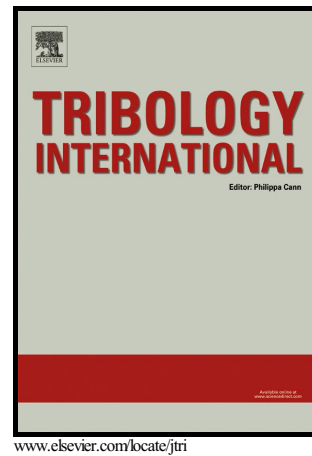


Author's Accepted Manuscript

Novel polymer grease microstructure and its proposed lubrication mechanism in rolling/sliding contacts

D. Muller, C. Matta, R. Thijssen, M.N. bin Yusof, M.C.P. van Eijk, S. Chatra



PII: S0301-679X(17)30090-7
DOI: <http://dx.doi.org/10.1016/j.triboint.2017.02.030>
Reference: JTRI4611

To appear in: *Tribology International*

Received date: 2 January 2017
Revised date: 13 February 2017
Accepted date: 20 February 2017

Cite this article as: D. Muller, C. Matta, R. Thijssen, M.N. bin Yusof, M.C.P. van Eijk and S. Chatra, Novel polymer grease microstructure and its proposed lubrication mechanism in rolling/sliding contacts, *Tribology International* <http://dx.doi.org/10.1016/j.triboint.2017.02.030>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

Novel polymer grease microstructure and its proposed lubrication mechanism in rolling/sliding contacts

D. Muller, C. Matta, R. Thijssen, M. N. bin Yusof, M. C. P. van Eijk and S. Chatra

SKF Engineering & Research Centre, 3430DT Nieuwegein, the Netherlands

Abstract

A novel polymer grease micro-structure is revealed using scanning electron microscopy (SEM), cryogenic scanning electron microscopy (cryo-SEM) and transmission electron microscopy (TEM). The structure consists of amorphous polypropylene nano-particles uniformly distributed in the base oil. This novel microstructure has never been documented before. Rheology shows that there is no irreversible shear-thinning. The grease shows excellent stability and flow behaviours. In the absence of crystallization and a network thickener structure, it has a potential for use at extremely low start-up temperatures. Spherical roller bearing (SRB) testing shows excellent lubricating performance and the potential for lowering friction in comparison with benchmark greases. It is hypothesized that the grease behaves as a highly stable nano-fluid allowing abundant oil replenishment into the rolling contact, whereby nanoparticles are released with the base oil in the contact.

Keywords: grease, polymer, polypropylene, PTFE, lithium, thickener, TEM, cryo-SEM, microstructure, rheology, yield stress, bearing testing, Lubrication mechanism, nano-particles.

List of symbols

G'	Pa	Storage modulus
G''	Pa	Loss modulus
G^*	Pa	Complex modulus
T	°C	Temperature

Download English Version:

<https://daneshyari.com/en/article/4986090>

Download Persian Version:

<https://daneshyari.com/article/4986090>

[Daneshyari.com](https://daneshyari.com)