

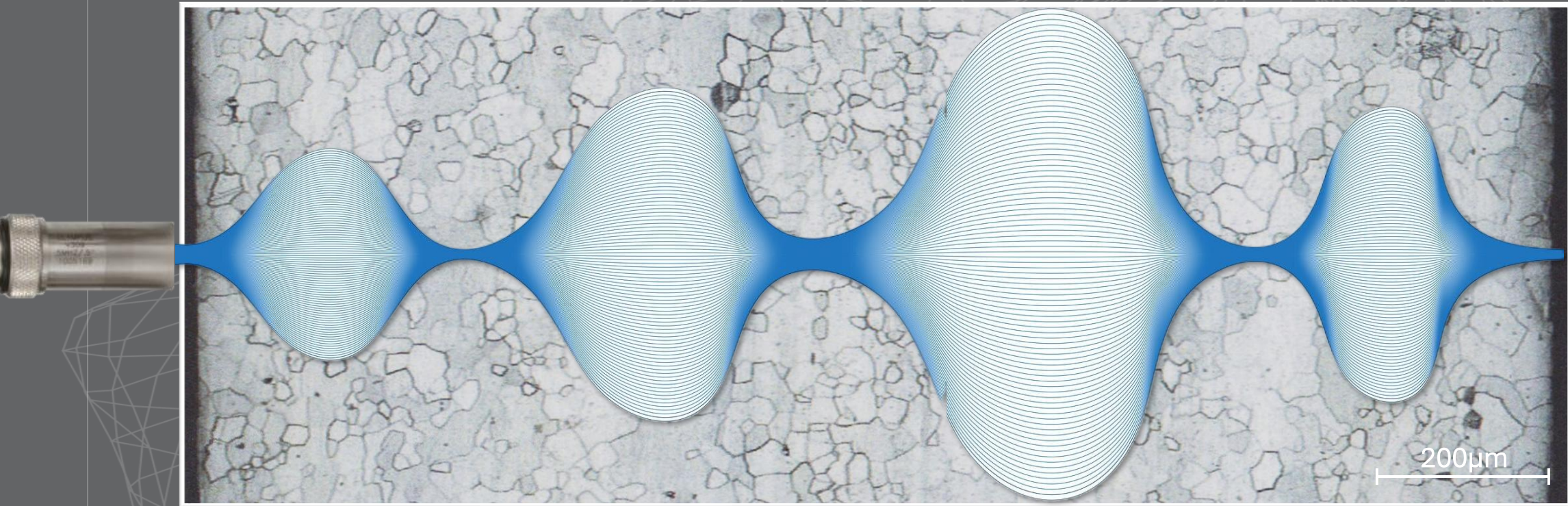
MiNTEQ

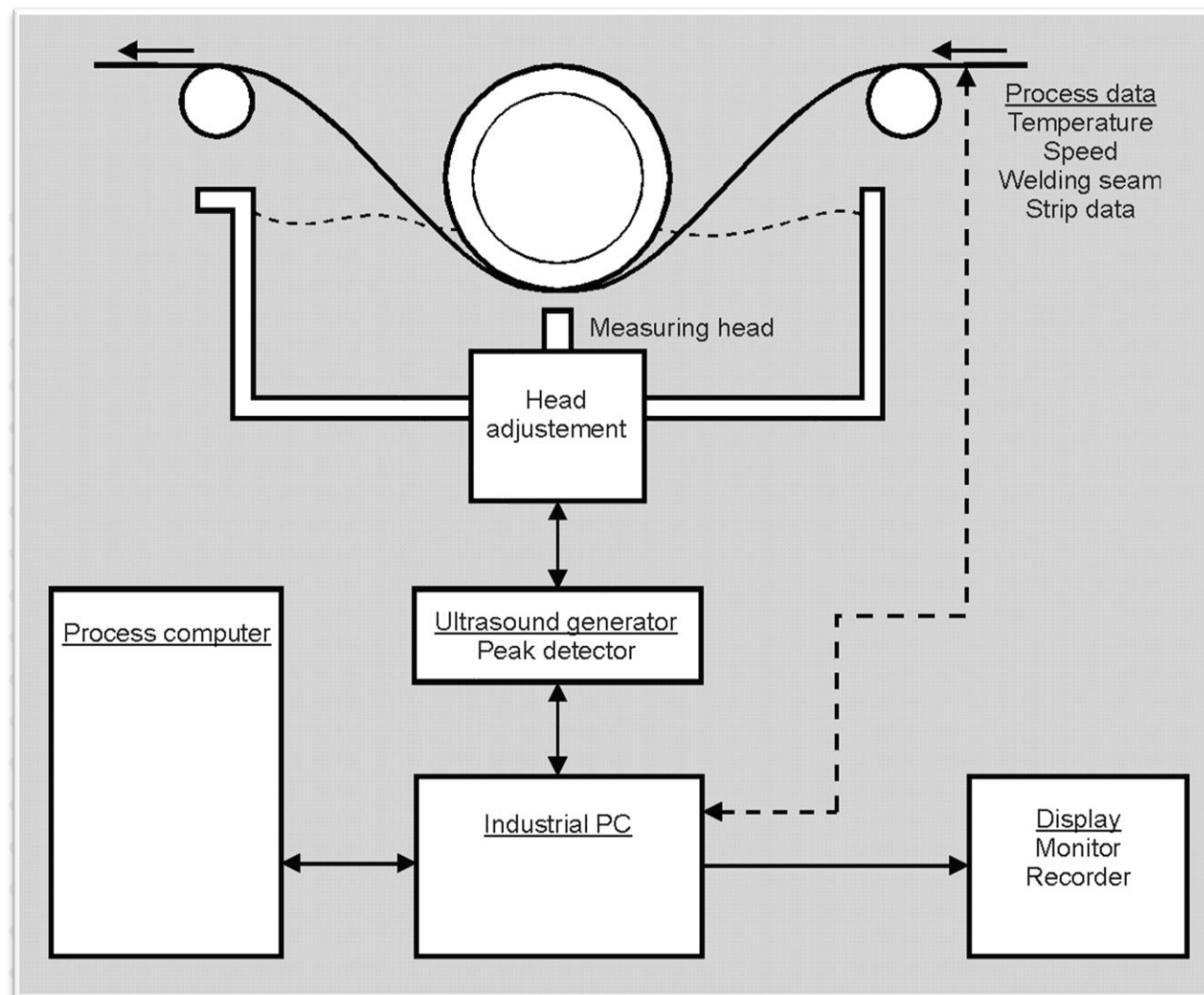
A MINERALS TECHNOLOGIES COMPANY

