

# Material analysis

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As the international trade is opening up more and more, our markets are being flooded by products with all kinds of origins.

To varify our work of keeping a high product quality we have an instrument for material analysis, a spectrometer, at our quality division's disposal.

The spectrometer is of the brand SPECTRO - LAB L and can analyse most FE-based materials, such as stainless-, acid-resistant-, free-cutting-, tool- and low-alloy steel. The sample size is normally 2,0 mm or more.

The instrument is equipped with 20 analysis channels which cover almost all alloy metals for FE-alloys, such as phosphorus (P), sulphur (S), boron (B), carbon (C), silicon (Si), manganese (Mn), chromium (Cr), molybdenum (Mo), vanadium (V), niobium (Nb), copper (Cu), titanium (Ti), cobalt (Co), wolfram (W) and lead (Pb).

As a complement to "Swedish steel grades" the alloy norms from "Stahlschlüssel", "Carpenter Technology Corporation", "Brush Wellmann" and "Inco Alloys International" are in the alloy database and can be used at a routine analysis.

## How does the spectrometer work?

The Spectrolab normally requires a flat sample with a diameter of at least 2 mm. This is placed on a spark stand and then fixed by a spring-loaded clamp.

Below the sample, on a distance of 4,5 mm, is an electrode located.

The space between the sample and the electrode is flushed with argon before the spark discharge, preventing the sample from oxidising and allowing the generated light in the spark discharge to reach the slits in the vacuum spectrometer without any absorption worth mentioning. The light from the spark is also led, via fibre optic cables made of quartz, into spectrometers working in air at atmospheric pressure.

To guarantee that the spectrometer is working, before every analysis there is a test performed to control the stability of the photomultiplier tubes. Every tube is individually illuminated by a diode and if a tube for some reason (usually age phenomenon) does not return a predefined signal, this is reported on the screen.

During the light measuring period, the integration time, the intensity of the reference line is measured for every single discharge, usually 400 times a second, and the intensity value of every single spark is stored in a memory. The outgoing signals are then processed by a microprocessor, where the sample's percentile composition is calculated. The calculating program considers line overlap, background variations and inter-element effects of various kinds in an iterative program, which in a few seconds prints the correct analysis result on screen or on paper.

