high convection heat treatment facility in laboratory scale

speed up your materials lab for R&D of rolled wrought materials

we process your samples precisely, within short time and confidential

02/2014
The short time annealing process has a major impact on the final materials properties. During the short heating- and cooling cycle complex metal-physical changes of the material occur, e.g. recrystallization, solution annealing and subsequent precipitation hardening, which are mostly very sensitive to slight changes of the temperature-time characteristics of the process.

The ability to achieve annealing cycles similar to production with standard lab facilities, e.g. muffle furnace, salt- or sandbath furnaces and water-, air- or oil cooling facilities, is very limited or needs high effort.

Annealing cycles similar to those in present production lines are achieved with the WSP/ITP high convection heat treatment facility with low effort. Even higher heating and cooling rates can be realized which might be interesting for future material developments.

Expensive and time consuming trials in production lines become redundant or can be reduced to a minimum.

exemplary annealing curves

![Continuous strip annealing furnace with preheating section and soaking time](image)

technical data

- >10 trial/h (series investigations with slightly changing parameters)
- Sample dimensions:
  - max. 400 mm x 400 mm, thickness: 5 µm to 15 mm
- annealing temperature:
  - max. 1000°C (high convection), max. 1150°C (radiation)
- annealing atmosphere:
  - air, N₂, 95%N₂5%H₂, N₂ mit >5%H₂ on request
- special features:
  - water quench to „freeze“ intermediate state

we offer

- annealing of your samples, precisely, within short time and confidentially or
- manufacturing of your own lab annealing facility

discover the potential of your materials
our lab facility is ready for operation

costs

We develop a customized annealing program for your product in close agreement with your specialists and prepare an individual quotation.

publications (see also download area of our homepage):
Berrenberg : Control of continuous strip annealing for copper and copper alloys by means of real-time recrystallization modelling; International Wrought Copper Council - Technical Seminar - Chicago 2008
Berrenberg: Das WSP-Werkstoffmodell zur Online-Simulation von Rekristallisationsvorgängen und der WSP-Versuchsofen zur Prozesssimulation; WSP Seminar; 2008 Aachen
Berrenberg: Entwicklung und Optimierung von Glührezepten für die Kurzzeit-Wärmebehandlung; VDI Wissensforum; Stuttgart 2011
Berrenberg: Kurzzeitwärmebehandlung von Kupfer- und Kupferlegierungen im Werkstofflabor unter Glühbedingungen wie in Banddurchlaufen anlagen; HochschulKupferSymposium; Freiburg 2012

for further informations please contact:
Dr.-Ing. Thomas Berrenberg
ITP GmbH
+49 (0)241/87970378 berrenberg@itp-aachen.de www.itp-aachen.de

The project is supported by funds from the German ZIM-program (Central innovation program for SME’s) of the BMWI (Federal Ministry for Economic Affairs and Energy), funding No.: EP 120094