MINUTES

MEASUREMENTS ON ASSEMBLY E MODULUS PRESS FOR MQYYM (REF 6000)

Summary

The goal of this document is to present the dimensional measurements made by DMP and the preliminary ones performed at CERN

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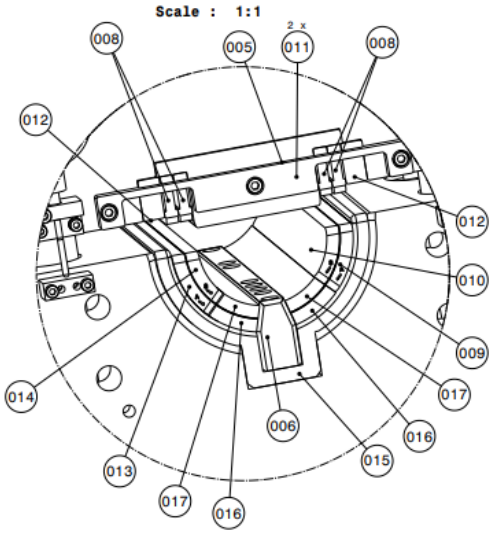
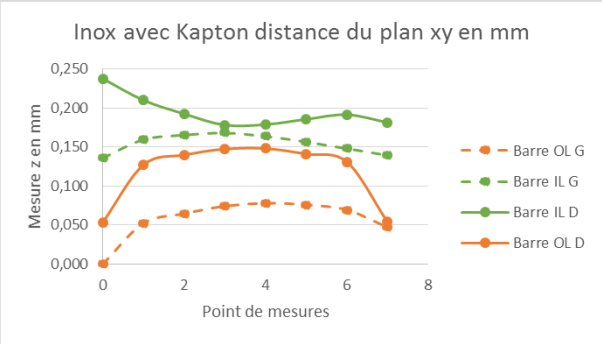
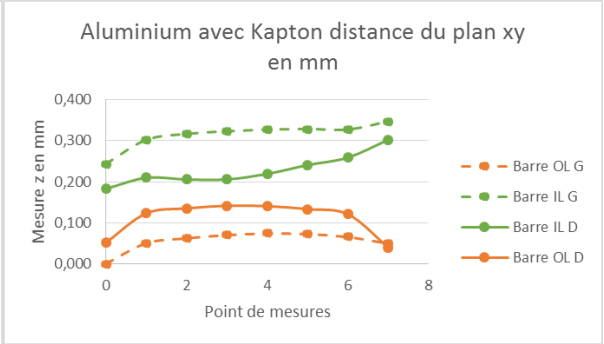
1 MEASUREMENTS OF THE BELOW BLOCK (REF STO104519)

The below block have been assembled with all the parts (the aluminum dummy coil and the stainless steel dummy coil). The measurements on the block have been done on the top of the parts 9, 10, 13, 14 to be sure that the tops of these 4 parts are in the same plane. The measured points have been taken on the location of the measuring stations of parts 8. Because of the possible error induced by the Kapton on the measurements after assembly, some measurements have been done with and without Kapton. The measurements without Kapton is not stable as the radius of the parts are not fitting well and have been disregarded. The results of the assembly with the parts 16 and 17 in aluminum and then in stainless steel **with Kapton** are presented below:



First measurements at DMP:





In order to have the top of the parts 9, 10, 13, 14 on the same plane DMP proposed to rectify these parts. According to the measurements performed at DMP on the assembly the following rectification targets have been proposed:

The parts 9, 10, 13 should be rectified:

