

GENERAL INFORMATION ON PECHINEY CRM

The PECHINEY Certified Reference Materials (CRM) for aluminium and aluminium alloys were produced by the PECHINEY CRV Research Centre, Voreppe, France. These CRM are now sold and serviced by Suisse Technology Partners Ltd., Neuhausen, Switzerland.

Suisse Technology Partners guarantees for samples of the highest quality by:

- our experience in the material
- our continuous dialogue with laboratories and plants around the world
- the use of the most modern techniques
- the extent and quality of the testing equipment

The CRM and its compositions which are the subject of this catalogue have been manufactured and inspected especially for applications in emission spectrometry. Their use is also valid for other methods of analysis, such as luminescent discharge, X-ray fluorescence, atomic absorption and induced plasma emission spectrometry.

In particular, systematic studies have shown that in atomic absorption spectrometry, the composition which is given with the confidence interval, may be used routinely for the analysis of aluminium and its alloys. They bring an appreciable time saving and increased security in the preparation of calibration solutions.

The CRM allows spectrometrists to have points of reference at their disposal which are necessary for them to obtain by interpolation. So they will reach the analytical results they are seeking for with a security as great as possible.

The validity of these interpolations is even better if the CRM is as close as possible in its composition and its structure to the sample to be analysed.

The precision of the analytical results will also be affected by the confidence interval linked to the reported composition value of the CRM.

The previous points have been taken into consideration:

- in the choice of the composition of the CRM
- in the choice of the production technique
- in the essential inspection operations (homogeneity tests, determination of the absolute values, calculation of the uncertainty)

CHOICE OF REFERENCE SAMPLES IN ALUMINIUM AND ALUMINIUM ALLOYS CERTIFIED BY ALUMINIUM PECHINEY

These CRM are produced for the routine inspection of aluminium and aluminium alloys which are currently in use around the world.

The analysis of an alloy is achieved by using at least 3 CRM chosen from the available ranges. The CRM should be of compositions which mark the sought values.

Despite the diversity of the nuances available, it can happen that the alloy to be inspected contains one or several elements with a content outside the bracket covered by the samples of the available range. In these cases, it is often possible to use one or several CRM from close-by ranges after having checked that they are compatible.

PROPERTIES OF THE CERTIFIED REFERENCE SAMPLES

They exist in the form of cylinders.

Cylinders (C)

Diameter 55 mm, height 30 mm.

They are cut from bars obtained from cast billets.

Samples are taken from locations regularly spaced along the length of the bar to permit an evaluation of the homogeneity of the metal

REPORTING OF THE RESULTS

Each CRM is marked with a code number which links its composition to the tables of analyses in the catalogue.

The absolute value

In the majority of cases, the average of the values are obtained by different absolute methods.

For some of them, the absolute value results out of the choice of the method which appears, to be the best by experience.

Confidence interval

Whenever a confidence interval is assigned to the absolute value, it has been obtained after taking into account the scatter due to the composition of the metal, as well as the scatter which appears during the homogeneity test and from the uncertainty of the methods of absolute analysis.

METHOD OF USE OF THE CRM

Cylinders C

Their use should be limited to a ring situated approximately 10 mm from the external circumference.

Calibration Curves

The reference samples are designed for use in a set of at least 3 samples in order to provide a calibration curve of the indicated chemical elements.

This calibration curve is obtained by regression between the contents of the reference samples (placed normally on the Y-axis) and the response of the spectrometer (on the X-axis).

This regression may be weighted by assigning to the concentrations weights proportional to the inverse of the squares of the confidence interval.

SPECIAL SAMPLES

Monitors

At the end of each category of CRM, a certain number of reference samples are to be found

- Monitors in the form of 50 mm diameter and 50 mm high cylinders.

Monitors are distinguished by two essential characteristics :

- very high homogeneity
- composition close to the sample to be analysed.

The Monitor is therefore a reference sample which is especially adapted to Statistical Process Control (S.P.C.) and represents an essential tool for diagnosing deviations arising from the analytical process.

**WARNING : The composition indicated is not verified by chemical means.
These monitors can on no account replace the usual CRM used for calibration.**

Setting up Samples

At the catalogue a range of specialised setting up samples can be found which are intended to calculate the correction of the deviation of multi-channel spectrometers. Their manufacture has been carried out to obtain the best possible homogeneity, taking into account their composition.

Consequently, the setting up samples are capable of giving a highly reproducible spectrometric signal for the indicated elements.

Their use, at a frequency which is a function of the stability of the spectrometer, permits the measurement and correction of significant variations undergone by the spectrometric response of these elements (deviation correction).

The setting up samples are necessary to accomplish quickly the "standardization" of spectrometers equipped with calculators ; they comprise in a small number of alloys high points and a low point for calibrating all the channels.

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