ANNEALING CONTROL SYSTEM

Grain Size

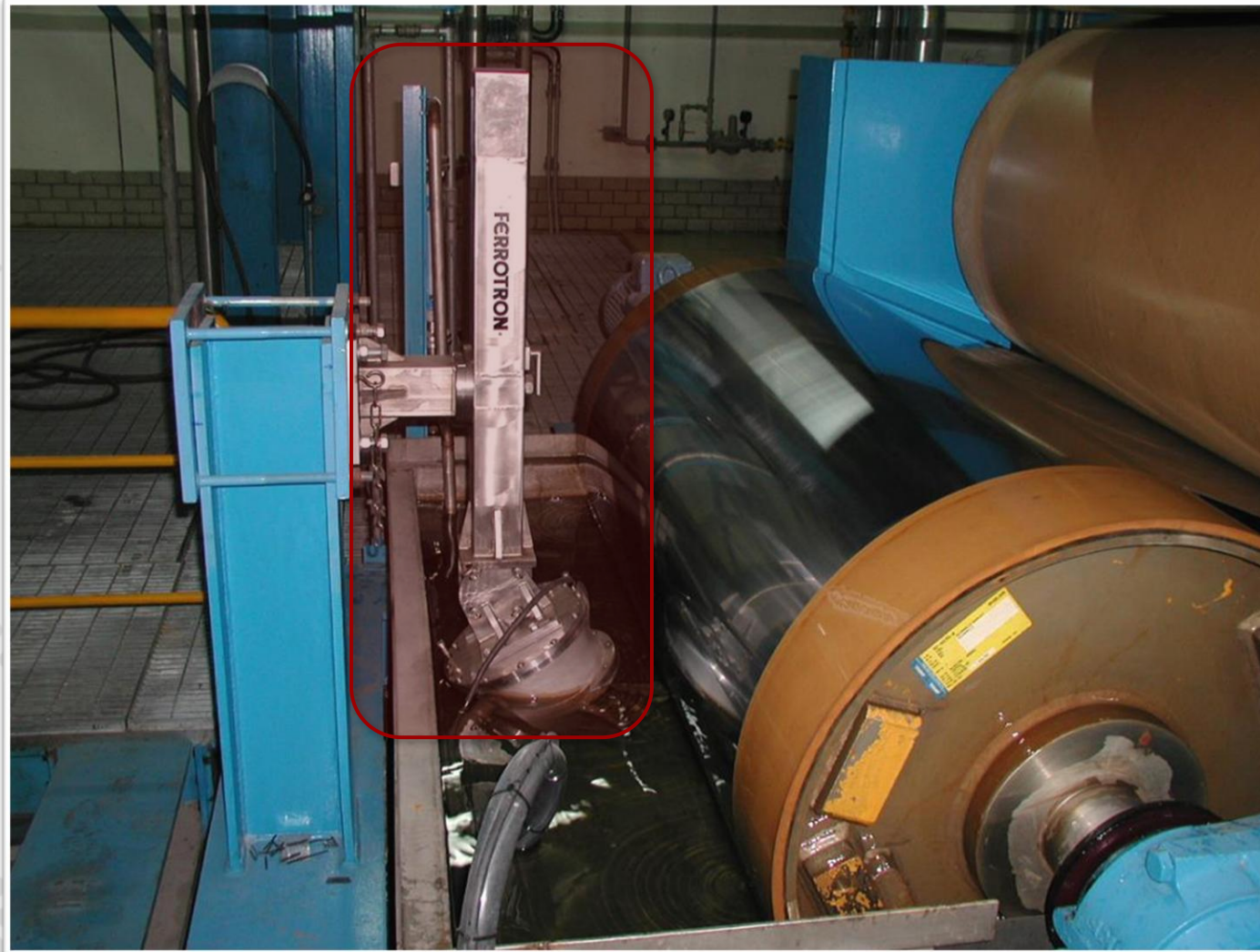


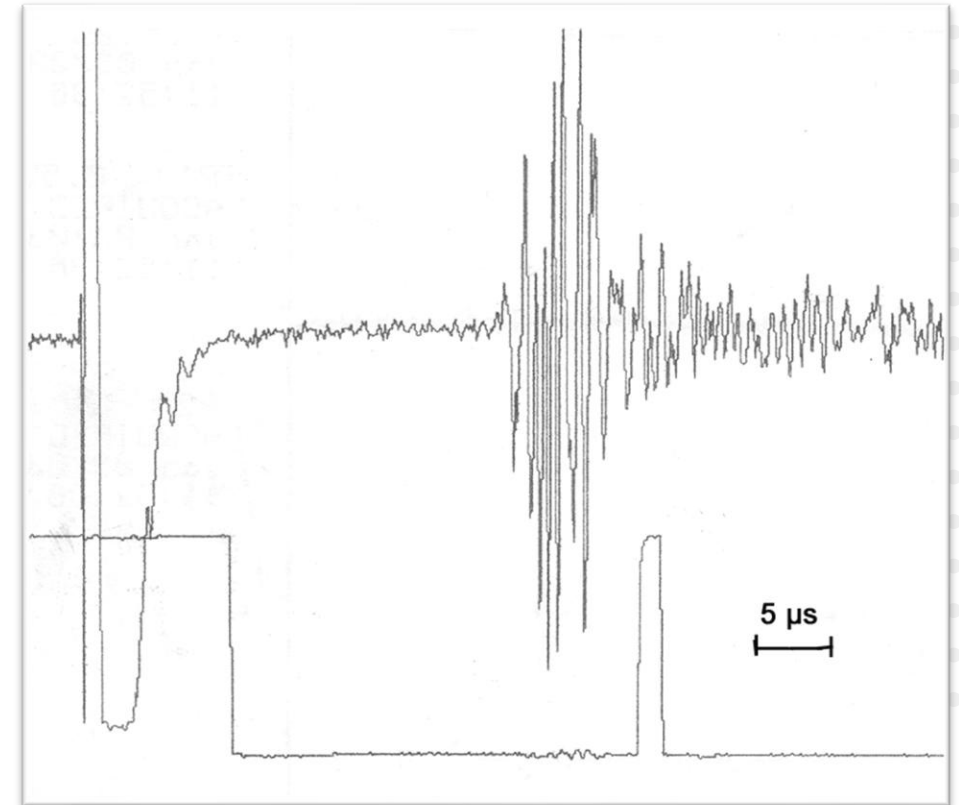




