

# HEAT TREATMENT

We help to plan and qualify heat treatment processes, analyse defects originating from heat treatment, clarify and solve complex problems and carry out technological optimisation. We offer implementation of simple and complex heat treatment processes such as annealing, quenching and thermochemical techniques for industrial partners.

## COMPETENCIES

- Whole volume heat treatments; surface hardening, quenching; thermochemical processes
- Determination of liquid quenchant efficiency
- Modelling of heat treatment technologies
- Planning and assessment of heat treatment technologies
- Failure analysis of heat treatments



## SERVICES

- Annealing processes, normalizing, softening, thermochemical processes
- Hardening and tempering, precipitation hardening
- Solid state carburising
- Gaseous and plasma nitriding and carburizing, carbonitriding
- Quenchant efficiency measurements (ISO 9950:1995, ASTM D 6200-01, ASTM D 6482-06)
- Modelling of heat treatment technologies
- Surface analysis, surface hardness (Vickers, Brinell, Rockwell tests), microhardness, hardness profile as a function of the surface distance



## TOOLS

- Chamber kilns
- Pit furnace with retort
- Plasma nitriding furnace (Nitron) with active screen
- ivf Smart Quench for control of cooling curve measurement
- Mechanical testing equipment
- Metallographical laboratory, polishing, etching, devices



## REFERENCES

- Cooperation between higher education, research institutes and vehicle industry, TÁMOP-4.1.1.C-12/1/KONV-2012-0002
- AUTOTECH - Vehicle industrial material developments: aimed basic research of plasticity, heat treatment and weldability. TÁMOP-4.2.2.A-11/1/KONV-2012-0029; <http://autotech.uni-miskolc.hu/>
- Csepeli Szerszámedző Kft.