

# Author's Accepted Manuscript

Energy efficiency tests in a full scale wind turbine gearbox

Carlos M.C.G. Fernandes, Luis Blazquez, Jorge Sanesteban, Ramiro C. Martins, Jorge H.O. Seabra



[www.elsevier.com/locate/jtri](http://www.elsevier.com/locate/jtri)

PII: S0301-679X(16)30092-5  
DOI: <http://dx.doi.org/10.1016/j.triboint.2016.05.001>  
Reference: JTRI4180

To appear in: *Tribology International*

Received date: 14 March 2016  
Revised date: 27 April 2016  
Accepted date: 3 May 2016

Cite this article as: Carlos M.C.G. Fernandes, Luis Blazquez, Jorge Sanesteban, Ramiro C. Martins and Jorge H.O. Seabra, Energy efficiency tests in a full scale wind turbine gearbox, *Tribology International* <http://dx.doi.org/10.1016/j.triboint.2016.05.001>

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.

## Energy efficiency tests in a full scale wind turbine gearbox

Carlos M. C. G. Fernandes<sup>a,\*</sup>, Luis Blazquez<sup>b</sup>, Jorge Sanesteban<sup>c</sup>, Ramiro C. Martins<sup>a</sup>, Jorge H. O. Seabra<sup>d</sup>

<sup>a</sup>INEGI, Universidade do Porto, Campus FEUP, Rua Dr. Roberto Frias 400, 4200-465 Porto, Portugal

<sup>b</sup>BP Portugal, Lagoas Park – Edifício 3, 2740-266 Porto Salvo, Portugal

<sup>c</sup>Sincro Mecánica S.L., Ctra. de Cedeira Km. 1,4 - 15570 Narón - A Coruña - Spain

<sup>d</sup>FEUP, Universidade do Porto, Rua Dr. Roberto Frias s/n, 4200-465 Porto, Portugal

---

### Abstract

A 850 kW wind turbine gearbox, widely used in wind farms, was used to perform efficiency tests of different wind turbine gear oil formulations.

One mineral and three polyalphaolephin commercially available lubricants were chosen, all them are ISO VG 320 wind turbine gear oils.

Study the influence of different gear oil technologies in the overall gearbox transmission efficiency is the main objective of this work.

The results show that different energetic efficiency as well as different oil particle counting were obtained even when the same base oil is used.

*Keywords:* wind turbine gearboxes, gear oils, additives, efficiency

---

### 1. Introduction

Renewable energies, due to concern over the environment, represent a new path into world sustainability [1–4]. Wind is considered to be one of the most effective and one of the world's fastest-growing renewable energy sources [5]. One of the reasons is that wind is an infinite and free source of energy with no harmful waste products.

Wind turbines are those which convert the kinetic energy present in the wind to mechanical energy. The blades of a wind turbine rotate at very low speeds, typically 20 revolutions per minute, which are not suitable for conventional power generation using an electrical generator. This constraint is solved using a multiplying gearbox between the hub and the electrical generator [6, 7].

---

\*Corresponding author

Email address: [cfernandes@inegi.up.pt](mailto:cfernandes@inegi.up.pt) (Carlos M. C. G. Fernandes )

Download English Version:

<https://daneshyari.com/en/article/7002594>

Download Persian Version:

<https://daneshyari.com/article/7002594>

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