

Start date: 27/12/2011

End date: 29/12/2011

**Reference:**

Motor/Generator: DC Motor Siemens 5500 kW

**Measurement details:**

	before	after
Deformation (oval):	153 $\mu\text{m}$	45 $\mu\text{m}$
Surface roughness (Ra):	+/- 1.080 $\mu\text{m}$	+/- 1.600 $\mu\text{m}$
Numbers of peaks/cm (>1m $\mu$ ):	+/- 80	+/- 150

**Picture of motor**

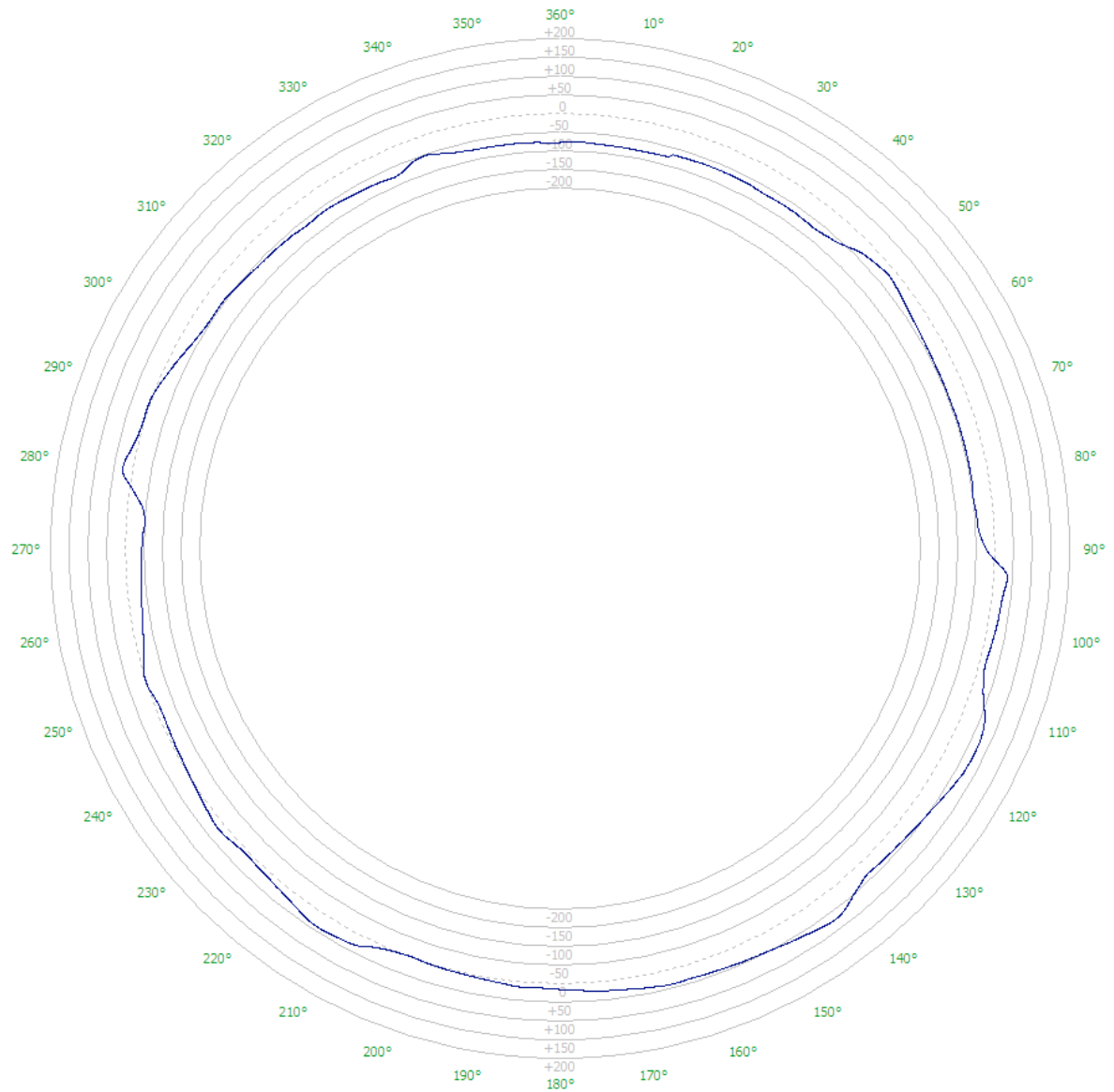


Radial graph before the intervention

## GRAPHIQUE RADIAL

Alu Norf  
Borstel 2

F4

