MOTORenovator NanoVit®

EFFICIENCY TECHNOLOGIES

Test values for DIN 51834 - Translational oscillation

TÜV Thuringia examination extracts

TÜV THÜRINGEN

Introduction

The test is designed to examine the wear protection and friction modification of the NanoVit Motor Renovator product according to test DIN 51834

Details of the DIN test :

Test Machine	Mechanical and Test descriptions	Test	Verifiable Products
SRV Tester (Translatory oscillation apparatus)	Universal Test System for the determination of Friction and Wear	Friction coefficient µ, wear in mm	Oils, Fats, Pastes, Bonded resins

The test examines the wear and friction behaviour under particular analyzed rotations.

The results give a demonstration of how the NanoVit product behaves under certain conditions and provides a reactive wear protection layer.

The aim was to evaluate the vendor claims that under pressure and temperature the effects are increasingly pronounced; **"The higher the pressure - the higher the wear protection - the lower the friction"** (*Source product information sheet from the manufacturer)

Introduction continued..

The studies presented here are in addition to the already available effectiveness tests made by TUV of the NanoVit Motor Renovator product.

The conclusions of the previous TUV tests showed:

1. The activation temperature for the development of the wear protection layer is 50 ° C.

2. The NanoVit wear protection arises under the influence of pressure and a temporary removal of heat energy. After building up and activating the layer ensures wear protection.

3. With a test load of 300N, wear performance of more than 50% was demonstrated above baseline 10W40 oil.

Examination of effectiveness

1. Test of resistance to wear / translatory oscillation test device

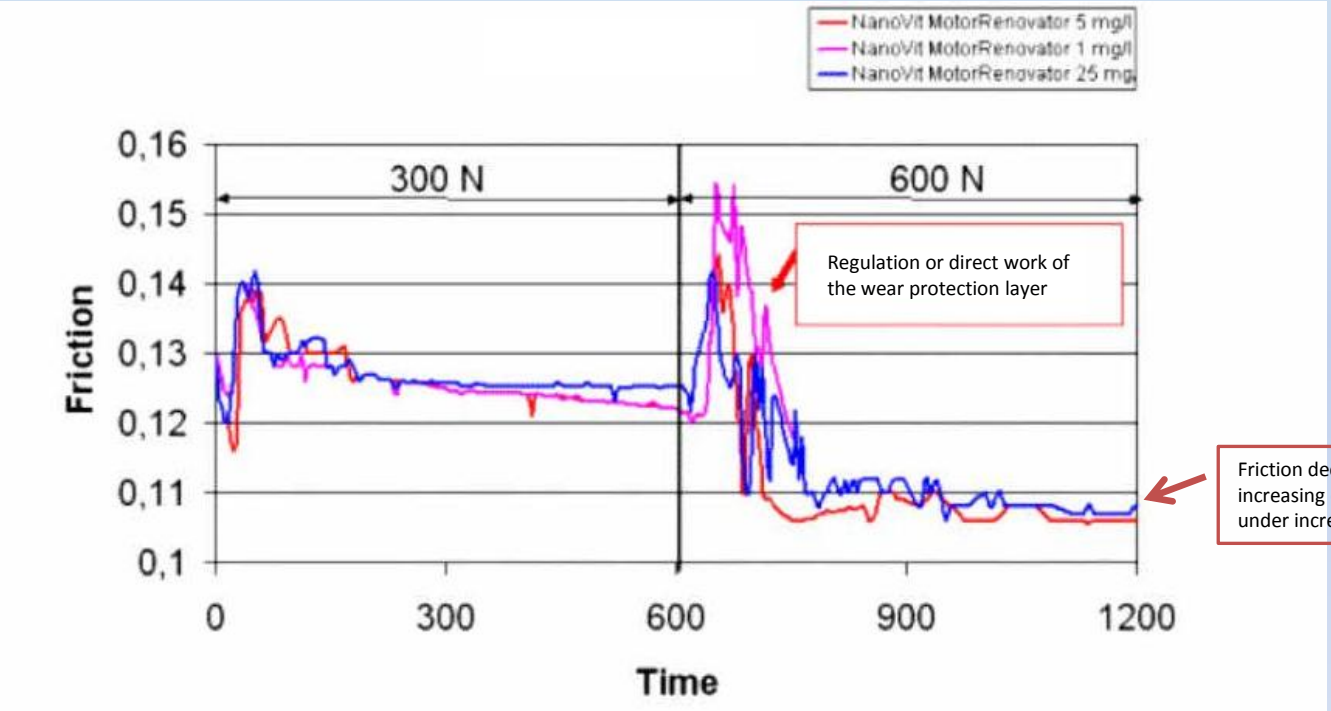
DIN 51 834 - part 2

Test force: 300 N
Test temperature: 50°C
Test duration: 120 min
Test object hardness: 62 HRC

Examination of effectiveness

Determination of Pressure Behaviour Results

Results recorded for the friction values with translational oscillation - Pressure curve :



Examination of effectiveness

Determination of Pressure Behaviour Results

Results

The wear protective layer at the beginning of the experiments always shows the same
spike in friction value. Initially, external pressure on the layer increases the friction briefly. The NanoVit self-regulatory process works against the pressure exerted, shifting to reduce friction.

As the pressure steps up (in this case 300 N to 600 N), then the process of reaction also exaggerates as the layer regulates itself. The decrease in friction at 600N compared to the 300 N force is actually greater.

To further examine this effect other wear tests could be used, for example DIN 51350.

Conclusions

1. NanoVit requires temperature and pressure for setting up the wear protection.
i.e. Available energy is absorbed by NanoVit temporarily to set up the layer.

2. The higher the pressure present in the shear zones, the higher the decreases in friction coefficient, therefore better wear characteristics are made available.

3. TÜV recommends further wear tests under certain force loads, for example DIN 51350 testing (4-ball machine) – to determine over wider test loads and whether there is a good welding point (***Note : see separate test report from Lubeck University, DIN 51350***)

4. The product analysis found that a 99% 10W40 and 1% concentration of the NanoVit product mixture (the NanoVit Motor Renovator product, containing oil and NanoVit material pre-mixed) has the best wear characteristics.