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**Y2K WHITE PAPER**

# Critical System Gearbox Filtration

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# CRITICAL SYSTEM GEARBOX FILTRATION

*“A lubricant is a substance, usually organic, introduced to reduce friction between surfaces in mutual contact, which ultimately reduces the heat generated when the surfaces move. It may also have the function of transmitting forces, transporting foreign particles, or heating or cooling the surfaces. The property of reducing friction is known as lubricity.”*

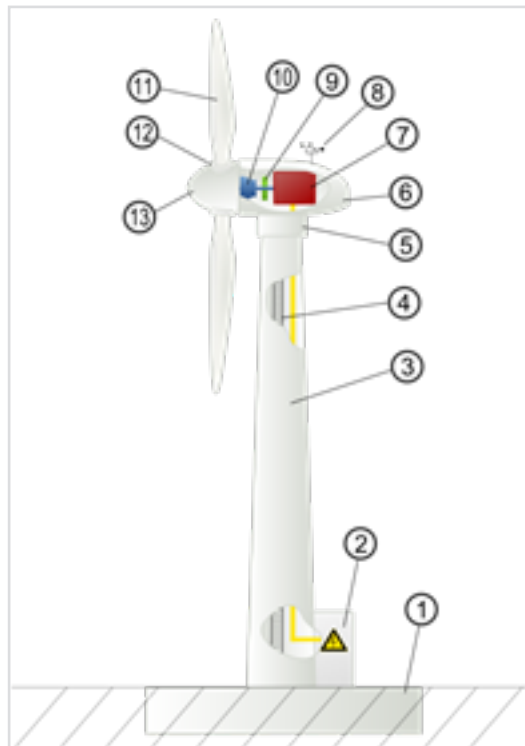
**Source: Lubricant - <https://en.wikipedia.org>**

## The Problem

Gearboxes, which often come from the OEM without dedicated or an adequate filtration system, can pose a great danger for pre-mature failure within a short segment of time and can be very costly from a repair standpoint. It is critically important to keep these systems performing at an optimal level, especially in the most severe and important applications of Power Generation, which can affect consumer costs in relation to energy and the cost per KW calculations. Specifically, in reference to Wind Tower Energy Generation Gearboxes and Coal Pulverizing Gearboxes, which supply the means to generate this energy in Coal fired plants.

The realized maintenance and operations costs of these systems generated throughout the proposed life cycle becomes clear that the challenge is not about the power generation output itself, but about the life cycle of the system in order to achieve the predicted or assumed cost of operation based off the estimated years in service. The main components supplied of the Gearboxes that help generate that power are often the costliest and most concerning points of failure in these types of systems. The life of the system in general has an ever-increasing demand for more power and longer service life; previously, 10-12 years then increased to 15-25 years, now we are looking at the extension of life beyond 25 years of service for the Renewable Energy markets.

The conclusion has come to that the only way to accomplish this goal is to extend the life of the Gearbox and all the components that are fed with that lubricating system. With rising costs associated with the handling and rebuilding of



**Source: File:Wind turbine int.svg - <https://en.wikipedia.org>**



**Source: File:Coal Mill Schwarze Pumpe.jpg - <https://en.wikipedia.org>**

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these gearboxes, it becomes extremely critical that these Gearboxes are kept and maintained at a tight level of cleanliness (typically an ISO 16/14/11) which can be tied to a direct multiplier of the service life and reduction in the overall maintenance costs to keep these systems maintained.

We often see that the systems are ran hard while under warranty, since parts and components are covered to an extent; however, in the long run end up failing well before the determined life cycle and often after the warranty has expired. It is important to start the filtration process at the commissioning of these systems rather than after an issue has been identified to ensure maximum life at the lowest possible cost.

## The Effects of Inadequate Filtration on Gearboxes

Pointing out some of the key points and some of the effects associated with not having a proper filtration or maintenance program on your Gearbox really breaks down to the following.

- 1 Oil in these applications are often very expensive (between \$600-\$800 per drum).
- 2 Costs of repairs or rebuilding (IE: Shutdowns either scheduled or unscheduled, Wind Gearboxes have to be craned down and sent off for repairs).
- 3 The staff costs to manage the operation and repairs.
- 4 The time it takes to drain and replace the oil with new oil (Which is not cleaned to the ISO specifications of the systems they are used in).
- 5 The downtime, equipment and transporting costs.

## Solution

Implementing a good filtration and monitoring program gives a good balance of extended maintenance intervals with a substantial costs savings. It also provides less oil consumption, which is also a substantial costs savings, in addition to the environmental impact of dealing and handling waste oil; more importantly it extends the life of the gearbox and creates a pathway for more consistent and predictable power generation at a lower cost over the lifetime of the system. A great reliability program that extends beyond filtration, ensures that the wear particles existent in every single Gearbox are removed to a less harmful level. This can be directly correlated with a multiplier of life for that system; so if you take the traditional lifespan and you maintain the system at the proper ISO cleanliness levels, you can get much better reliability out of the gearbox and therefore more productivity out of the system over longer periods of time.

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## Solution Steps

- 1 Establish and set a ISO Cleanliness target for your gearbox based your application
- 2 Implement a process for verifying and trending your ISO Target on your system (Oil Analysis)
- 3 Create a maintenance interval that allows you to maintain those ISO Levels
- 4 Install a permanent or dedicated filtration system on your gearbox



## Summary

So, in looking at the key points with the proper level of filtration the amount of oil consumed annually can be significantly reduced since the oil can be maintained and reused for an indefinite amount of time, providing the additives and integrity of the oil has been maintained and verified through proper Oil Analysis. Drain and Replace with new lubricant is the “old way of thinking” and is ineffective because the oil although probably better than the oil currently in a contaminated system, still doesn’t meet the ISO specifications required by the system to allow for better reliability and reduced maintenance intervals. This causes a frequent never-ending cycle of Use, Failure and Repair/Rebuild. By reusing the oil or maintaining it you can avoid the costs associated with not only acquiring the oil but also the time associated with having to drain and fill these systems, not to mention the loss in revenue due to downtime.

Y2K Manufactures a complete line of systems to Remove Solid particulate, Varnish, Water (Emulsified, Dissolved and Free) and ferrous materials from your hydraulic or lubricating system.

Please contact Y2K today for your most critical applications and let us provide a solution to help you stay ahead of downtime and failures.