

# DIMENSIONAL AND METALLOGRAPHIC TESTS OF MATERIALS AND COMPONENTS

**Innovations and Benefits** - ENEA - Brasimone Research Centre has a metallographic laboratory for carrying out dimensional and metallographic tests. The laboratory carries out, in compliance with the regulations, the investigations necessary for the characterization of the materials used in nuclear and conventional systems. It qualifies anti-corrosion and waterproof protective coatings for nuclear materials. It participates in international projects and research groups, aimed at developing innovative materials.

## Use -

The following services are delivered in the laboratory:

- Metallographic analysis of material composition: qualitative and quantitative determination of elements between boron and uranium.
- Analysis of compounds, crystalline and amorphous, solid or powdery, for the identification of phases and crystallographic structures.
- Measurements with digital acquisition of angles distances, circumferences, Cartesian and polar coordinates etc.
- Dimensional measurement in direct and transmitted light, with acquisition by camera and software as regards measurements of distances, angles, circles, coordinates.
- Roundness measurement for measurements on cylindrical pieces of roundness, cylindricity, straightness, flatness, concentricity, coaxiality, parallelism, perpendicularity.
- Brinell, Vickers and Rockwell hardness measurements, loads from 9.8 to 2452 N, magnification optics between 41 X and 195 X, 10 storable hardnesses and 42 allowed test methods.
- Measurements of microhardness with Vickers indenter with variable load between 100 and 1000 gf, magnification between 100 X and 500 X, dedicated software with digital camera and possibility of converting the HV hardness into other types

## Applications and ongoing Activities -

Characterization activities of different types of materials used for nuclear systems have been carried out and are in progress, such as 15-15Ti, AISI 316L, AISI 316LN, T / P91, DS3, DS4, AISI304, Ti3Si2, Sic / SiC, characterization of protective coatings in Al2O3, GESA, etc. analysis of chemical composition of lead alloys.



Inverted optical microscope



Metrological Bench X Y Z COORD 3 ARES 1000



X-ray fluorescence spectrometer



X-ray diffractometry

## Characteristics:

The services provided by the laboratory are certified according to ISO 9001