


We will be exhibiting at
Lubricant Expo & The Bearing
Show on stand 872.



Improving longevity and sustainability of tribologically stressed systems

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4 Design of new nontoxic and water-resistant greases for water mixer taps

Both the selection and optimisation of friction systems offer potential for reducing friction losses and improving service life. The parameters “coefficient of friction” and “wear coefficient” allow statements to be made about the functional performance of the materials and operating materials under consideration. In this way, the tribological damage effects can already be modelled and tested in advance on a laboratory scale using suitable test methods.

In the classic product development process, many products are still tested directly in the field in real use or on unit and component test benches. In terms of rapid prototyping, however, as much detailed and high-resolution data as possible should be made available for software simulations. With modern tribometers and the extensive ready-to-use methodologies, on the one hand the testing cycles can be greatly simplified and shortened by suitable pre-selection on a laboratory scale, and on the other hand more precise data can be supplied for software simulations, since individual operating points such as temperatures or normal forces can be individually provided with data points ([📄 Read more](#)).

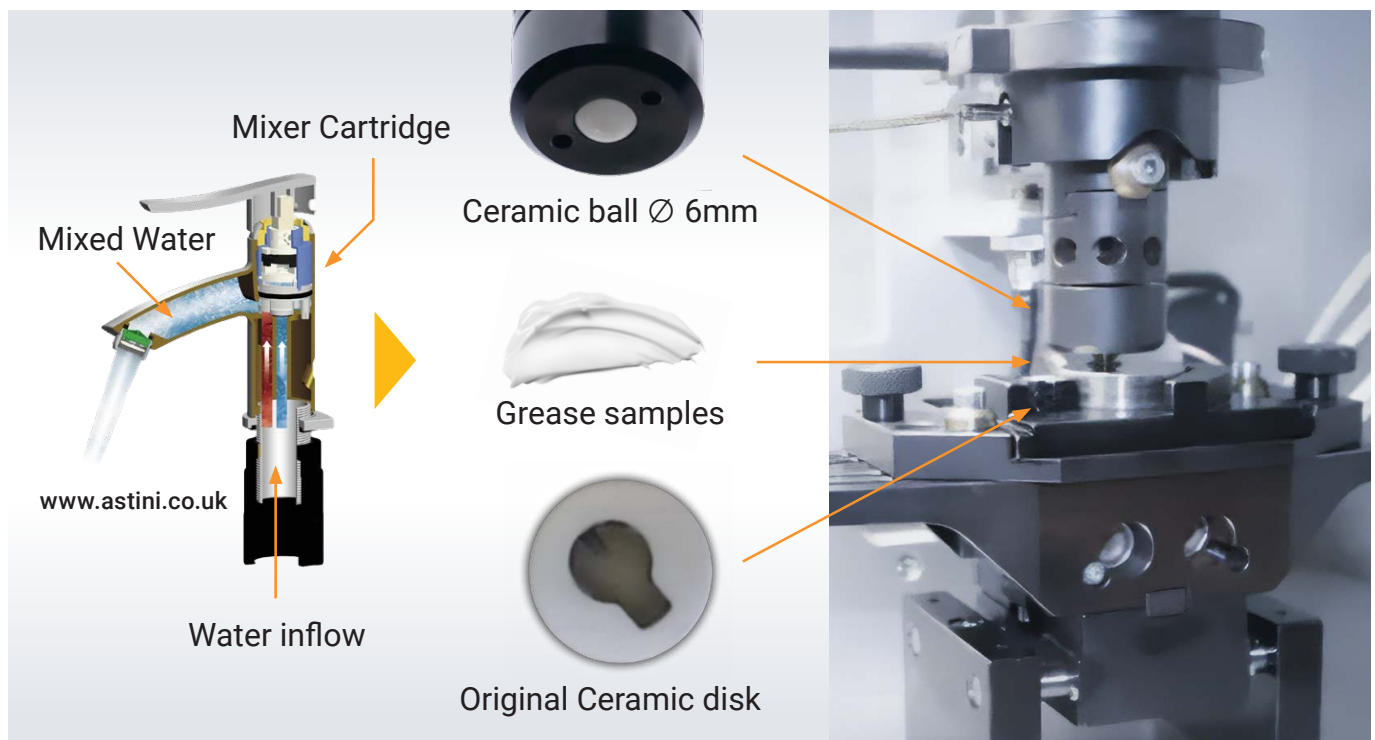
The greases in water mixing taps are subject to a permanent drive for optimisation and innovation - on the one hand due to highly diversified chemical and waste water regulations worldwide - on the other hand due to varying requirements of the manufacturers. Wear protection ensures a long service life of the mixing valve and precise adjustment behaviour, as tolerances and fits do not lose their effect due to wear. Constant friction behaviour ensures good operability by the customer, as the setting force for a specific temperature or flow rate always remains constant.¹

Technology

The ETS - Easy Tribology Screener - (Optimol Instruments) is an easy-to-use benchtop tribometer. By means of real-time measurement of coefficient of friction CoF and wear depth in high precision, the ETS shows the performance of a tribological collective even during the test ([📄 Read more](#)).