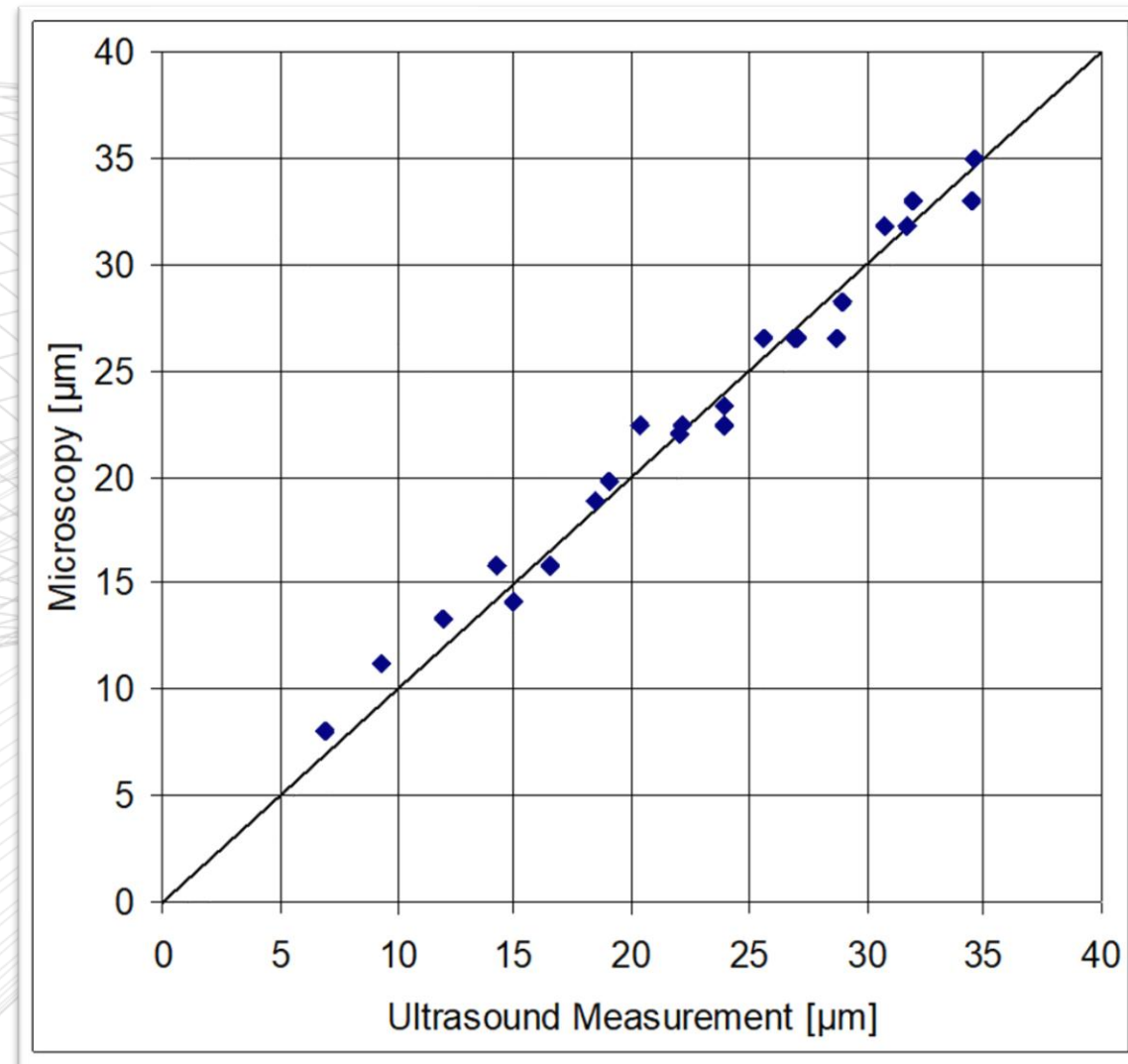
INSTALLATION OF GRAIN SIZE MEASURING SYSTEM

MiNTEQ

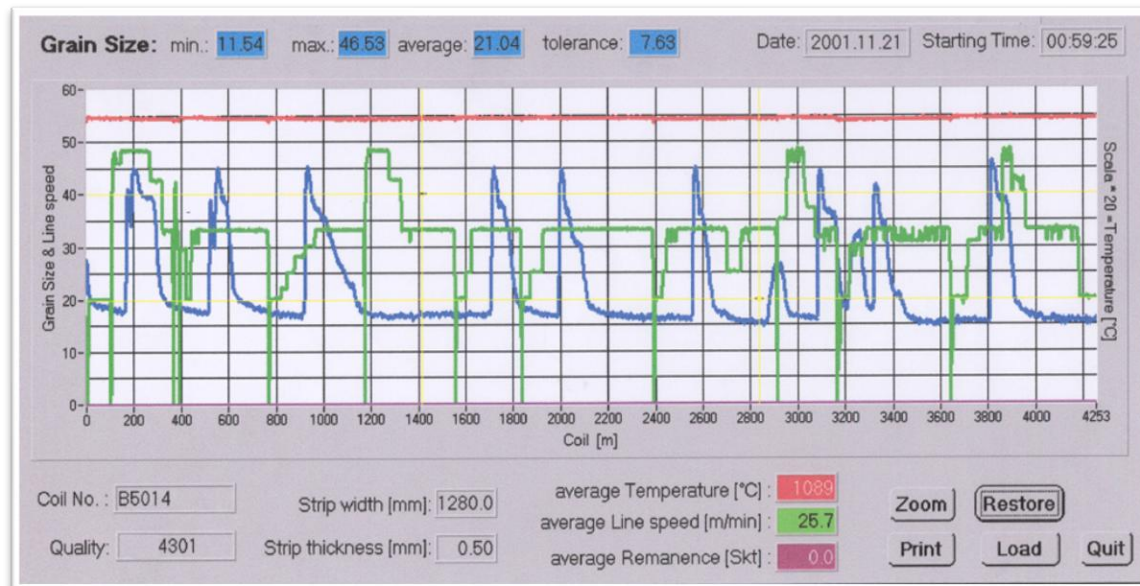




