Grain Size Measuring System FWT 25

for on-line Annealing Control of Austenitic Stainless Steel Strip

The instrument is used for the continuous and non-destructive measuring of the grain size of Cr-steel strip.

Operating principle

Ultrasound signals are reflected by metallic material. Under a certain angle a maximum signal is detected (about 31° for stainless steel). The received signal includes information of the grain size which can be compared with visually obtained results. Thus the values of the grain size can be calculated (Figure 1). In case of the used ultrasound frequency of 25 MHz the measuring range is about 8 to 40 µm, the error within ± 2 µm.

Since austenitic stainless steel cannot be magnetized, the remanence meter is not applicable for this kind of material. The mechanical properties can substantially be determined by the grain size. Therefore the annealing control can be carried out by the described instrument.

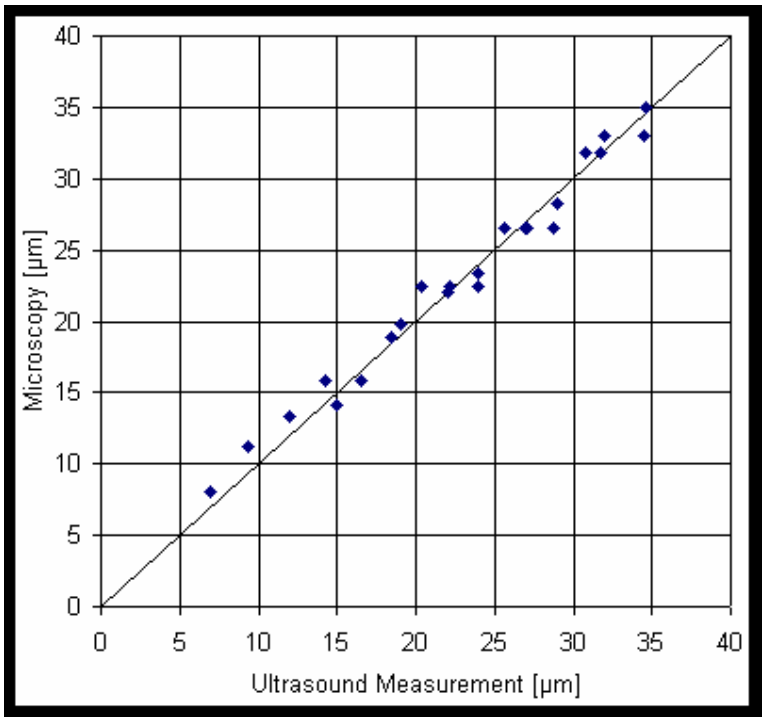

Figure 1: Comparison of on-line grain size measurement with visual method

Design

The grain size measuring system consists of a mechanical unit, mounted in a bath, a control cabinet and a computing system (Figure 2).

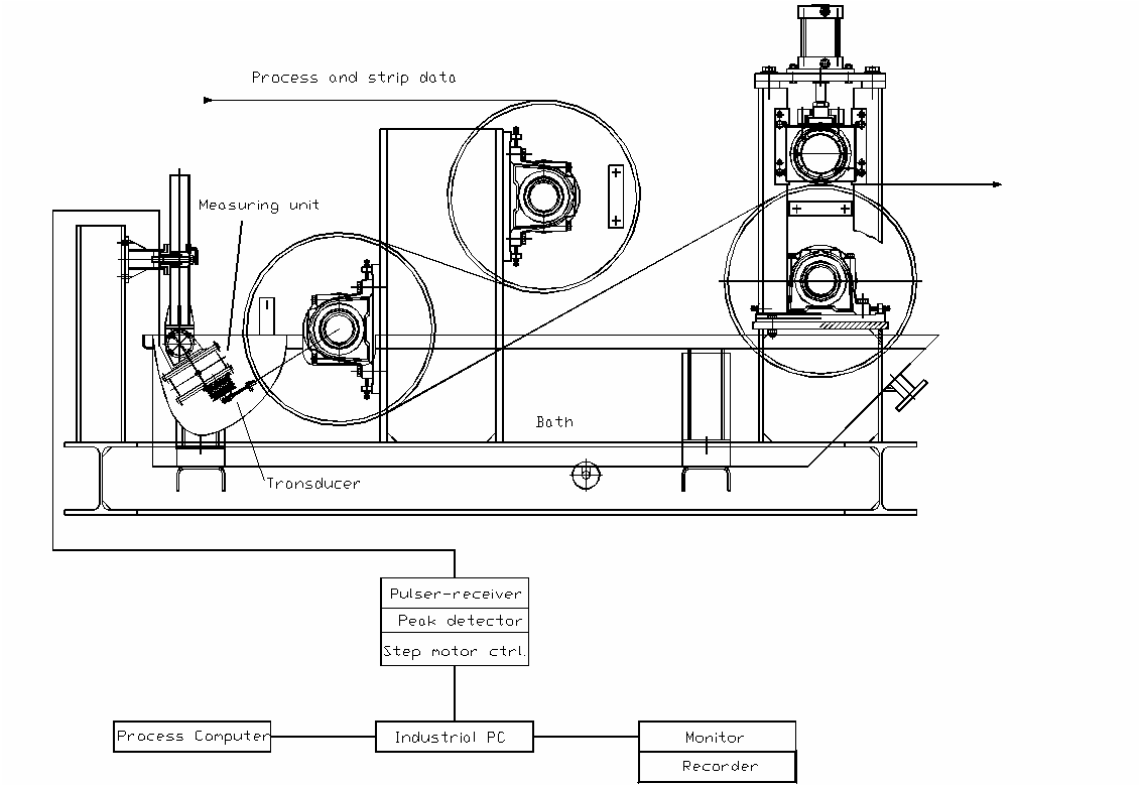

Figure 2: Principle setup of grain size measurement

Components:

- Measuring unit with movable ultrasound transducer
- Mounting frame which can be swinged up for transducer change
- Control cabinet for ultrasound electronics and for step motor control
- Industrial PC with monitor and optional recorder

Benefits

The benefits of continuous annealing control can be pointed out as follows:

- Improved quality assurance
- Reduction of sampling costs
- Enhanced reliability in production
- Increased annealing line throughput.