

MATERIAL TESTING AND CHARACTERISATION

This competency focuses on experimental characterisation and testing of engineering materials to determine their mechanical, structural, and surface properties. Using advanced methods such as hardness measurement, surface wear evaluation, and microscopic imaging, the research team investigates how material composition, treatment, and microstructure influence performance. The activity supports RDI by providing reliable data for design optimisation, quality assurance, and industrial problem-solving, enabling partners to improve product durability and functionality.



ACHIEVEMENTS

- Established a comprehensive material testing laboratory supporting RDI
- Developed testing protocols for coated and heat-treated surfaces (Calotest, microhardness)
- Collaborated with industrial partners in quality assessment and failure analysis of engineering components
- Peer-reviewed publications on wear resistance, surface coatings, and microstructural characterisation



INFRASTRUCTURE

- Calotest Ball-Cratering Wear Tester for coating thickness and wear-resistance evaluation
- Micro-Hardness Tester for micro- and nano-scale hardness measurements
- Scanning Electron Microscope (SEM) for high-resolution surface and microstructural imaging
- Optical Microscope for metallography and surface inspection
- Surface Roughness Tester for topographical characterisation
- Sample preparation equipment including polishing, sectioning, and etching tools
- Differential Scanning Calorimetry (DSC)



REFERENCES

- Industrial collaborations and dual-training projects with PEMÜ Műanyagipari Zrt. and Ferzol Lemezmezmunkáló Kft. for material testing and failure analysis
- Development of robotised CT-based quality-inspection technology for detecting micro-defects in castings (Industrial CT Laboratory project, 2019-1.1.1-Piaci KFI-2019-00462, Bánki Donát Faculty)
- RDI project on polypropylene-based adhesion-promoter composites for vehicle applications with CT and material analysis support (NVKP_16-1-2016-0038, Bánki Donát Faculty)