COMPARISON OF ONLINE GRAIN SIZE MEASUREMENT TO VISUAL METHOD

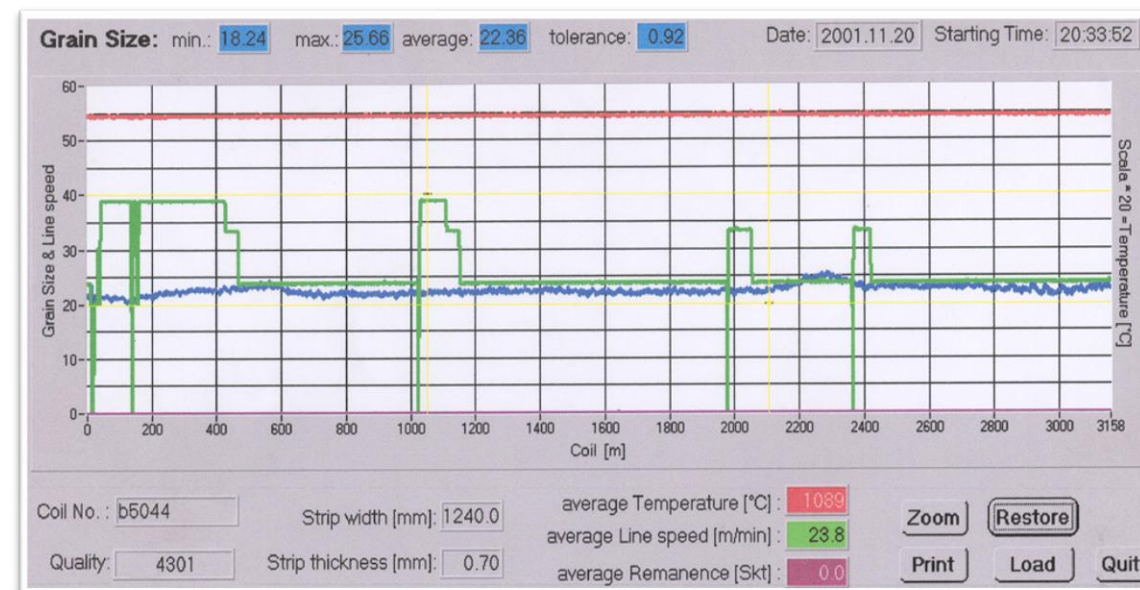


