

# APPLICATION



## Determination of lead from whole blood

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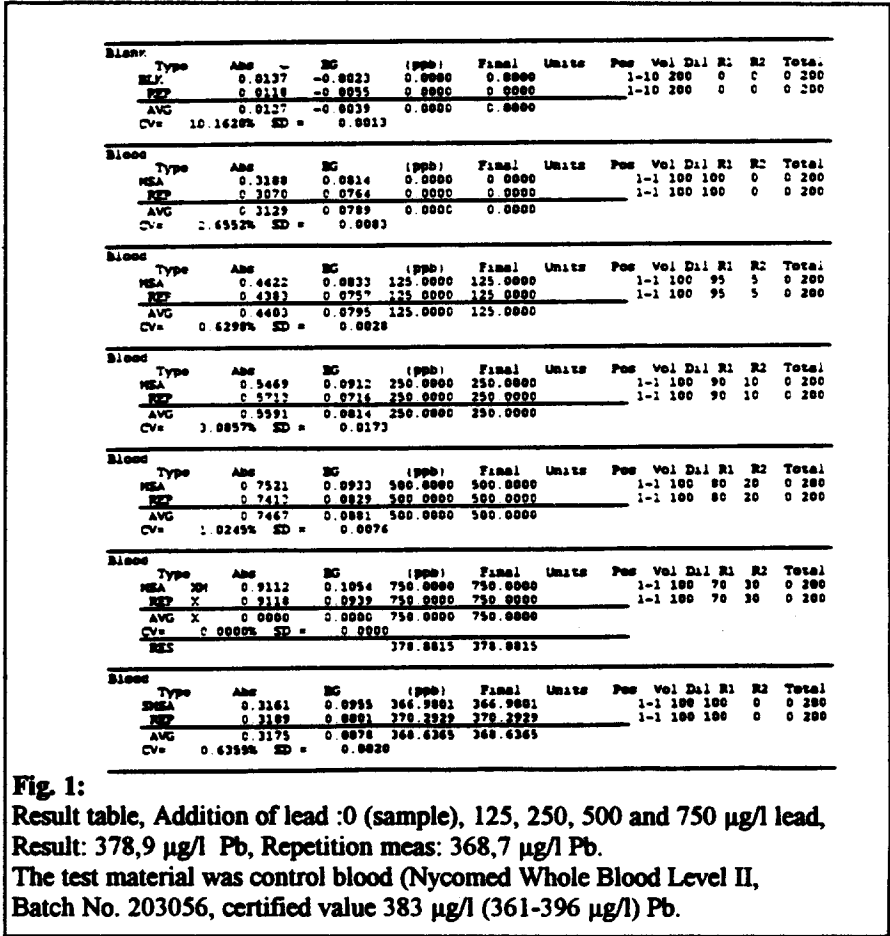
The determination of lead from whole blood is performed as routine analysis in occupational health control. Whereas the normal concentration of lead found in blood of central european patients is about 70-100 ppb (0.34 - 0.48 µmol/l) Pb, values of up to 400 ppb (1.93 µmol/l) can be found during control of disposed industrial workers.

This common application was completely renewed to point out the advantages of our new atomic absorption spectrophotometers AA-6701 und AA-6501S in addition with the graphite furnace system GFA-6500 and the autosampler ASC-6000. The described method allows to control normal value patient material as well as high level blood measurements in the occupational health control.

The determination of lead in whole blood is performed using standard addition method. Due to the complex matrix, for the achievement of reliable data normally a time consumable sample preparation is necessary. By using the autosampler system, the sample preparation efforts could be minimized in the way, that only dilution of the original blood sample with diluted phosphoric acid has to be performed prior to analysis. All other additions of reagents and all necessary mixing routines will be performed by the autosampler ASC-6000. Palladium modifier, phosphoric acid and Triton X-100 solutions are used as

further reagents. The analysis can be programmed as a full automatic run. Aliquots of a 500 ppb lead solution and reagent solution containing all reagents are mixed with a constant volume of 100 µl diluted blood sample during standard addition procedure. All

dilution calculations are considered in the procedure and the result of lead concentration can easily be read directly from the x-axis intercept of the calibration plot (see Fig. 2).



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The Peak Profile Graph (Fig.3) allows the control of the current analysis. By starting the measurement, the background signal (D<sub>2</sub>-background compensation system) as well as AA signal can be followed on the monitor. For instance, in Fig.3 one can see the background signal arising from foaming of the blood sample in the drying step of the applied furnace program.

platform graphite tubes are used in this procedure, a shift of the remaining background signal and an almost complete separation of the atomic absorption signal can be observed.

