NUCLEAR RESEARCH INSTITUTE

Mechanical and Corrosion Properties Department
Integrity and Technical Engineering Division

ASSESSMENT OF MECHANICAL AND CORROSIVE PROPERTIES OF IRRADIATED MATERIALS

The accredited laboratory of the Mechanical and Corrosive Testing Department

Value for customers
- Comprehensive services in the field of mechanical testing and material analysis in accredited laboratory (in close collaboration with the other accredited laboratories within the UJV Integrity and Technical Engineering Division)

Applications
- Evaluation of the degradation of irradiated materials of nuclear power plant (NPP) components
- Determining the original material properties to analyse the lifetime of components in power production and chemical industries
- Conducting surveillance programmes for NPPs during their entire lifetime
- Research of the material properties of prospective materials for advanced GEN-IV reactors
- Compliance tests and conducting technological tests

What we offer
- Laboratory accredited by the Czech Accreditation Institute
- Quality assurance programme accredited to ČSN EN ISO/IEC 17025 and certified to ISO 9001
- Irradiation of materials in research reactor or Co^{60} source

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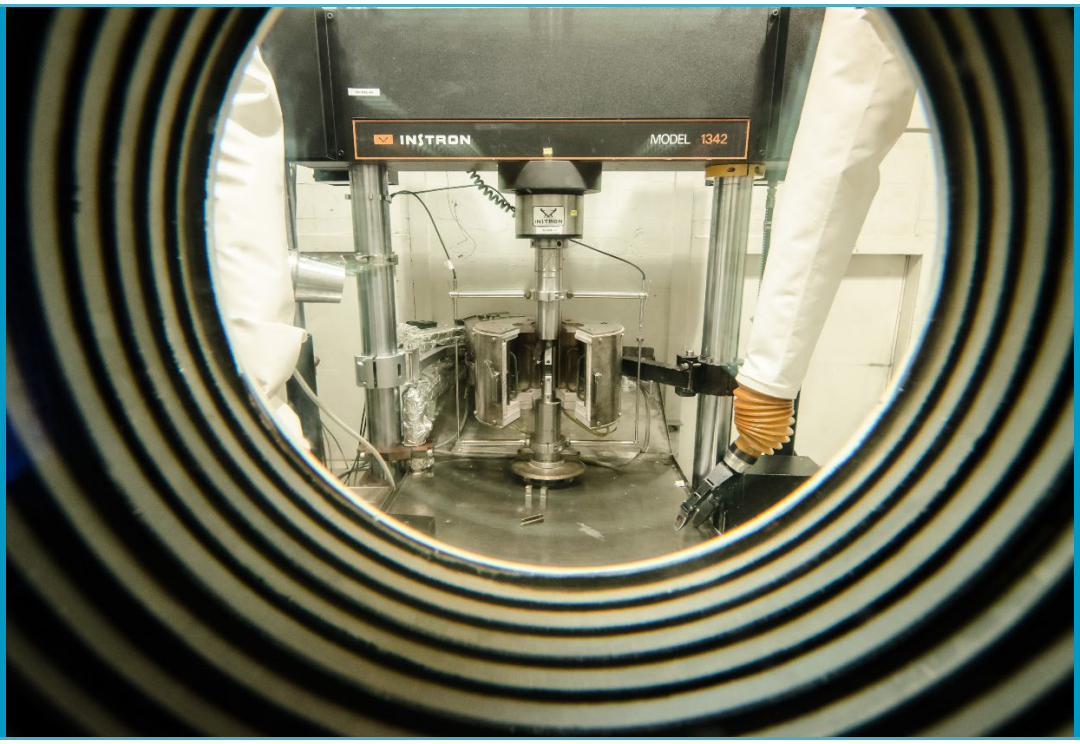
- Undertaking accredited mechanical tests on irradiated and non-irradiated structural materials and analysing the results in accordance with various international standards:
  - Charpy impact tests undertaken on a pendulum impact tester
  - Tensile tests and measuring Young's modulus on universal testing machines
  - Static and dynamic fracture toughness test
  - Vickers hardness tests, fatigue tests and bend tests
  - Instrumented hardness tests (ABIT)
  - Slow Strain Rate Tests in a corrosive environment, evaluation of the sensitivity of materials to EAC and IASCC
  - Crack growth rate test (CGR), stress corrosion cracking initiation test in a corrosive environment
  - Low-cycle fatigue tests in a corrosive environment
  - High-temperature mechanical tests up to 1200 °C
  - SEM analysis of irradiated and non-irradiated structural materials
  - Small punch tests
- Analysis of the results of mechanical tests
- A standard test temperature range of between –190 °C and +500 °C

Our references

- Assessing the impact of radiation damage on the mechanical properties of reactor pressure vessels of reactor types WWER 440 and WWER 1000
- Evaluation of materials from surveillance programmes of WWER 440 and WWER 1000 reactors
- Assessing the impact of radiation damage on a wide range of materials for foreign clients (from Ukraine, Finland, Japan, Great Britain, South Korea and IAEA)
- Participation in the HORIZON2020 (DELISA-LTO, STRUMAT-LTO, FRACTESUS), in several European Framework Programmes and in by IAEA coordinated programs (CRP).
- Membership of the European Structure Integrity Society (ESIS), ASTM, ISO and NDT A.S.I.



Static fracture toughness testing of irradiated materials (using 0,5T-CT specimens)