GRAIN SIZE SOFTWARE RECORD – ANNEALING RESULTS

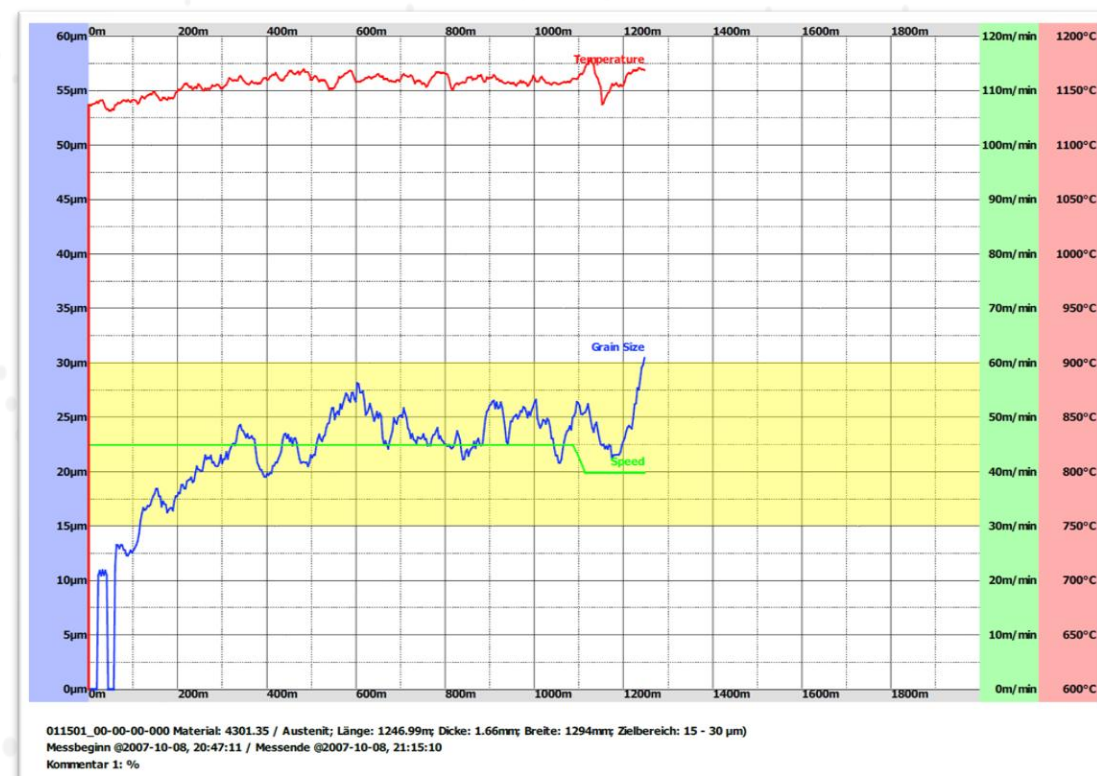
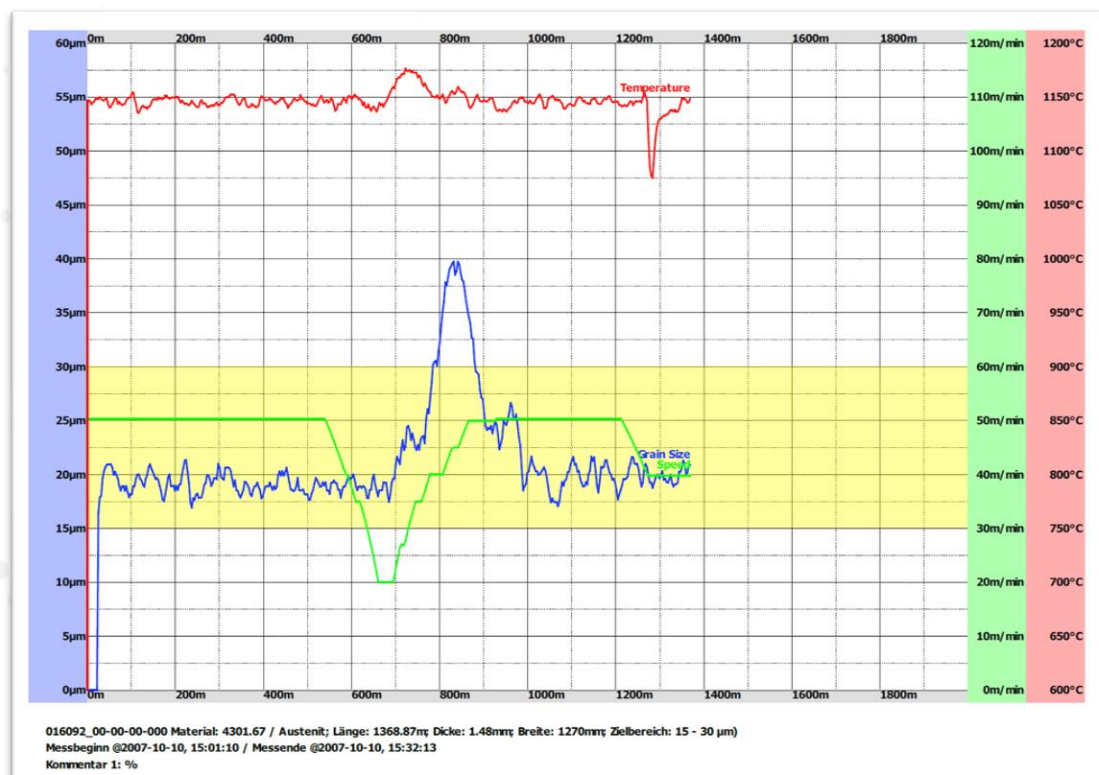