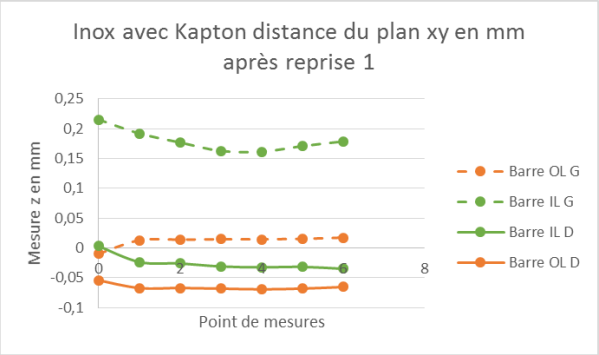
Barre OL G (part 13): 0 mm

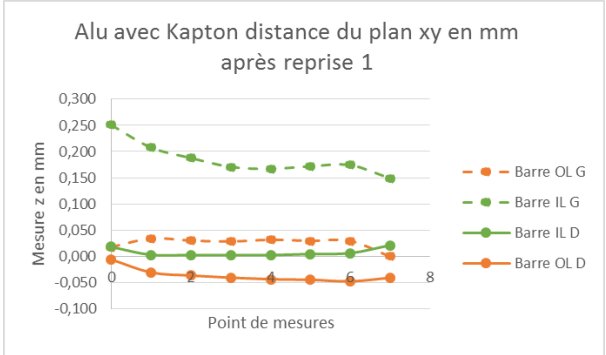
Barre IL G (part 14): - 0.1 mm

Barre IL D (part 10): - 0.12 mm

Barre OL D (part 9): - 0.07 mm

Second measurements at DMP:





After the first rectification and the second measurements, in order to have the top of the parts 9, 10, 13, 14 on the same plane DMP proposed to rectify these parts. According to the measurements performed at DMP on the assembly the following second rectification targets have been proposed:

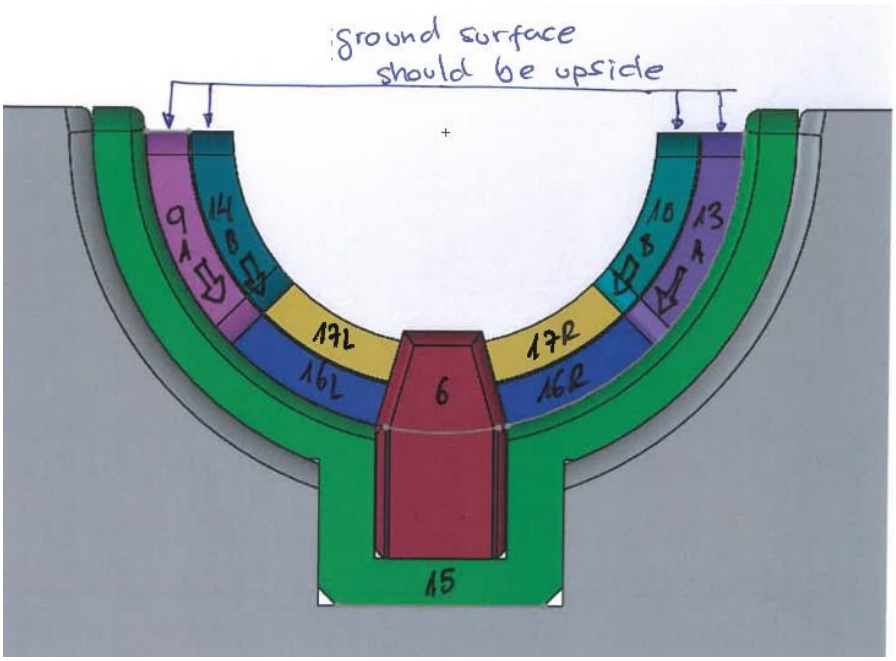
The parts 9, 10, 13 should be rectified:

