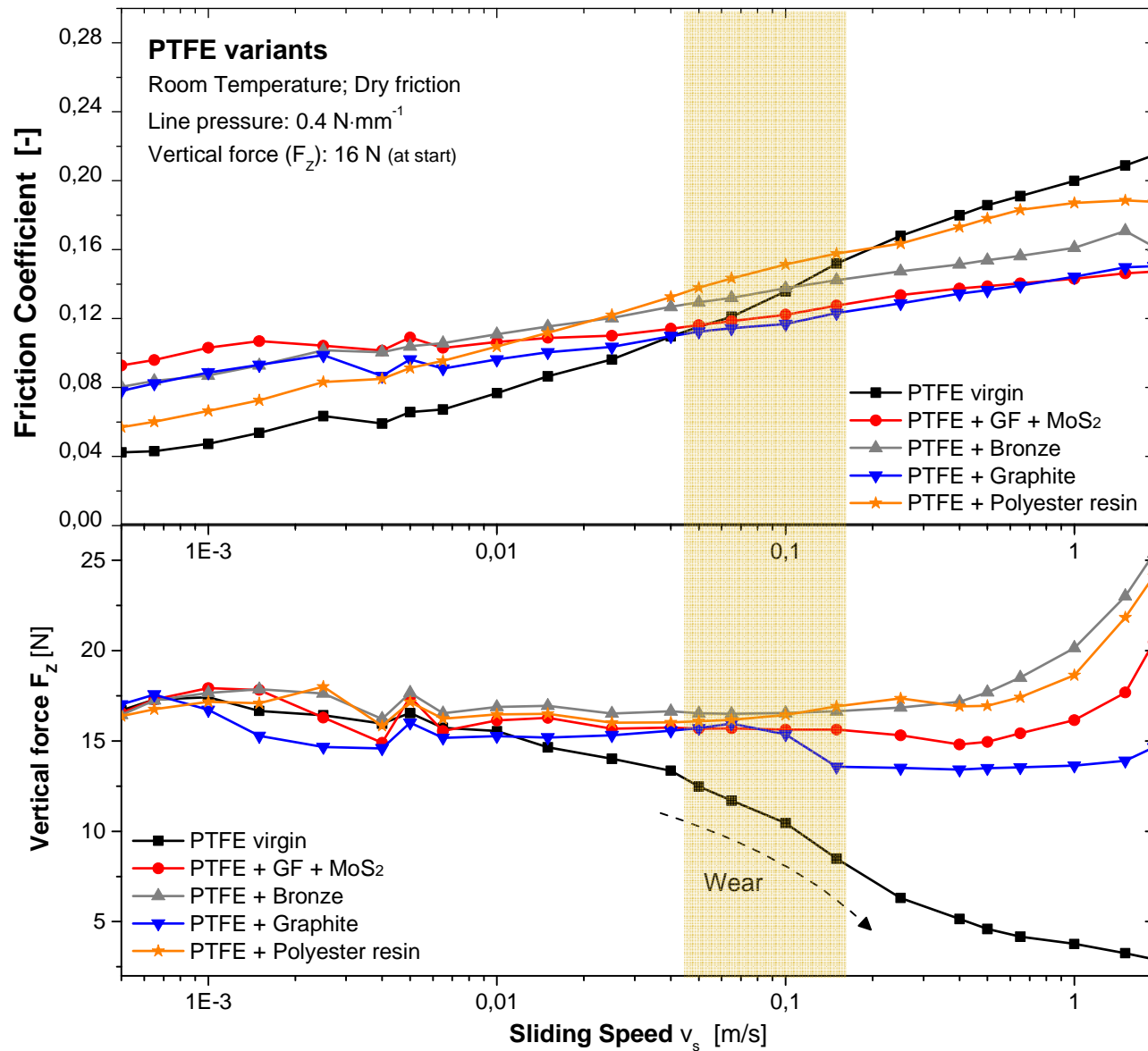
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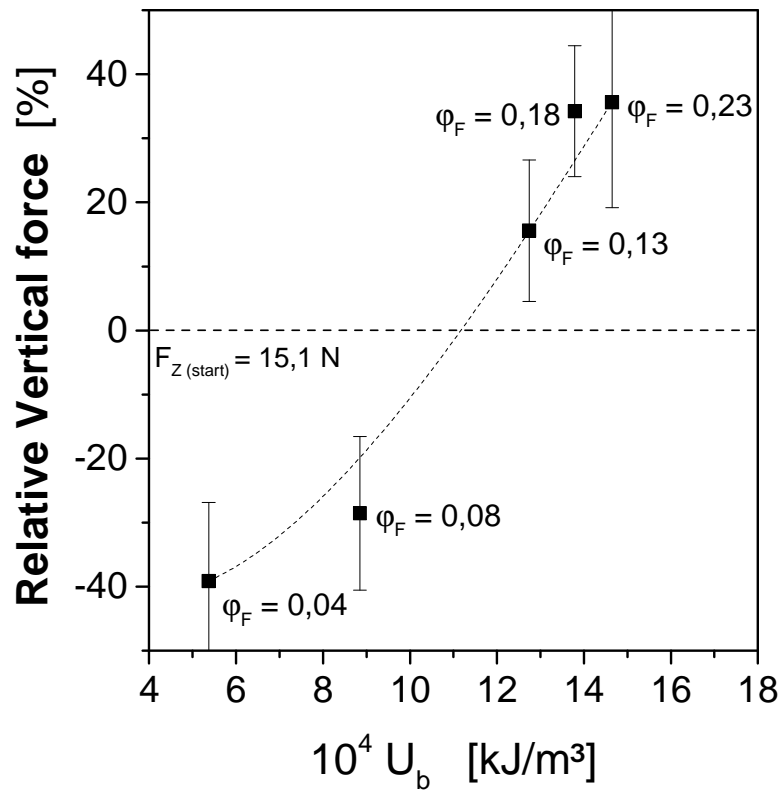
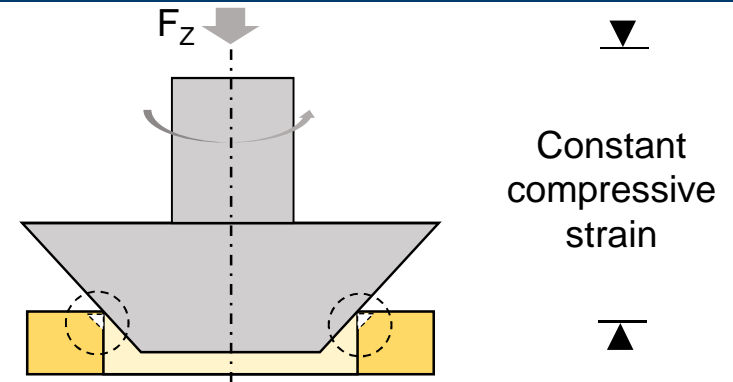


