

Alloy Check Procedure

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An alloy check is a procedure where a type standard or other standard is analyzed every 4 hours (or some reasonable time interval, beginning of every shift if your instrument is proven stable) and the Mg concentration is plotted on a simple control chart. The Mg value plotted is the average of 3 sparks. More sparks are better. One or two sparks are insufficient. *We strongly recommend that other elements such as Si, Fe, Cu and Mn be plotted on separate charts.* The standard chosen should have chemistry similar to the product being cast.

In this example the Upper Control Limit and Lower Control Limit are the certified Mg value of the standard ± 0.017 . The value ± 0.017 is the uncertainty of the standard and is found on the certificate of analysis for the standard. The upper and lower limits are represented by the double line on the chart. Normally a range chart is included in the alloy check procedure and is not represented in this example. In some cases a small amount of instrument error is added to the uncertainty.

Every instrument will have a different amount of drift. A few things that could affect instrument drift are:

1. Swings in laboratory temperature *or humidity*
2. Spectrometer heating system issues
3. Argon quality issue (*UHP or Ultra High Purity argon recommended*)
4. Profile knob moved
5. Poor *standard/sample surface*
6. Electronics temperature and electronics issues
7. Poor power conditioning, improper grounding
8. Spark stand temperature

When beginning this program it is acceptable to simply plot the data for a period of time (a week for example) before determining when to react.

Some instrument software may be able to plot alloy check information for multiple elements. Contact your instrument software supplier to see if the alloy check capability is available.

Simply sparking a standard and confirming that in instrument is inside the uncertainty, and then filing the results is not best practice. Plotting the trend and making decisions based on the trend is better practice.

The "Alloy Check" procedure with a trend graph is an aspect of laboratory best practice and must be considered at some point as a laboratory evolves. *Points outside the limits must be annotated. When action is taken based on instrument performance the chart must be annotated.*