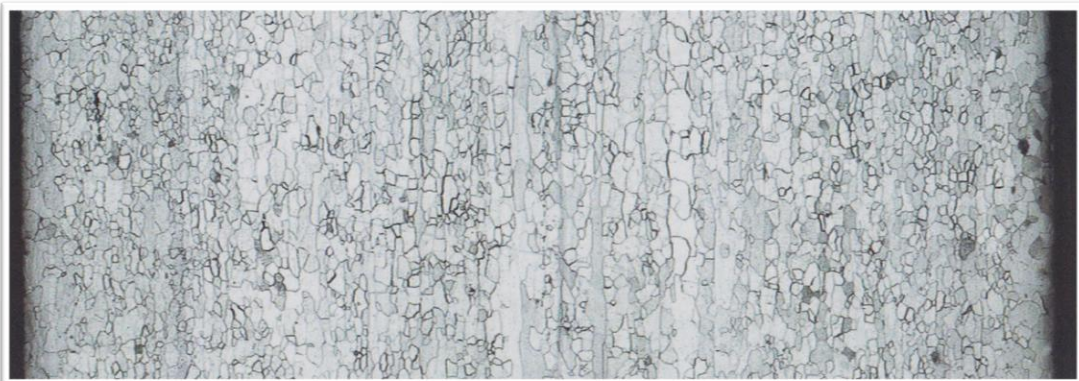
BADLY ANNEALED

WELL ANNEALED

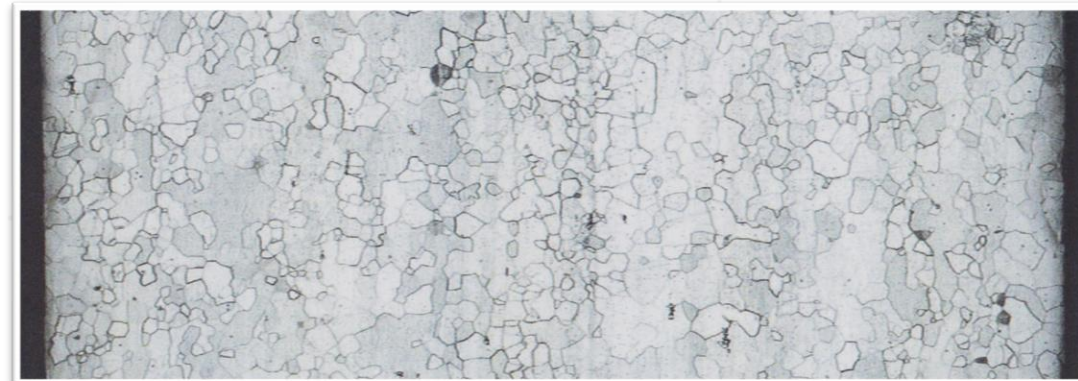


GRAIN SIZE MEASUREMENT - DOCUMENTATION PLOTS





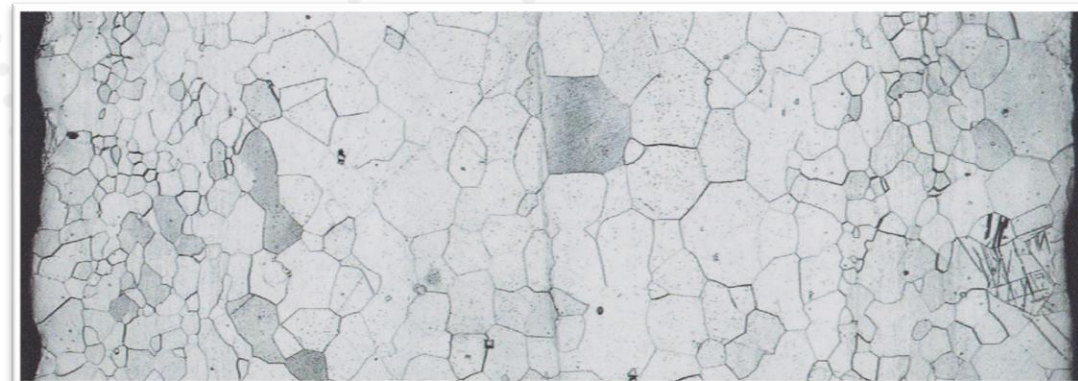
Micrograph **slightly under** annealed



Micrograph **well** annealed

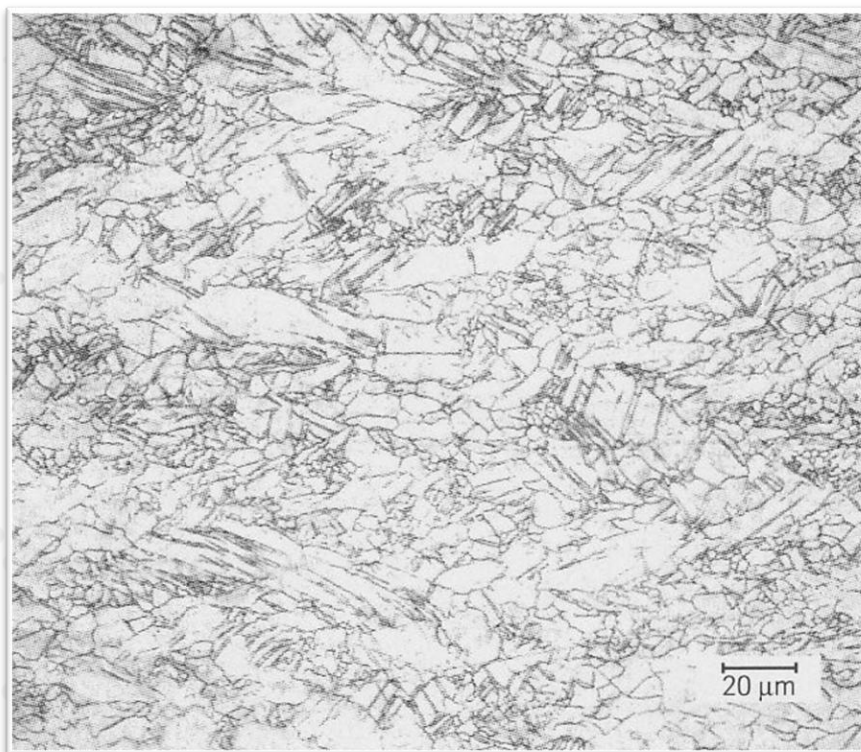


Micrograph **slightly over**-annealed

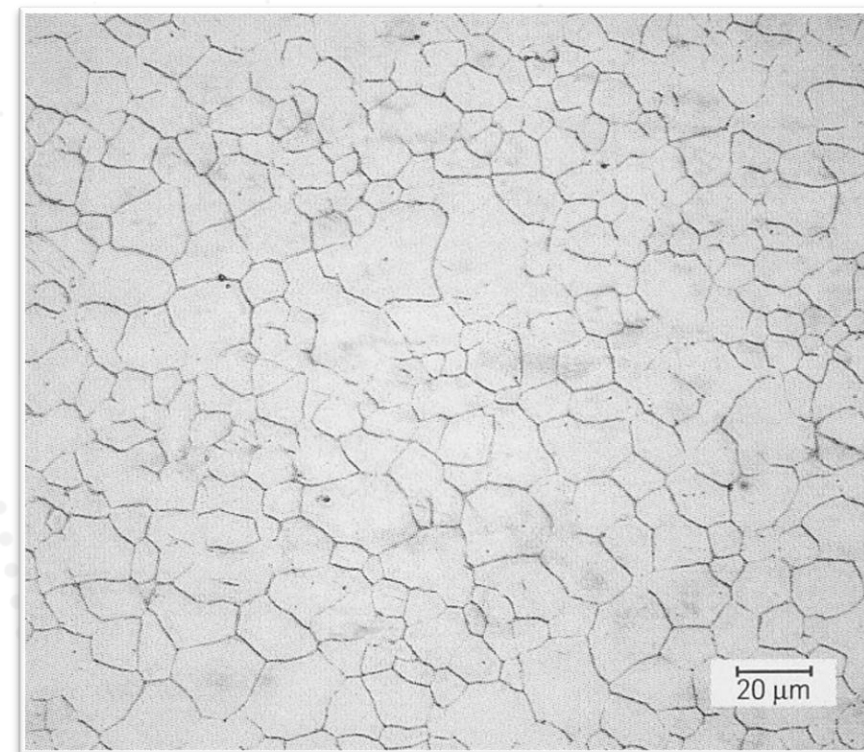


Micrograph **heavily over**-annealed

Microstructure of a magnesium sheet (AZ 31) after rolling and heat treatment



Microstructure after rolling

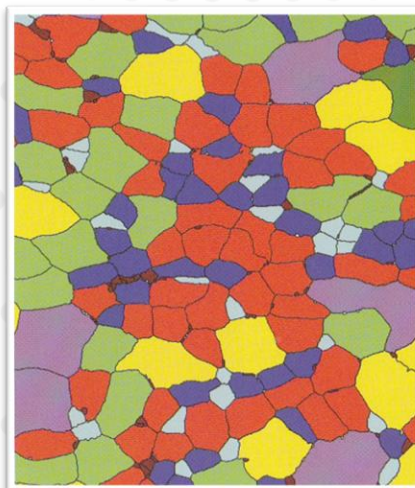


Microstructure after heat treatment

Quantitative metallography Grain size measurement

To determine the microstructure parameters of a ferritic quality steel, a microstructure image is first reduced to the essential features (here: grain boundaries) using image analysis methods.

