

# Electromagnetic and Thermal Modeling of Microwave Furnaces

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## Abstract

As a high-tech silicon producer, it is our goal to provide efficient and sustainable production technologies. This requires to constantly upgrade our production concept. Thus, material and design innovations are an inevitable part of our everyday work, which leads our microwave technology to become more efficient. Therefore, multi-physics simulations can support our development from the concept phase to implementation. A detailed knowledge of the heat and electromagnetic field distribution inside the furnace, gives us valuable information on the functionality of the preliminary design. COMSOL Multiphysics® has enabled us to visualize the heat and electromagnetic field distributions inside the furnace using RF and Heat Transfer Modules. Based on the simulation results we can verify the feasibility of the studied concepts. More important is the use of Application Builder Tool, which has helped us to easily compare the effects of small changes, i.e. different material properties or size of the components, on the electromagnetic and thermal field distributions without being required to conduct a study from the beginning.