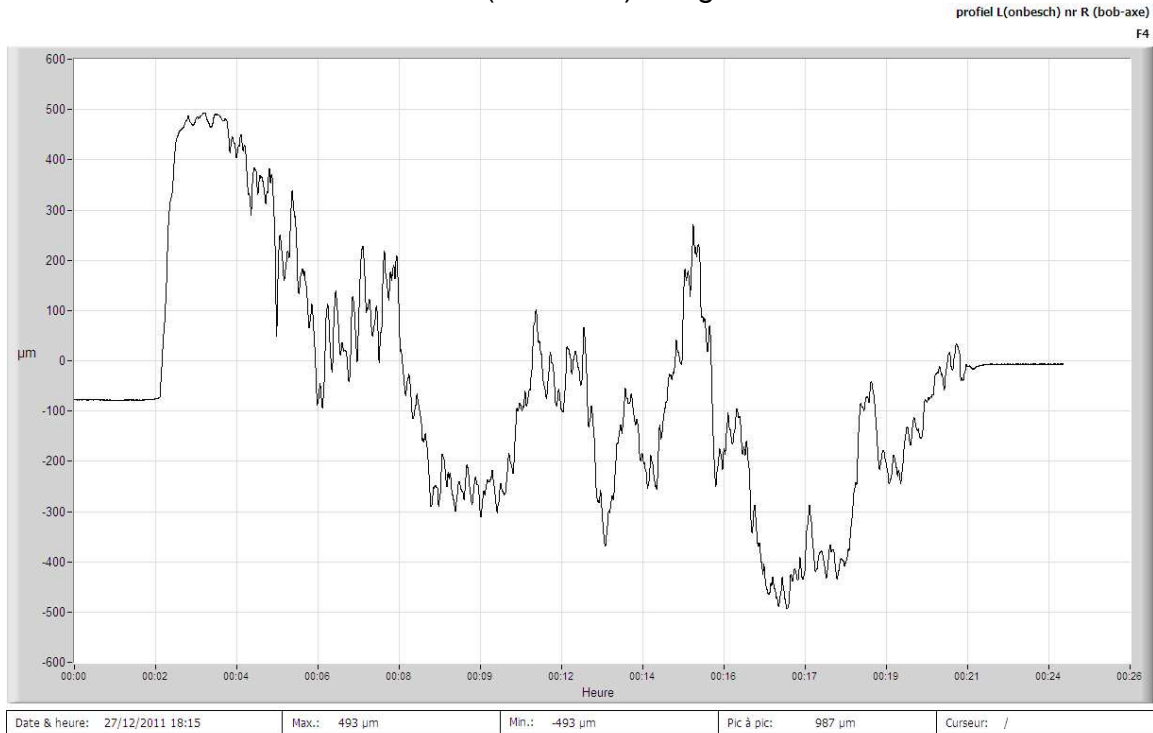


Date & heure: 27/12/2011 13:45	Pic à pic: 153 µm	Max.: 74 µm	Min.: -79 µm	Curseur: /
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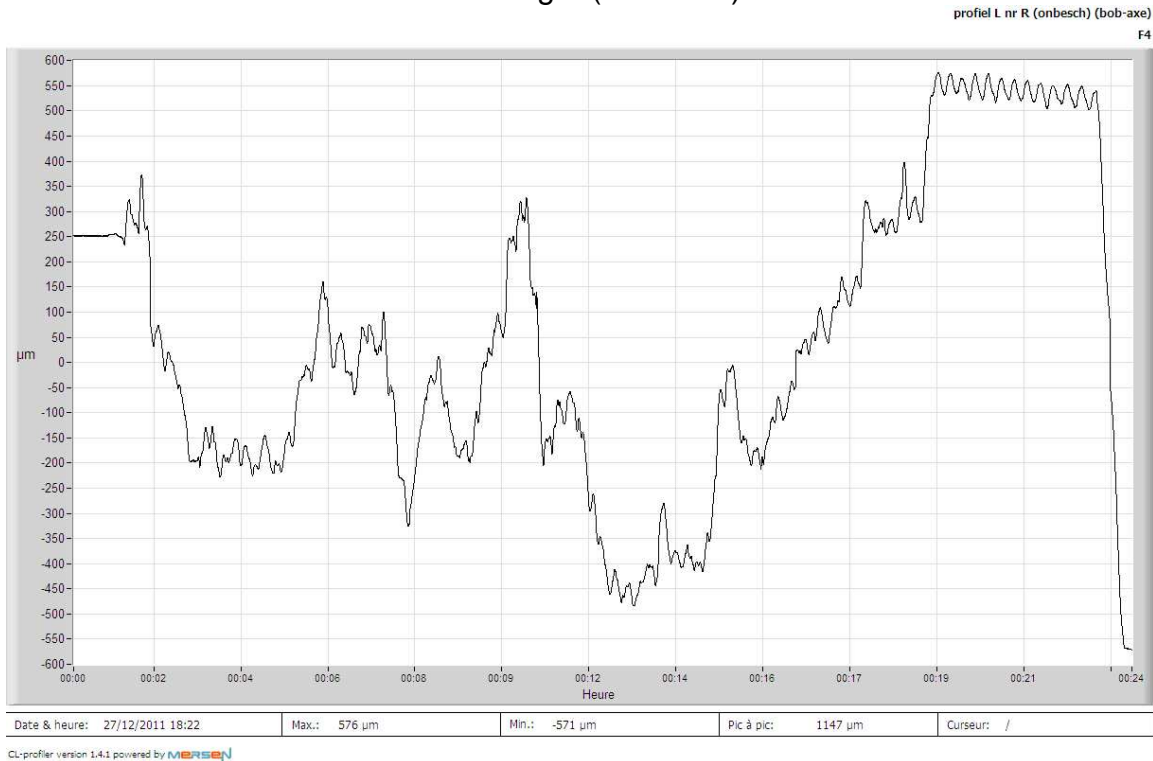
CL-profiler version 1.4.1 powered by MERSEN