The area of the individual grains, for example, can then be determined in this image. The large number of grains measured allows a statistical evaluation of the measurement results.



DISADVANTAGES OF METALLOGRAPHY

- Testing a long time after the annealing process
- No influence on the ongoing process possible
- Results are often person-dependent
- No measurement data about the entire coil length
- Measurement results too close to band end are often inaccurate

INSTALLED BASE – 95 SYSTEMS GLOBALLY (08/2024)

AMERICAS

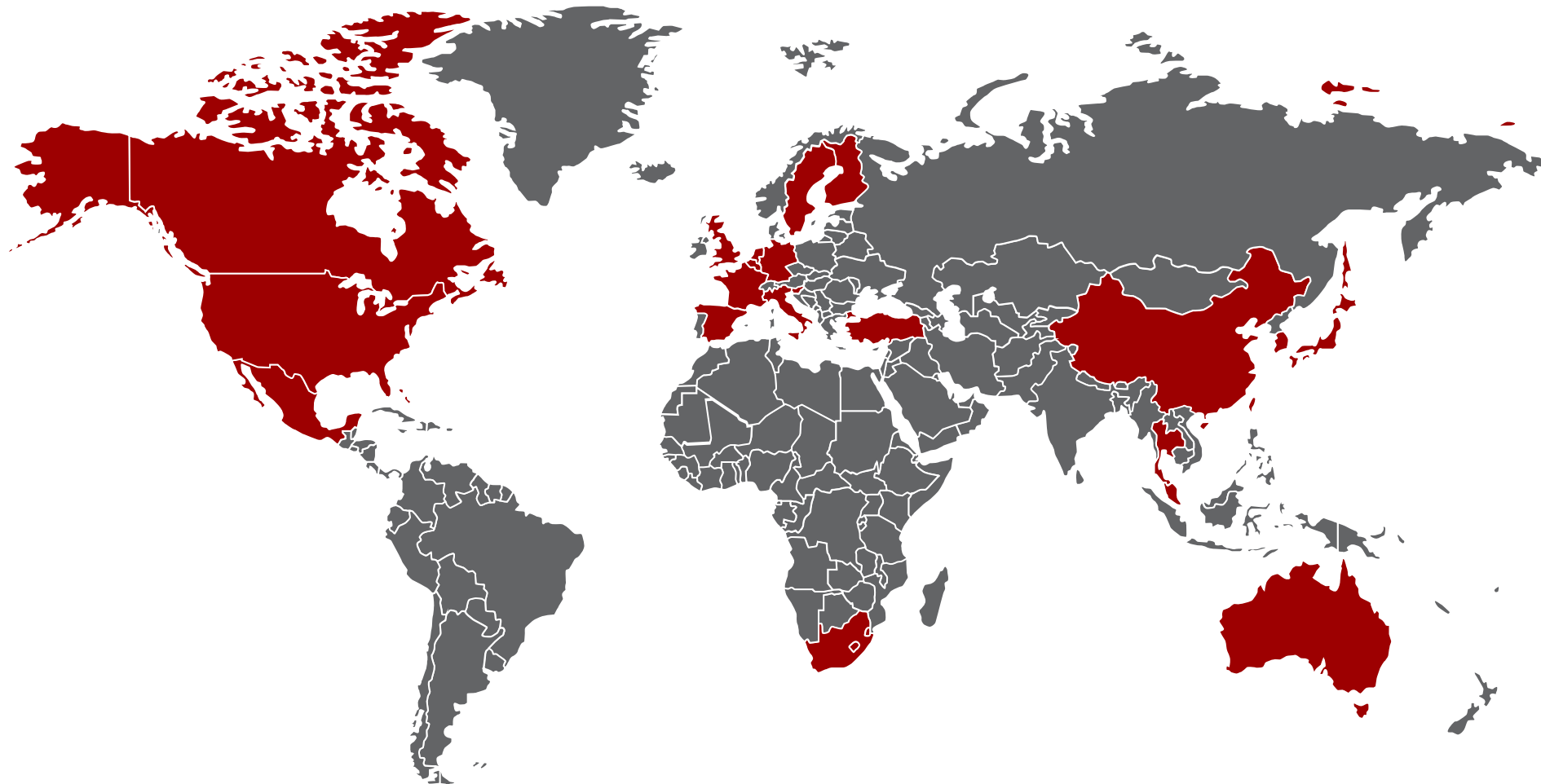
- Mexico 3
- USA 6

EMEA

- Belgium 4
- Finland 2
- France 7
- Germany 24
- Italy 11
- South Africa 4
- Spain 6
- Sweden 4
- Turkey 2
- UK 4

APAC

- Australia 1
- Malaysia 1
- Japan 3
- P.R. of China 6
- South Korea 2
- Thailand 1
- Taiwan, R.O.C 4



MiNTEQ

A MINERALS TECHNOLOGIES COMPANY

FERROTRON
A **MiNTEQ** DIVISION