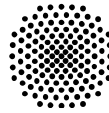


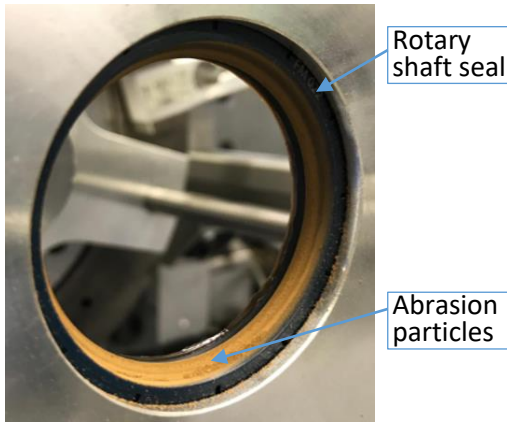
# Research Project: Grease deficiency

Avoidance of starved lubrication in grease-sealing rotary shaft seals

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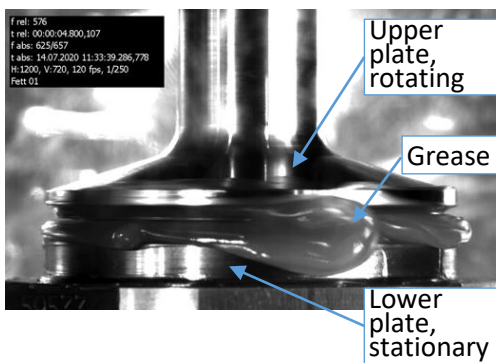
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Rotary shaft seal with abrasion particles after test

Seal	Grease	Evaluation Parameters								
		1	2	3	4	5	6	7	8	
FM011	Grease 8	3.0	1.8	2.0	1.0	1.1	3.0	2.0	2.0	2.0
FM039	Grease 10	2.5	1.8	3.0	3.0	1.2	3.5	3.0	3.0	2.6
FM017	Grease 10	2.5	2.0	3.0	3.0	1.2	3.5	3.1	3.3	2.7
FM065	Grease 17	4.5	5.0	2.5	2.5	1.8	4.0	2.0	2.0	3.0
FM037	Grease 4	3.5	4.0	3.5	2.0	2.6	3.5	3.2	3.5	3.2
FM014	Grease 5	4.5	5.0	3.5	4.0	2.6	3.5	3.3	3.8	3.8

Matrix for the evaluation of the lubrication condition



Tear-in test on the rheometer

## Motivation

When sealing greases, starved lubrication of the sealing system often occurs. The emergence of and possibilities for avoiding this starved lubrication were investigated in the grease deficiency project.

## Background

Grease lubrication is a popular alternative to oil lubrication due to its low maintenance requirements and possible lifetime lubrication. In contrast to oil-lubricated seals, grease-lubricated rotary shaft seals have a significantly higher risk of starved lubrication. Starved lubrication leads to increased abrasive wear and higher thermal stress on the seal, which can lead to premature failure of the sealing system. This can result in a leakage of the lubricant into the environment and a functional failure of the entire product.

## Approach

- Detailed rheological examination of 23 commercially available lubricating greases
- Functional tests on the friction torque test rig to evaluate the lubrication condition
- Correlation of grease properties and lubrication condition
- Functional investigations on the origin and influence of operating conditions on starved lubrication
- Structuring of shaft/seal to reduce starved lubrication

## Results

- Test and evaluation methodology for assessing starved lubrication in the sealing system
- Estimation of the risk of insufficient lubrication on the basis of grease properties
- Knowledge of the influence of operating conditions on starved lubrication

Supported by:



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