## Profile before the intervention

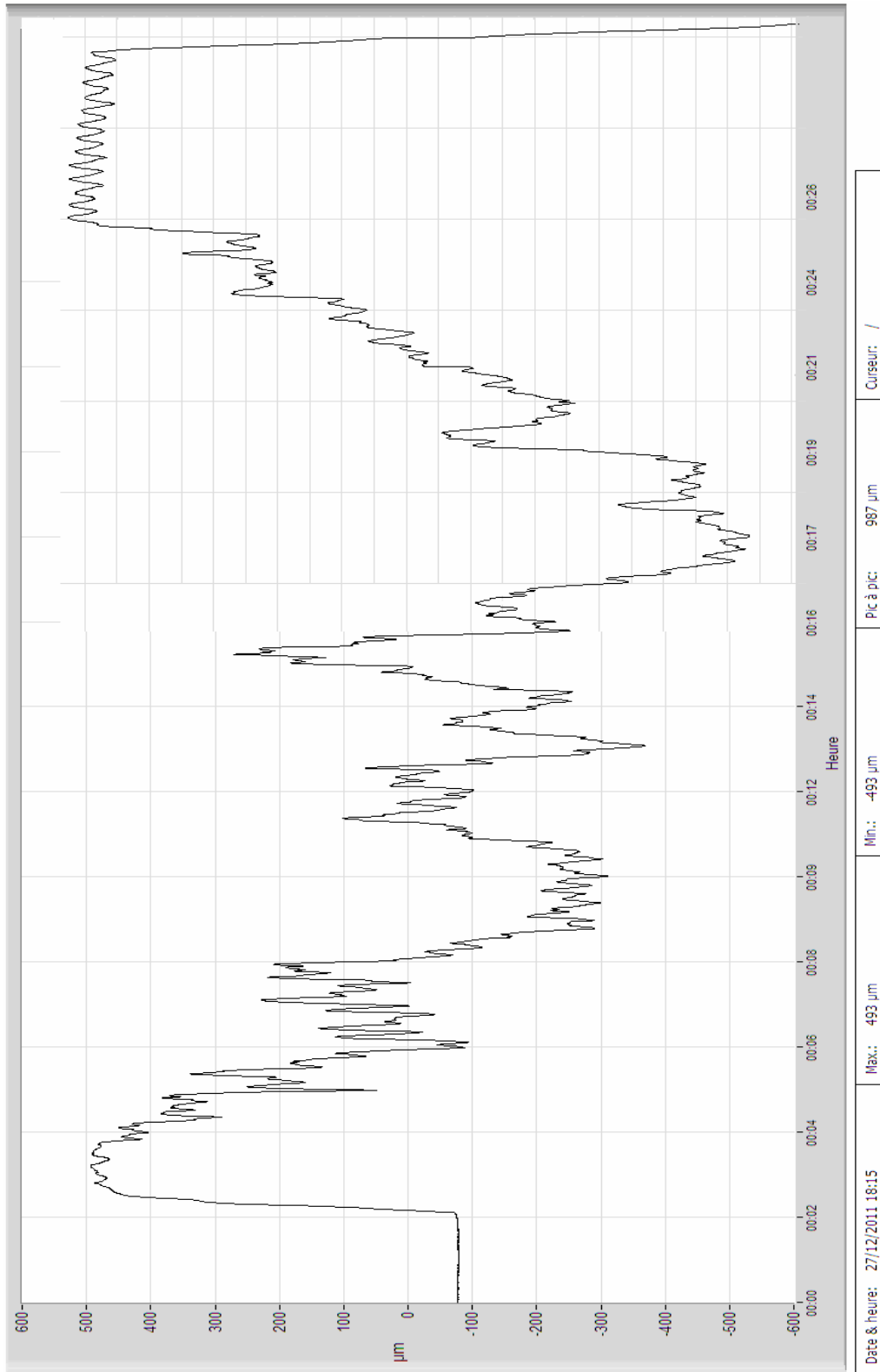
Left (unwritten) to right



Left to right (unwritten)



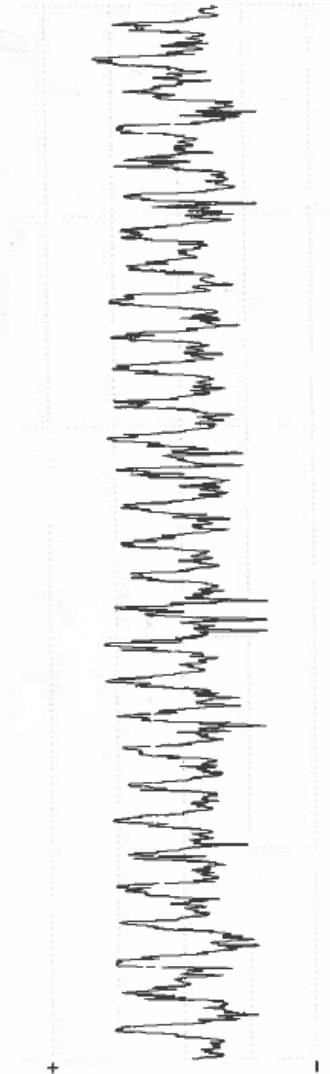
Profile before the intervention (combined)