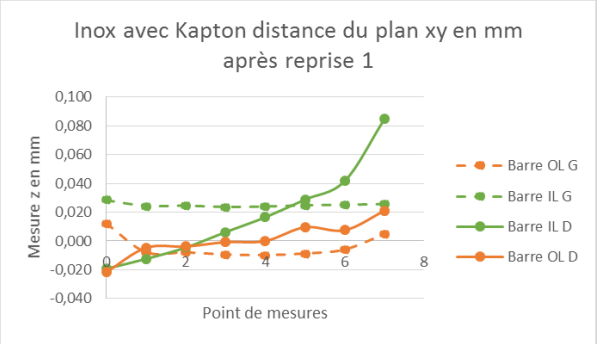
Barre OL G (part 13): - 0.084 mm

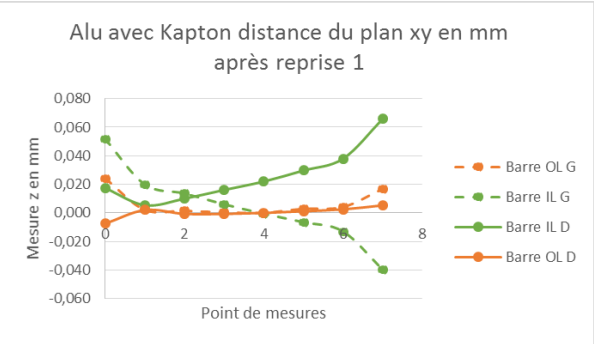
Barre IL G (part 14): -0.230 mm

Barre IL D (part 10): - 0.037 mm

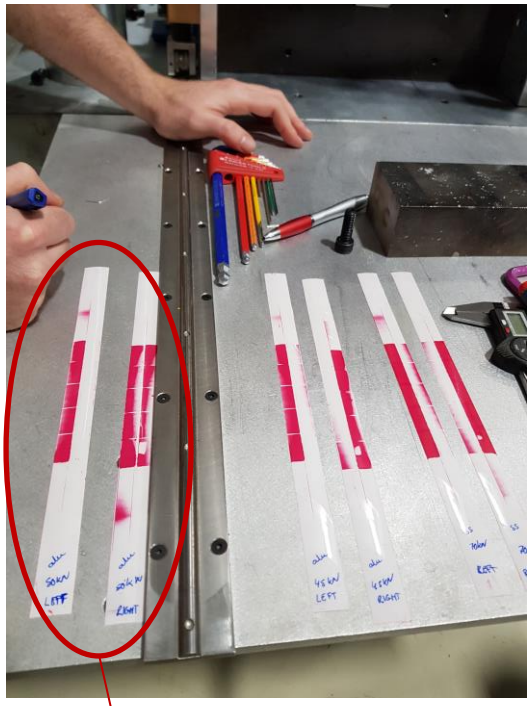
Barre OL D (part 9): 0 mm

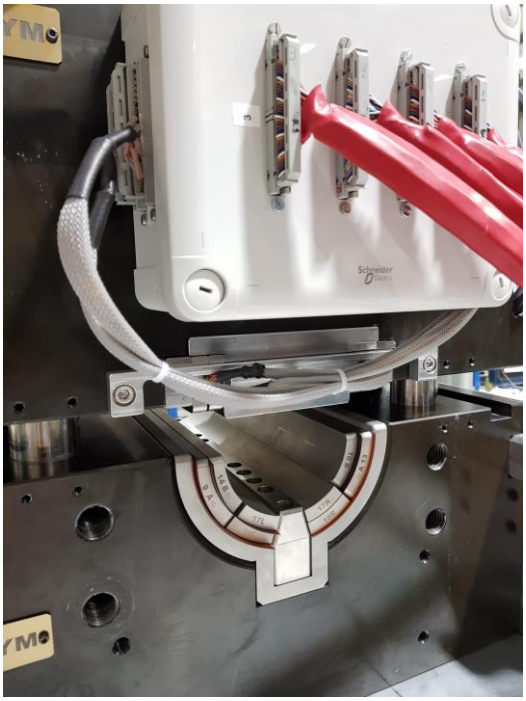






Measurements at CERN under press in 927 on 13/12/2018:





