

# The influence of nanocomposites in polymers on the wear and friction performance

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## I. INTRODUCTION

Thermoplastics are often used today in a wide variety of mechanical engineering applications such as bearings, gears and cams running under dry sliding conditions. In some cases special lubricants can be beneficially implemented to reduce friction, wear and noise. However, it can lead to problems like contamination and needing of periodic maintenance. To overcome those problems polymers are reinforced with nanocomposites or nanoparticles which considerably improves the tribological performance and mechanical properties. The PhD aims to study the effect of the nanocomposite reinforcements in polymers and to compare the friction and wear response of unfilled and nano-filled polymers.

## II. METHODS

The tests in polymers are going to be carried out on a flat tribotester medium-scale (MSF) designed at the Laboratory Soete, (Figure 1). On the bed of the test frame the load assembly is mounted where two steel counter-faces are mounted (bolt connection) on a central sliding block. This central sliding block is connected to the actuator of the load frame. It moves in the vertical direction and slides against two polymer specimens placed in holders. The reciprocating sliding test will be performed in unlubricated conditions and in ambient air, i.e., 25°C and 50% relative humidity in an estimated range of contact pressure between 0.5 and 10 MPa. The

counter plates will be oscillated at 50mm/s. The test time will be based on sliding distance of 2000m. The results of wear experiments from the medium scale tribometer under several temperatures shall be compared on the basis of their wear mechanisms which will be determined by means surface observing techniques such as profilometry, optical and electron microscopy.

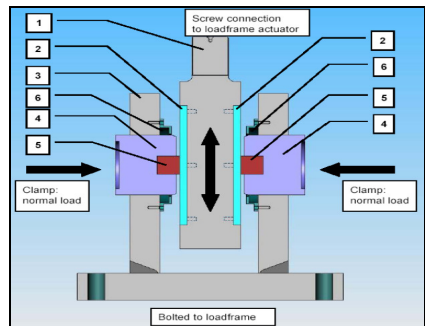


Figure 1. Medium-scale flat (MSF) tribotester

## III. CONCLUSIONS

Nanofillers are expected to have a strong influence in the tribological behaviour of polymers reducing the coefficient of friction, wear rate and also improving the mechanical strength of the bulk.

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