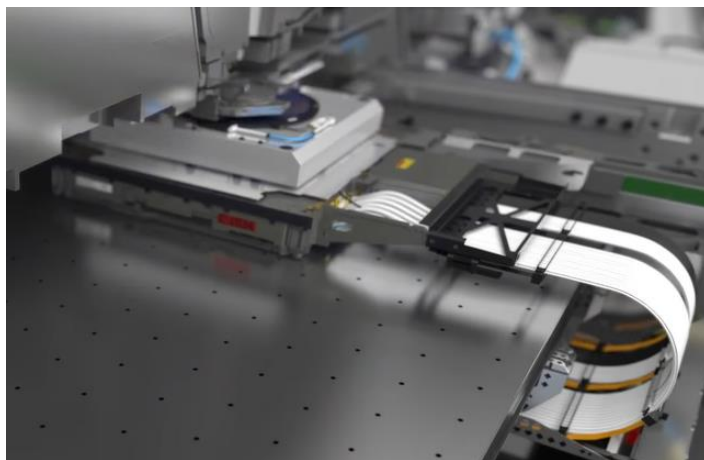


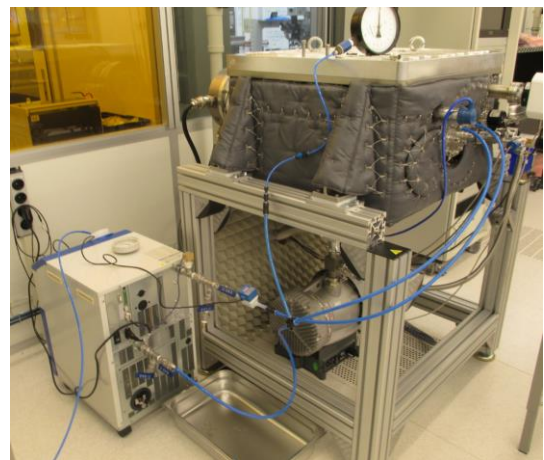
MSc-project: gas permeation in high precision vacuum applications

Description

High precision motion stages require air and water supply for different purposes such as cooling of actuators to achieve the desired performance. In most cases, this supply is realized through flexible hoses in the so-called cable slabs. For vacuum applications this poses an additional challenge: hoses are to a certain extent permeable. This means water, air or various hydrocarbons can be transported through the hose walls into the vacuum, which leads to molecular contamination of the vacuum environment. For design of motion stages in vacuum applications, it is essential to understand and characterize this permeation process.



Hoses in high precision motion stage (courtesy: ASML)



Vacuum setup for characterizing hose permeation

Goal

The goal of this MSc. project is to characterize permeation of water, air, and hydrocarbons through flexible (PTFE) hoses using a vacuum setup equipped with a mass spectrometry device (RGA). The measured data will be used to create a predictive model that is applicable in a design practice.

Activities

- Literature study and analysis of existing measurement data
- Design and execution of a test campaign for experimental study and analysis
- Create a predictive model for the permeation process (using MATLAB or COMSOL)
- Documentation (master thesis) and presentation of results

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