



CLEAN OIL  
BRIGHT IDEAS

# Hydraulic Oil Wind Turbine, Vestas V90-2MW, Pitch Hydraulic System

## CJC™ Application Study

Application Study  
written by:

Jonas Rutgeron  
C.C.JENSEN AB  
Sweden

&

Martin Jansson  
Stema Wind  
Sweden

2014



### CUSTOMER

Customer: Arise AB, Sweden  
Wind Farm: OXHULT, Sweden

### SYSTEM

Turbine: Vestas V90-2MW  
System: Pitch Hydraulic  
Manufacturer: PMC Technology  
Oil type: Texaco Rando HDZ 32  
Oil volume: Approx. 300 L

### PROBLEM

Arise was experiencing increased particle and water contamination in the pitch hydraulic systems of their Vestas V-90 2 MW wind turbines

### SOLUTION

Refurbished CJC™ HDU 15/25 PV - system #7  
After a retrofit on the gearbox the existing CJC™ HDU 15/25 PV was dismantled from the gearbox, cleaned and reinstalled on the pitch hydraulic system.

### RESULT

After only 1 month operating with the CJC™ HDU Fine Filter, the following results were obtained:

#### Particles:

The contamination level in the oil was reduced by 95% from 34,631 to 1,539 of 2 µm particles per 100 ml.

#### Water:

The water level was reduced from 1,859 ppm to 86 ppm also 20 times better than the initial start out level.

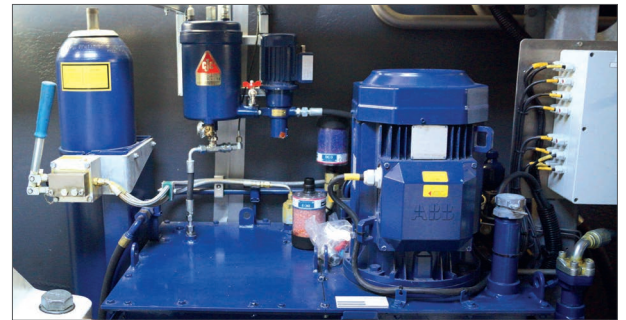
According to industry experience and Noria Corporation, this extends the life time of the hydraulic components with a factor of > 2.5 times.

### ENVIRONMENTAL BENEFITS

CJC™ Fine Filters are easy disposable and environmentally friendly.

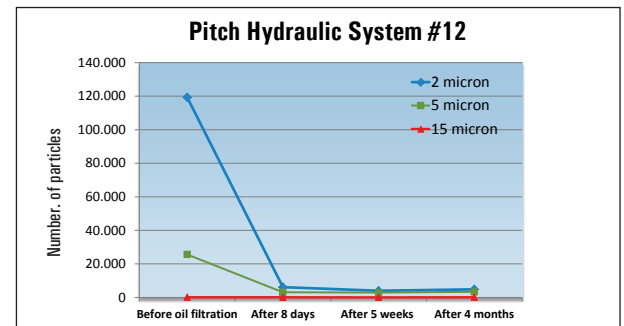
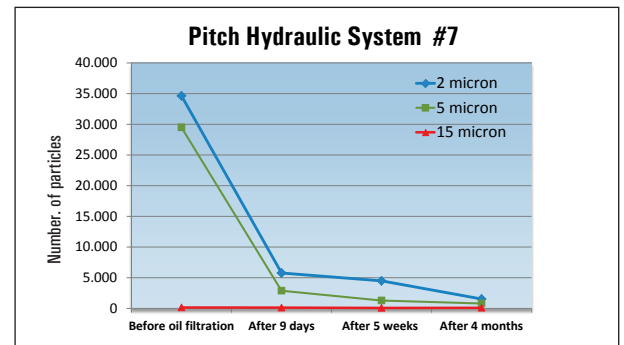
Guide for Oil Cleanliness	
Oil in wind turbine components	Recommended ISO 4406 Oil Cleanliness
Gearbox	17/15/12
Pitch hydraulic	16/14/11
Main bearing	16/14/11

\*) Source: Noria Corporation



Vestas Wind Turbine V90, Pitch Hydraulic System with a CJC™ HDU 15/25 PV installed

### PARTICLE DEVELOPMENT



### RESULT

pr. 100 ml	Before Oil Filtration	After 9 days	After 5 weeks	After 4 months
<b>Pitch Hydraulic System #7</b>				
> 2 micron	34,631	5,773	4,489	1,539
> 5 micron	29,503	2,887	1,285	797
> 15 micron	149	123	75	98
ISO Code	16/15/8	13/12/7	13/11/7	11/10/7
Water, ppm	1,859	977	89	86
<b>Pitch Hydraulic System #12</b>				
> 2 micron	119,287	6,147	4,005	4,811
> 5 micron	25,653	3,093	2,887	3,367
> 15 micron	133	99	63	145
ISO Code	17/15/8	13/12/7	13/12/6	13/12/8
Water, ppm	347	143	87	82