Methodology and results

After a detailed system analysis, a suitable test methodology was developed in which standard ceramic elements from water fittings served as the basic body and a ceramic ball as the counter body. The experimental setup is shown in the following figure.

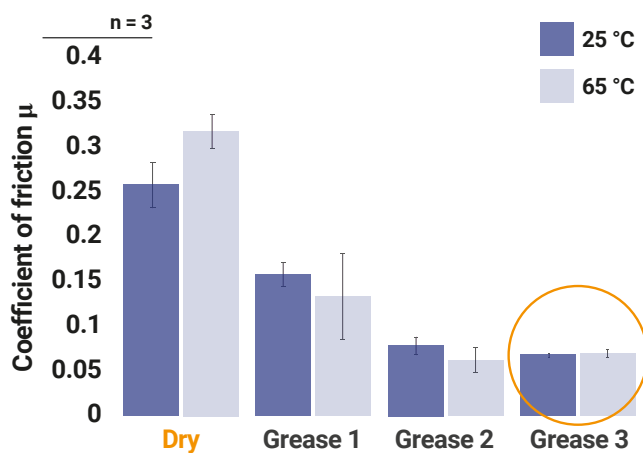


Derivation of the experimental set-up for testing different greases for water fittings on the ETS

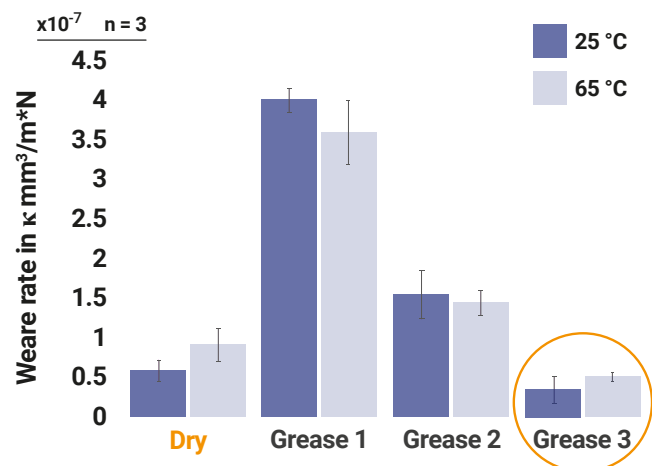
¹ Marlene Ziegler, B. R. (2023). Experimental study on the tribological behavior of ceramic disks for application. Industrial Lubrication and Tribology.

The greases were tested under suitable test conditions at room temperature as well as at 65°C as a typical hot water temperature and compared with regard to friction behaviour and wear. A clear differentiability of the grease samples with regard to wear protection and friction reduction is shown.

With all three greases tested, a desired reduction in friction compared to the dry system can be measured. The temperature constant friction coefficient of Grease 3 speaks for further benefits.



Comparison of the coefficients of friction of three grease samples and the unlubricated reference at two temperatures.



Comparison of the wear coefficients of three grease samples and the unlubricated reference at two temperatures.

For further information on this topic and/or your individual question, please contact us!

About Optimol

Optimol is a leading international company for the development and distribution of tribological model testing systems and test benches. We are a reliable partner for our customers with innovative technology, tried-and-tested solutions, competent advice and comprehensive services. With the world-renowned SRV® test system, we have created the industry standard for tribological model testing.

To find out more about tribology and Optimol: *Improving longevity and sustainability of tribologically stressed systems*

- 1 How tribometry contributes to net zero emissions - Selection of sustainable, low friction tribo-systems - Future moves and requirements for tribometric test methods
- 2 Save time and costs in product R&E and QA - Facing the challenges with ETS
- 3 Functional performance of used lubricants - Qualification of lubricants with regard to their service life in terms of acceptable energy losses and damage risks
- ④ **Design of new nontoxic and water-resistant greases for water mixer taps**
- 5 Reducing fretting wear in wind turbine bearings and gearboxes
- 6 Pre-qualification of materials with regard to fluid compatibility and reduction of fretting wear in the electric drive train in the stator-hairpin-housing system