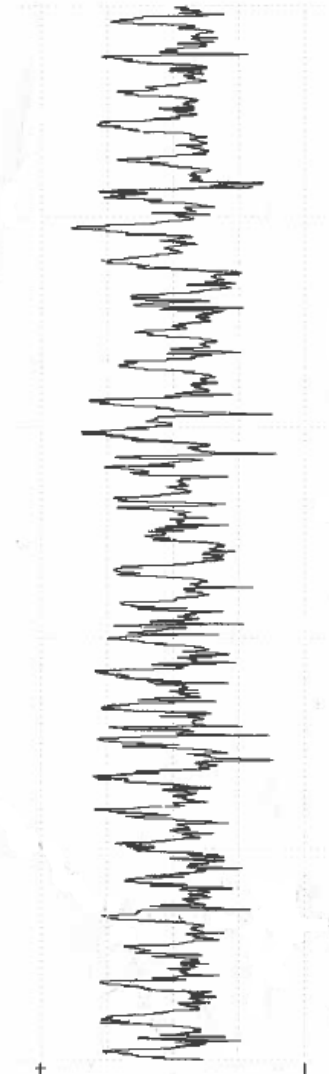
Ci-profil version 1.4.1 powered by MERSEN

### Roughness measurement before the intervention

Perthometer M1  
 Objet  
 Nom  
 #  
 Lt 5.600 mm  
 Ls Norme G 2.5  $\mu$ m  
 Lc 0.800 mm  
 Ra 1.076  $\mu$ m  
 Rz 5.84  $\mu$ m  
 Rmax 6.24  $\mu$ m  
 R<sub>Pc</sub>(1.0,-1.0) 78 /c  
 R Profil  
 Lc 0.800 mm  
 VER 2.50  $\mu$ m



Perthometer M1  
 Objet  
 Nom  
 #  
 Lt 5.600 mm  
 Ls Norme G 2.5  $\mu$ m  
 Lc 0.800 mm  
 Ra 1.096  $\mu$ m  
 Rz 6.79  $\mu$ m  
 Rmax 7.62  $\mu$ m  
 R<sub>Pc</sub>(1.0,-1.0) 90 /c  
 R Profil  
 Lc 0.800 mm  
 VER 2.50  $\mu$ m