For further data processing, data can be transferred to all text editors and spread sheet application working in the MS-Windows™-environment. Following GLP requirements,

measured data can not be deleted from the measured result table and will be marked by a not removable „M“ if data have been manipulated.. For demonstration purpose of this program function in Fig. 1 the calibration point of 750 ppb was manipulated and excluded from the calculation (Mark „X“)

The given specifications serve purely as technical information for the user. No guarantee is given on technical specifications of the described products and/or procedures

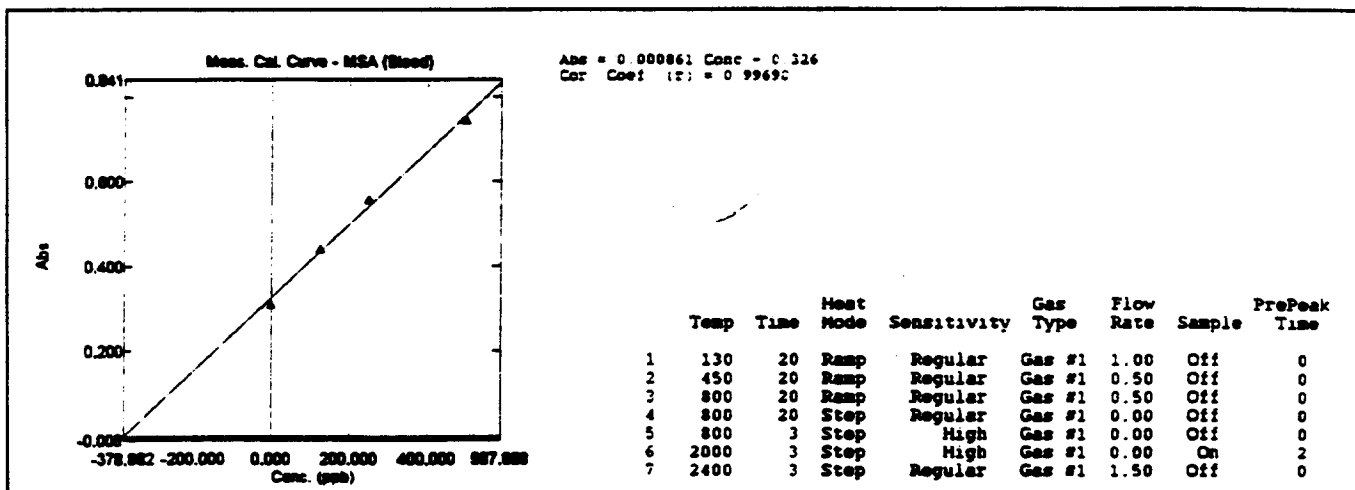


Fig. 2: Calibration plot (standard addition method)

Fig. 4: Utilised furnace program on AA-6701

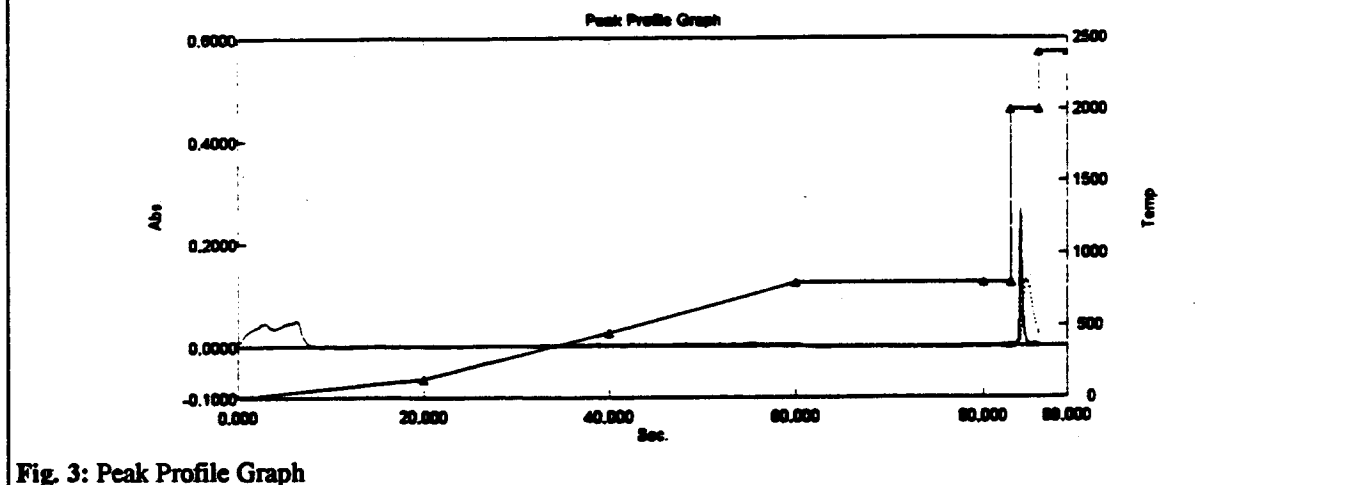


Fig. 3: Peak Profile Graph

The described method and the sensitivity and precision of the used instruments allow a safe and reliable routine analysis.

## Instrumentation

AA-6701  
 Autosampler ASC-6000  
 Graphite furnace GFA-6500



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