- Defined speed profile – Logarithmic ($1 \cdot 10^{-3}$ till $1.5 \text{ m} \cdot \text{s}^{-1}$)
- Starting friction \rightarrow defined start condition
- F_z is defined through line pressure of $0.4 \text{ N} \cdot \text{mm}^{-1}$
(equivalent contact pressure of about 2 MPa, for a contact width of 200 μm)
- Coefficient of friction (COF) $\mu = f(M_z, \omega)$

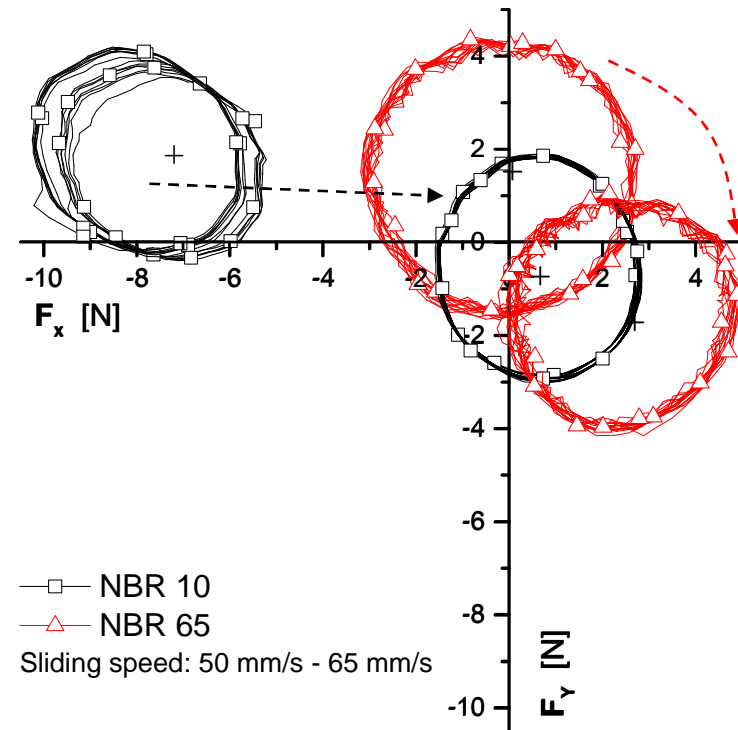


- Vertical force change ($F_{Z, rel}$) \rightarrow indicator for wear
- Strain energy density U_B

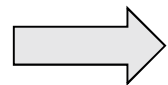
$$\text{Wear} \propto f(1/U_B)$$



Lateral force change during tribo-measurement



- Rotational cone tribometer (RCT) benefits:
 - End-manufactured seals as well as semi-finished products can be tested in various modes
 - Seal contact conditions are replicated → *Line contact, constant compressive strain*
 - Enables comparison between performance of semi-finished product (bulk material) against end-product → *Study of process influence on the tribological behavior of the product*
 - Forces (X, Y, Z) and Moments (X, Y, Z) at the contact zone measured “Live”
 - Contact condition can be analyzed by interpreting the measured lateral forces vs time
 - Different contact conditions was observed in the sliding friction behavior of differently filled NBR samples
 - Monitoring of contact condition during the measurement is possible → provides further interpretation of contact mechanism and its influence on tribological behavior



“RCT opens the opportunity to study the tribological behavior of material pairs with in-sight to their real contact condition observed in-situ.”

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