



**CLEAN OIL**  
BRIGHT IDEAS

**Application Study**  
written by:

Thomas Møller Andersen  
C.C.JENSEN A/S  
Denmark

2000

## CJC™ Application Study

### THE SYSTEM

Wind turbine gearbox.  
**Gearbox type:** 3-stage planetary / helical.  
**Gearbox manufacturer:** Flender AG.  
**Oil volume:** 60 ltr.  
**Oil type:** Tribol 1710.

### THE PROBLEM

The gear system was heavily contaminated with solid particles, oxidation products and water. To obtain a life time of 20 years on the gears and bearings the oil had to meet a contamination level of ISO 17/15/12 or better with a water content lower than 500 ppm.

### THE SOLUTION

**CJC™ Fine Filter HDU 15/25 PV** with a pump rate of 45 ltr/h and a 3 µm absolute CJC™ Filter Insert.

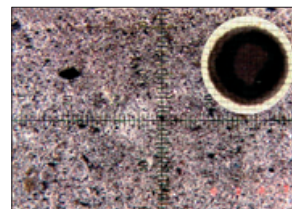
### THE TEST

- **Oil sample No 1** was taken when the filter was installed on the running turbine.
- **Oil sample No 2** was taken after 48 hours with the filter in operation.
- **Oil sample No 3** was taken after one month with the filter in operation.

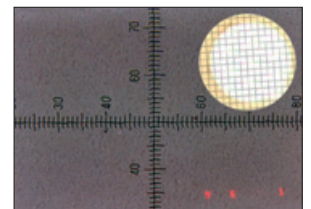
### THE RESULT

After one month with the **HDU 15/25 PV Fine Filter** installed, just 0.5 % of the particles larger than 2 µm were left in the gear oil and the water content was reduced to less than 100 ppm.

The life time of the first filter insert was 12 months, while all of that time keeping the contamination at a very low level.



*Oil sample  
before filter test start*



*Oil sample  
after one month of filtration*

### THE RESULT

Filtration time	0 hour	48 hours	1 month
Particles 2 µm	1,443,178	29,975	6,774
Particles 5 µm	298,681	14,652	2,204
Particles 15 µm	17,893	1,549	356
ISO 4406 Code	21/19/15	15/14/11	13/12/9
Water content	1,240	109	76
Colour of membrane filter disc	Black	Light	White



CLEAN OIL  
BRIGHT IDEAS

## CJC™ Product Info

### THE APPLICATION

The **HDU 15/25 PV series off-line Fine Filters** are especially designed for the filtration of high viscosity lubricants on wind turbine transmissions.

The large by-pass valve ensures a controlled operation of the filter system, even at very low temperatures.

### THE FUNCTION

The filter pump draws oil from the lowest point of the system, and passes the oil through the filter insert. Clean oil is returned to the top of the transmission box.

### THE SOLUTION

**CJC™ Fine Filter HDU 15/25 PV with CJC™ Filter Insert BG 15/25** consisting of several discs stacked and bonded together. The material is basically cellulose.

All CJC™ Filter Inserts have a filtration degree of  $3\ \mu\text{m}$  (micron) absolute and  $0.8\ \mu\text{m}$  nominal, i.e. 98.7% of all solid particles  $> 3\ \mu\text{m}$  and approx. 50% of all particles  $> 0.8\ \mu\text{m}$  are retained in one pass.

The water absorption capacity of the cellulose insert is up to 50% of the total contaminant holding capacity of 1.5 ltr.



HDU 15/25 PV  
CJC™ Off-line Filter

### TECHNICAL DATA

Model	HDU 15/25 PV
Pump yield, std.	45 ltr / h
Filter Insert	BG 15/25
Power consumption	0.13 kW
Max. fluid temp. approx.	85° C
Max. pressure drop	2.5 bar
Max. viscosity, approx.	ISO VG 320 cSt
Dirt holding capacity, approx.	1.5 ltr.
Water absorption capacity	0.75 ltr.
Weight	17 kg