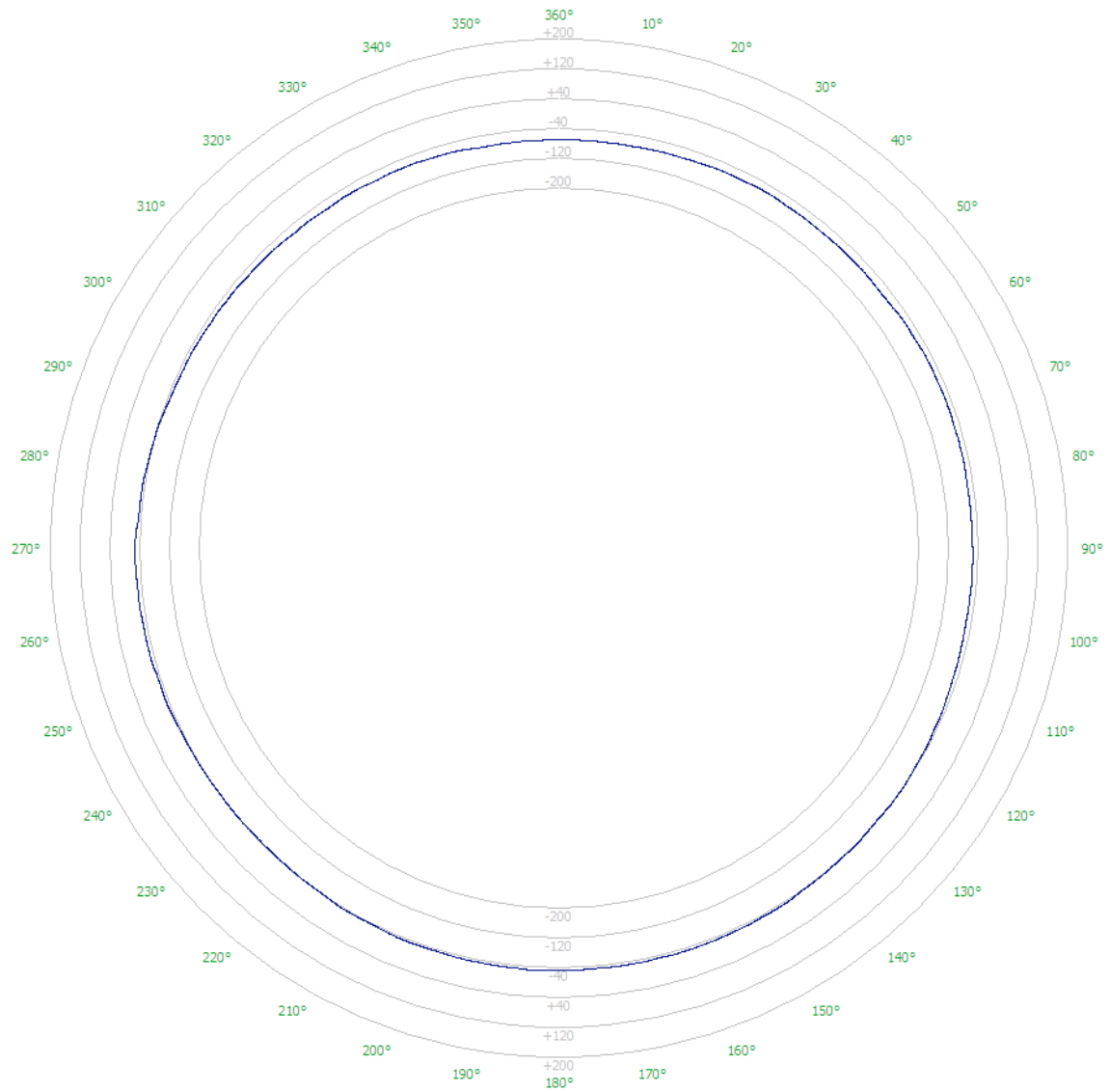


We can spot a spiralshaped pattern in the roughness of the collector which is not advised due to extra wear to the brushes.

Radial graph after the intervention

## GRAPHIQUE RADIAL

Alu Norf  
Borstel 1 starten en accelereren  
F4



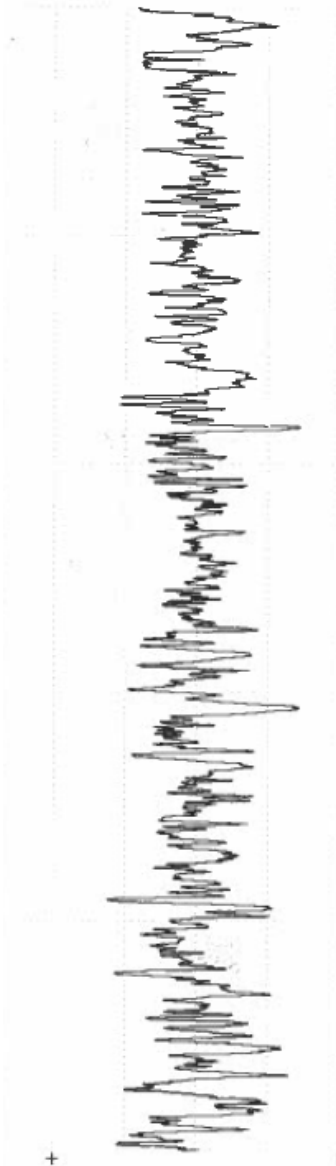
Date & heure: 29/12/2011 12:28	Pic à pic: 45 µm	Max.: -26 µm	Min.: -71 µm	Curseur: /
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CL-profiler version 1.4.1 powered by MERSEN