First measurement: disregarded

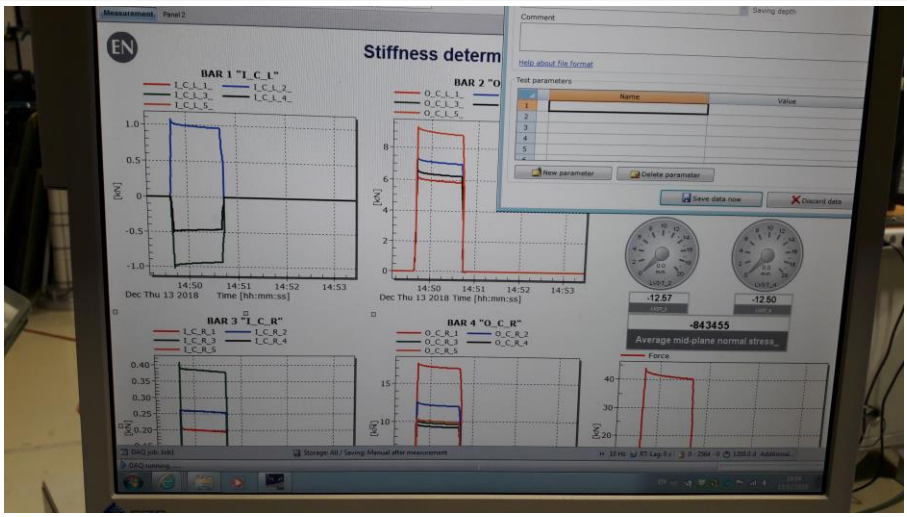
Observation:

1) **First measurements with aluminum sectors**

The measurements have been disregarded since there was a mistake in the shimming: 4 Kapton layers + one fuji paper layer instead of 3 Kapton layers + one fuji paper layer have been used

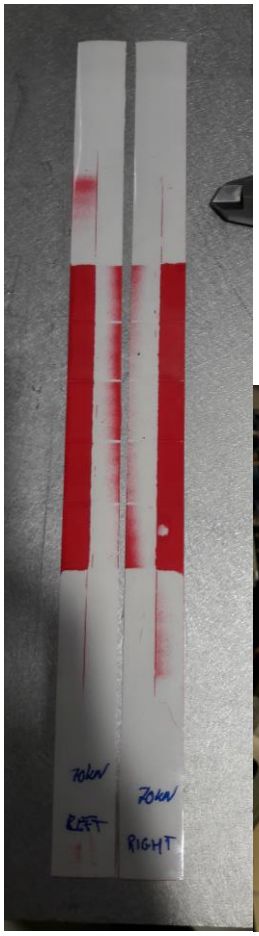
2) **Second measurements with aluminum sectors**

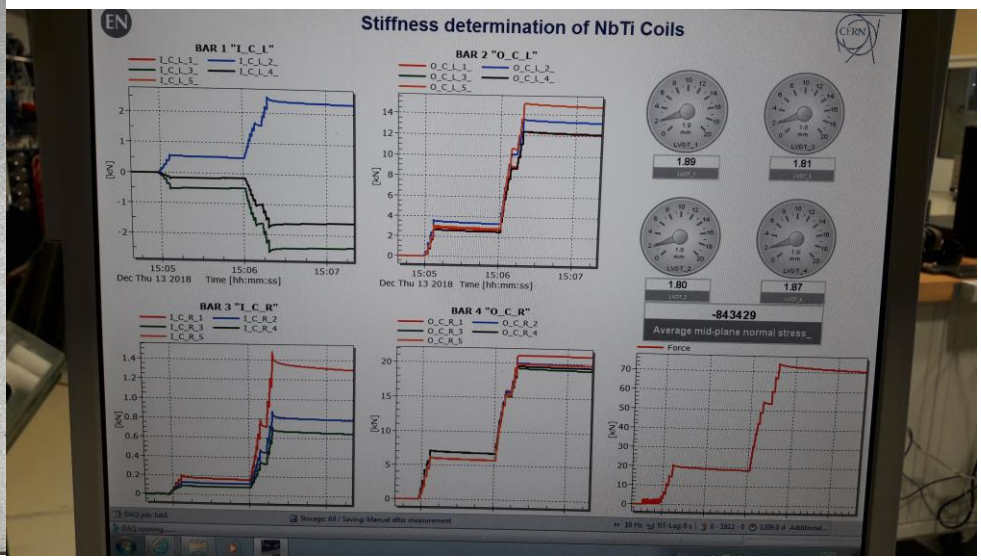
A total force of 40 kN has been applied. Both inner layer Fuji show very low pressure points which is confirmed by the SG readings.



