

# Interreg



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## PROOF-OF-CONCEPT EXPERIMENT REPORT PLANARITY ISSUES ON MICROFLUIDIC DEVICES

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## **Proof-of-Concept experiment details**

**Received sample:** Microfluidic circuits printed on slabs and films of cyclo-olephines transparent plastic material (TOPAS)

### **Planned analysis:**

Evaluation of sample planarity by optical interference methods

**Sample preparation:** as received

**Preliminary measures:** Evaluation of sample planarity by optical interference methods

**Main aim of the proposal:** the printed films carrying the microfluidic circuitry are produced by thermal printing on nominally planar thermoplastic slabs. After printing they should be sealed with a second planar thermoplastic lead. The PoC proposer has an issue with this last sealing process and suspects that there is a residual non-planarity that accumulate a strain that eventually causes the detachment.

The PoC proposer asks to evaluate the feasibility of the measurement of the residual curvature after printing with a resolution better than 10m of radius of curvature, which means a resolution of 10microns over 1cm lateral displacement.

## **Results**

The measurement did not provide the requested results.

Both the film and the slabs are transparent and the interference between the two opposite faces dominate the signal making impossible the determination of the curvature.

We tries to metallize the films and the slab by eletron beam evaporation, but the metallization process introduces thermal stresses of the same intensity, if not more intense, than the effect to be observed.

Preliminary indicative measurements indicates significative bending both on the pristine and the printed slabs, suggesting that the printing process could be maintained while the printed material should be changed or checked carefully.

However optical interferometry does not represent the right experimental approach.

No picture are available for this experiment since the acquired data are too noisy and not significative.

This report has been written by Marco Lazzarino (Trieste, 25 November 2021)