## Roughness measurement after the intervention

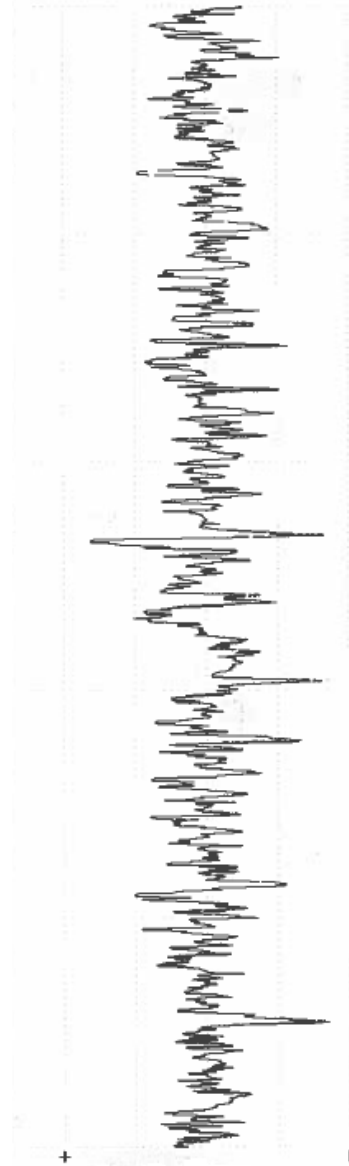
Perthometer M1  
 Objet  
 Nom  
 #  
 Lt 5.600 mm  
 Ls Norme G 2.5 µm  
 Lc 0.800 mm  
 Ra 1.671 µm  
 Rz 11.4 µm  
 Rmax 13.4 µm  
 R<sub>Pc</sub>(1.0,-1.0) 143 /c

R Profil  
 Lc 0.800 mm  
 VER 5.00 µm

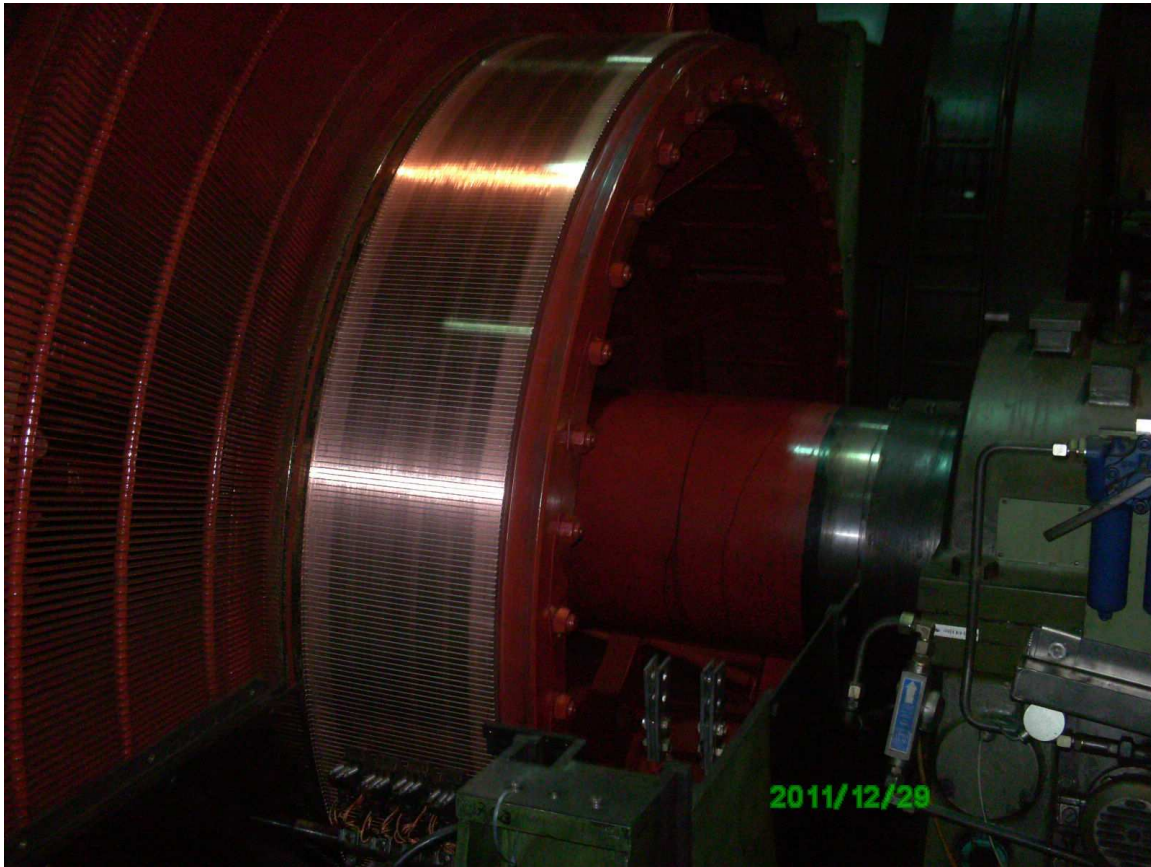


Perthometer M1  
 Objet  
 Nom  
 #  
 Lt 5.600 mm  
 Ls Norme G 2.5 µm  
 Lc 0.800 mm  
 Ra 1.579 µm  
 Rz 12.4 µm  
 Rmax 16.7 µm  
 R<sub>Pc</sub>(1.0,-1.0) 158 /c

