

Establishing Tolerances and Limits of Failure for Sample and Reagent Flow Using COMSOL Multiphysics® Software

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Abstract

Microfluidics is the science of manipulating and controlling fluids at the micron scale. Although, fluid flow in standard geometries can be determined easily by analytical methods, a more rigorous computational model is required for custom geometries. Achira's microfluidics cartridge has a microchannel with intricate curvatures to allow the entrapment of biosensors. The number and dimensions of these biosensors as well as the dimensions of the microfluidic cartridge play a significant role in setting engineering limits of failure for our microfluidic immunosensor platform. The effect of each of these individual factors was predicted using a model built with COMSOL Multiphysics® software. Experimental observations are found to have close correlation to the predictions made with the model built using COMSOL® software. Further, the model proved practically useful to set quality control criteria in our manufacturing process.

Figures used in the abstract

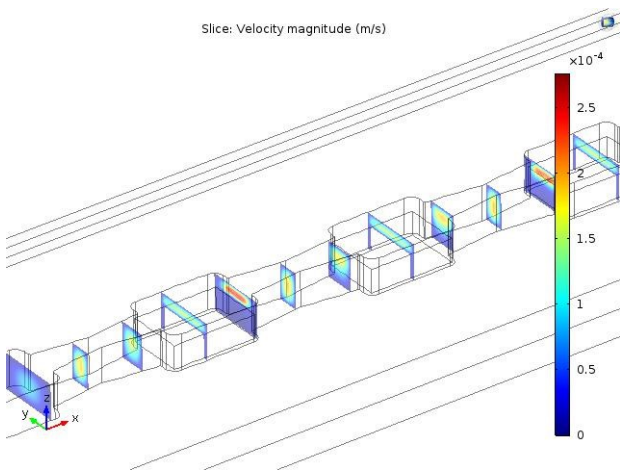


Figure 1: Velocity Profile.