



OIL FILTRATION SYSTEMS

# CJC™ Application Study

## Gear Oil - Wind Turbine Transmission



WIND POWER

*Application Study  
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### 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 element. Clean oil is returned to the top of the transmission box.

### THE SOLUTION

**CJC™ FineFilter HDU 15/25 PV** with **CJC™ FilterInsert 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 µm (micron) absolute and 0.8 µm nominal, i.e. 98.7% of all solid particles >3 µm and approx. 50% of all particles > 0.8 µm are retained in one pass.

The water absorption capacity of the cellulose element is up to 50% of the total contaminant holding capacity of 2 L.



**HDU 15/25 PV**  
*CJC Off-line Filter*

### THE RESULT

| Model                           | HDU 15/25 PV   |
|---------------------------------|----------------|
| Pump yield, std.:               | 45 ltr. / h    |
| Standard filter element:        | 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          |





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### THE SYSTEM

Wind turbine gearbox.

**Gearbox type:**

3-stage planetary / helical.

**Gearbox manufacturer:**

Flender AG.

**Oil volume:** 60 l.

**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™ FineFilter HDU 15/25 PV** with a pump rate of 45 L/h. and a 3 µm absolute **CJC™ FilterInsert**.

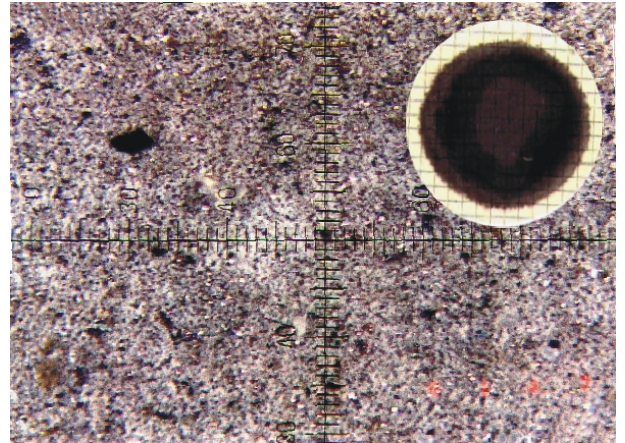
### THE TEST

- 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.

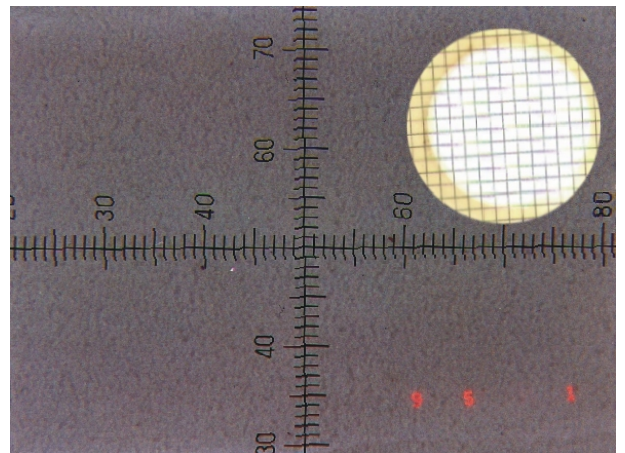
### THE RESULT

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   |

