

MSc-project: Thermal Contact Conductance

In thermal design in high precision applications in vacuum (e.g. ASML EUV machines) the thermal contact conductance (TCC) between metallic surfaces often plays a dominant role, see Fig 1a. Previously, tools and values from literature have been employed to model this heat transfer at a contact. Also, an experimental setup and testing procedure, see Fig 1b, was set up to investigate the thermal contact conductance in vacuum. Especially for contacts between low thermally conductive and hard metals the thermal contact resistance can be significant.

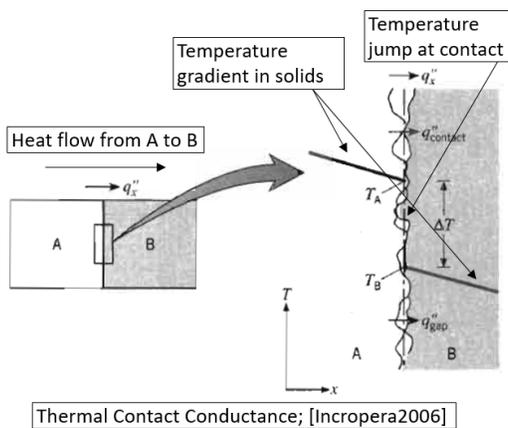


Fig 1a: Thermal Contact Conductance

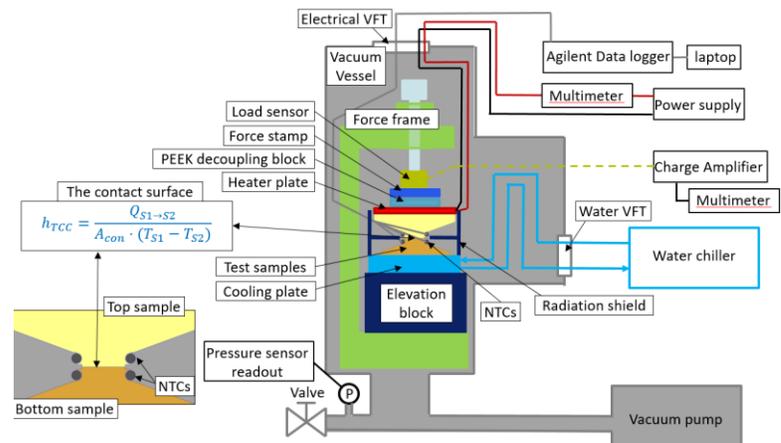


Fig 1b: Schematical representation of test setup

Objective of this MSc-project is to investigate methods to increase the TCC in both vacuum and atmospheric conditions between samples on this experimental setup. Solution directions can be searched in the application of coatings and/or thermal interface materials. But a literature survey on possibly other solution directions should be done as well. As such, the following activities are foreseen for this project:

- Study of previous work: design of experimental setup, found results and peculiarities, etc.
- Literature survey on possible techniques to improve TCC and definition of techniques to investigate in this research
- Optionally: updating testing procedure using advanced identification techniques and modelling
- Performing a series of measurements on the setup to derive the TCC for a set of coatings and/or interface materials
- Documentation (MSc. thesis) and presentation (at Philips + ASML) of the results of the assignment

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