3) Third measurements with stainless steel sector

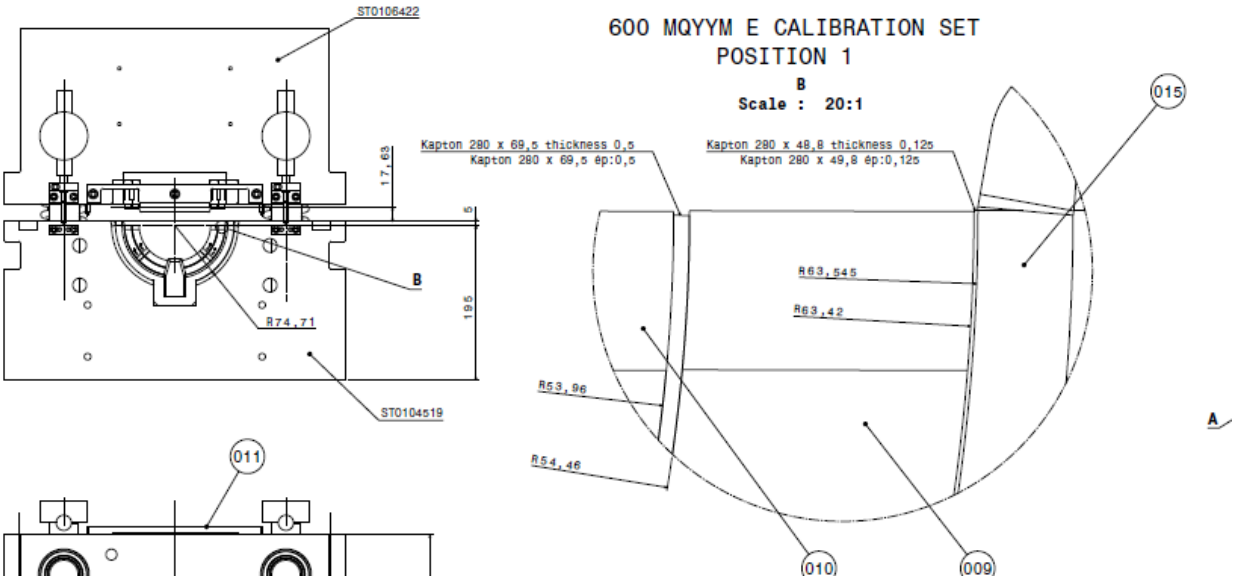
The aluminum sectors have been replaced by the SS ones and the same behavior has been observed with a total force of 70 kN.





<u>Possible explanation:</u>

The measurements at DMP might have been made with 0.52 mm interlayer Kapton instead of 0.5 mm. This 0.02 mm difference translates into 0.125 mm in the circumference of the inner sector position, which translates in 0.016 mm at the tool midplane (PI/4*(54.46-0.52)-Pi/4*53.96).



Computation of the displacement required to make contact on the inner layer stainless steel bar

Surface station: S=19,5*8,3=161,85 mm^2

Number stations: 20

Number stations loaded: 10

Load per station: 7 kN (stainless steel)

Pressure: 43 MPa (stainless steel)

Strain: ε= 43/210000=204 $\mu\varepsilon$ (stainless steel)

Displacement: u=86*204*10^-6=17,1 μm (stainless steel)

Proposed solution:

- Shim the inner layer sectors incrementally with 0.010 mm metallic shims if possible and perform the measurements for each 0.010 mm shim.