



Laboratory of Technology Process Simulation

Principal goals and activities

- Support to technology research in polymer processing, welding, heat treatment, casting and forming of metals.
- Experimental verification of results from numerical simulations.
- Development of new material models.
- Research and development of simulation procedures for optimization.

General focus of laboratory

- Processing of plastics – simulation of injection, forming and blowing technology. The simulation diagnoses potential part defects, such as cold joints, air bubbles and shrink holes.
- Metal forming – simulation of sheet forming (mainly drawing, deep-drawing and bending), specification of cut-outs, rapid modelling and modification of stress-strain fields in the vicinity of the pressed product, detailed verification of the pressing method.
- Metal casting – simulation of filling and solidification of castings, material stress, changes in metal structure during solidification, identification of defects.
- Welding of metals – simulation of heat treatment processes of metals that incur phase changes in the considered material or changes in the chemical composition of the materials. Those procedures include quenching, hardening, thermal and mechanical processing, thermal and chemical processing (nitridation, carburizing, carbonitriding, oxidation, etc.). Also

induction-based surface treatment, surface treatment by laser, welding with filler material (e.g. TIG, MIG) or without filler material (e.g. with laser, electron beam), coating, etc.

Specific instruments and outcomes

- Cadmould 3D simulation software for injection of plastics technology.
- Autodesk Moldflow simulation software for injection of plastics technology.
- T-SIM simulation software for plastic forming technology.
- B-SIM simulation software for plastic blowing technology.
- PAM-STAMP 2G simulation software for sheet forming technologies.
- MAGMA5 simulation software for metal foundry technology.
- SYSWELD simulation software for welding and heat processing technology of metals.
- CATIA CAD suite.

Offer of technology and expertise

- Research in plastic processing, investigation of inlet systems and temperation of injection moulds.
- Design of plastic components.
- Expert analyses of the metal alloy founding process.
- Influence of welding conditions on the properties of welded metal components.
- Research of material changes during heat treatment.

