



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**

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discover the potential of your materials

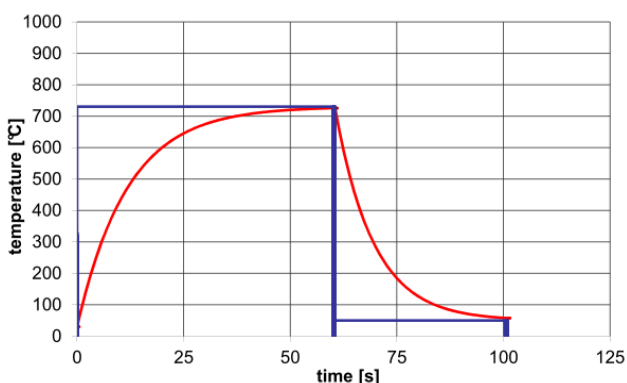
The short time annealing process has a major impact on the final materials properties. During the short heating- and cooling cycle complex metal-physical changes of the material occur, e.g. recrystallization, solution annealing and subsequent precipitation hardening, which are mostly very sensitive to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

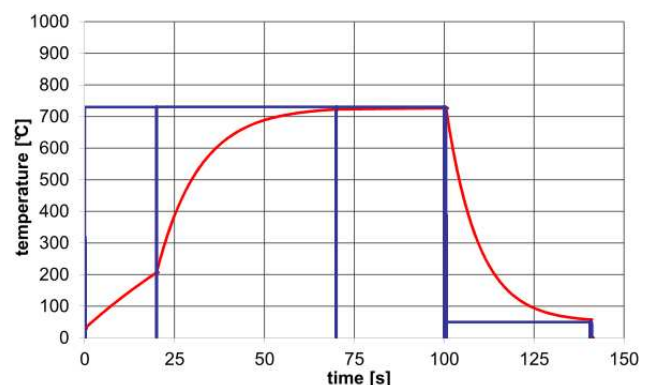
Annealing cycles similar to those in present production lines are achieved with the WSP/ITP high convection heat treatment facility with low effort. Even higher heating and cooling rates can be realized which might be interesting for future material developments.

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

exemplary annealing curves



continuous strip annealing furnace



continuous strip annealing furnace
with preheating section and soaking time

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

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 Banddurchlaufanlagen; HochschulKupferSymposium; Freiburg 2012
- Berrenberg: lecture on the IWCC (International Wrought Copper Council) Technical Symposium; Mumbai / Indien 3/2014

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