



PL9901453

## MATERIAL RESEARCH LABORATORY IEA

The Material Research Laboratory of the Institute of Atomic Energy is engaged in the research works covering all aspects of materials engineering and in the technological processes developed in the domain of powder metallurgy, welding, brazing and soldering. The investigations are carried out on both structural materials and their welded joints, including the examinations of irradiated materials. The Laboratory is equipped with modern devices for the scientific and applied research of materials. All work in MRL are carried out according to the Quality Assurance Program.

The MRL incorporates the Hot Laboratory, which was put into operation in February 1993 after the authorization by the National Inspectorate for Radiation and Nuclear Safety. The facility was designed to provide maximum flexibility for a broad research programmes involving the metallurgical, physical, and chemical testing of irradiated reactor structural materials.

The main part of the laboratory is the set of 12 hot cells with the lead shielding suitable for handling of radioactive materials up to 4 TBq related to  $^{60}\text{Co}$ . Every cell is equipped with up-to-date sophisticated devices for the examination of radioactive materials. The main equipment includes:

- Instron 8500 Dynamic Testing System with two 100 kN frames for testing of tensile strength, compressive strength, low cycle fatigue resistance, fracture toughness, bend characteristics and crack growth resistance at temperature range from 150°C to 350°C,
- Instrumented Wolpert Pendulum Impact Testing Machine PW 30/15 for dynamic tests of Charpy-V type specimens carried out at temperature range 150°C to 350°C for determination of: significant force and deflection values, partial energy values, characteristic fracture-mechanical values,

- Wolpert Hardness Testing Machine DIA-TESTOR 7521 for testing of hardness using Brinell, Vickers and Rockwell procedures,
- X-ray Diffractometer type DRD-4 for structure analysis.

Above mentioned devices are fully automated, remotely operated and instrumented, equipped with the computer control systems for machine control during the course of experiments, data acquisition and analysis of results.

The remainder equipment of the hot cells complex provides an opportunity to perform:

- cutting out of the samples from the irradiated reactor components,
- samples preparation for metallographic and X-ray examinations,
- thinning of metallic samples for transmission electronic microscopy,
- optical microscopy and microhardness measurements,
- swelling control of materials and density determination,
- thermal treatments and annealing,
- stereo macroscopic examination and stereo photography,
- chemical analysis.

Material Research Laboratory IEA received Certificate of Testing Laboratory Accreditation No L 25/1/95. This Certificate confirms that Material Research Laboratory at Institute of Atomic Energy is in conformance with the standard PN-EN 45001 and ISO/IEC Guide 25:1990.

In 1996 the Certificate of Testing Laboratory 2nd Degree Approval No L-II-001/27 was granted to the MRL by the Office of Technical Inspection. This indicates that Material Research Laboratory IEA fulfilled the criteria as set forth in PN-EN 4001:1993 and is in conformance with the Specification of the Office of Technical Inspection DT-L/95.