R Profil  
 Lc 0.800 mm  
 VER 5.00 µm



## Picture of final result



## Conclusion.

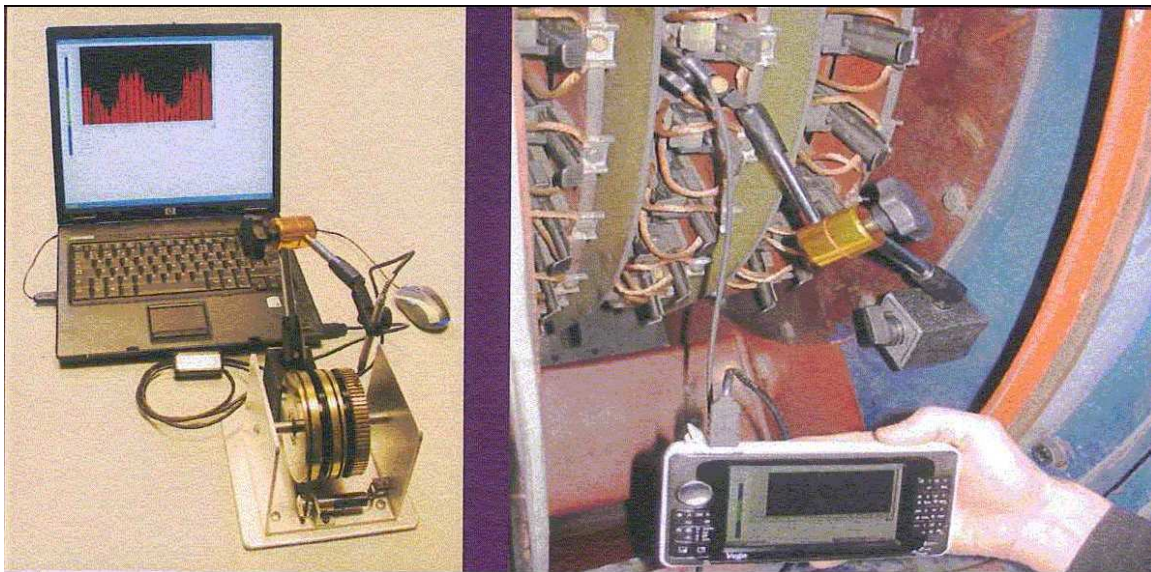
The final result of the rectification, a deformation of 45  $\mu\text{m}$  is not optimal, although the rectification conditions were good.

After a deformation on the axis, we can not determine an error in the bearings.

It might be possible that there is a problem with the collectors condition.



## Roundness protocol.



This measurement allows us to follow the evolution of the deformation and gives us the possibility to plan preventive maintenance support and hereby prevent large damages.

Based on our experience we advise:

- for the commutator and the brushes a deformation of 3/100 mm or less.

## Roughness protocol.

The roughness is the state of the surface of the commutator and brushes.

Recommended roughness value (Ra) of the commutator and brushes:

- A roughness smaller or equal to 0,2  $\mu\text{m}$  has to be avoided.
- A roughness higher then 2  $\mu\text{m}$  adds to high wear of the brushes.
- An insufficient number of peaks has to be avoided.

Based on our experience we advise:

- For the commutator of industrial machines an Ra-value from 1,5 to 2,5  $\mu\text{m}$  after the intervention, and an Ra-value from 0,9 to 1,8  $\mu\text{m}$  during operation. The number of peaks/cm has to be higher then 100.
- For rings in steel or brass, Ra between 0,8 and 1,8  $\mu\text{m}$  and the number of peaks higher then 80 pcs/cm