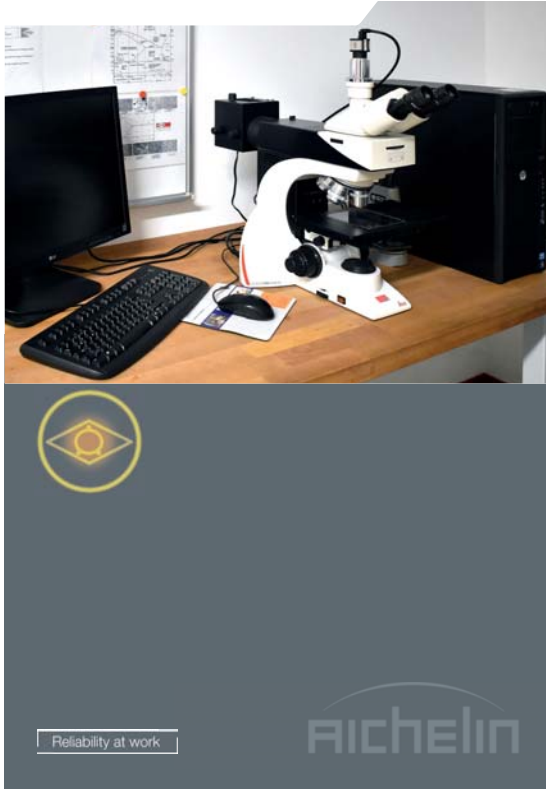


Materials Laboratory

Services



Documentation and repositories / sample storage

- The testing software (KB Prüftechnik) automatically stores the test reports on the internal servers.
- Storage is carried out in accordance with our quality management system.
EMA Indutec has been certified to ISO 9001:2000 since 2003.

Employee qualifications

- M.Sc.: Specialization in the optimization of metallurgical processes
- Dipl.-Ing.: Specialization in materials science and process engineering
- Additional qualifications in the field of materials science through external training courses
- Experience in the field of materials science, in particular in heat treatment for over 20 years



An overview of our laboratory services

- Hardness testing according to
 - > Vickers
 - > Rockwell
 - > If relevant, Brinell and other tests on request
- Measurement of the
 - > SHD (surface hardness depth)
 - > CHD (case hardness depth)
 - > NHD (nitriding hardness depth)
- Structural assessments
- Damage analysis
- Support in selecting the optimal heat treatment parameters

Calibration and maintenance of equipment

- Hardness testing equipment is calibrated annually by an external, accredited service provider, with internal validation weekly or on demand/upon customer request.
- Feasibility testing of the hardness testing equipment is carried out and documented regularly.

Our laboratory services in detail

1. **Separation** with a water-cooled parting-off grinder, to prevent heating of the sample.
2. If relevant, **manual pre-grinding** of the cut samples with a water-cooled belt grinder, to prevent heating of the sample.
3. **Embedding** (semi-automatically or manually) in synthetic resin with a mounting press, to enable better handling of the sample in steps 5 to 7.
4. **Grinding and polishing** (manually or semi-automatically) in several stages using grinding and polishing disks with increasingly fine granulations (max. 1 µm).
5. **Etching** of the sample with adapted corrosive to increase the contrast of the structural components for examination with a microscope.
6. **Hardness testing according to Vickers or Rockwell and, if relevant, Brinell**
 - In the Vickers hardness test the tip of a four-sided diamond pyramid is pressed into the specimen with a test load and the diagonal of the resulting pyramid impression is measured. The diagonal of the resulting pyramid indentation is measured.
 - A Rockwell hardness test consists of four steps: A test specimen is first pressed into the specimen with an initial test force. Then the actual test force is applied and removed again after a short time. The permanent penetration depth of the test specimen into the specimen is read directly from a dial gauge as Rockwell hardness.
7. **Microscopy** with reflected light microscopes with 50 to 1,000x magnification. PC connection with camera and suitable software to enable accurate evaluation.