



## ANALYSIS REPORT

### SPECTROSCOPIC REFERENCE MATERIAL

# SIMO 1/6

## SILICON MOLYBDENUM CAST IRON

The material for this sample was prepared, using a special method of casting known to provide material of uniform composition in a form suitable for use as calibration reference materials in optical emission spectroscopic and XRF analysis. Representative samples were examined spectroscopically and found to give reproducible results.

The Chemical analysis of representative turnings was carried out independently by both BAS Ltd and another laboratory experienced in the analysis of ferrous materials. The values reported are the overall means of the results obtained in both laboratories.

#### ANALYSIS mass content in %

		<b>C</b>	<b>Si</b>	<b>Mn</b>	<b>P</b>	<b>S</b>	<b>Cr</b>
<b>SIMO 1/6</b>	<b>Mean</b>	<b>2.50</b>	<b>4.04</b>	<b>0.372</b>	<b>0.036</b>	<b>0.005</b>	<b>0.750</b>
	<b>sd</b>	0.03	0.03	0.004	0.001	0.001	0.011
<b>SIMO 1/6</b>		<b>Mo</b>	<b>Ni</b>	<b>Al</b>	<b>As</b>	<b>Co</b>	<b>Cu</b>
	<b>Mean</b>	<b>0.727</b>	<b>0.060</b>	<b>0.025</b>	<b>0.001</b>	<b>0.025</b>	<b>0.016</b>
<b>SIMO 1/6</b>	<b>sd</b>	0.006	0.003	0.003	0.001	0.002	0.001
		<b>Sn</b>	<b>Ti</b>	<b>V</b>	<b>Mg</b>		
<b>SIMO 1/6</b>	<b>Mean</b>	<b>0.053</b>	<b>0.010</b>	<b>0.020</b>	<b>0.002</b>		
	<b>sd</b>	0.002	0.001	0.003	0.001		

sd: Standard deviation of the mean values from each laboratory.

**Note:** *This sample is in the form of chill-cast rectangular blocks approximately 48 mm x 42 mm x 12 mm thick with a single chilled working face. Spectroscopic reproducibility has been shown to be reliable to a depth of 5 mm below the original surface of the block. Analysis must be made on the fully ground surface only and the sample should be discarded when this face has been ground back as far as the small shoulder around the edge of the sample..*

*Using vacuum direct reading optical emission spectrometers it has been established that materials of similar composition from different sources may respond differently. These SIMOs are primarily intended for the construction of basic response curves which should be related to the response curves obtained from an identical examination of the user's own material.*

# SIMO 1/6

## NOTES ON METHODS USED

ELEMENT	METHODS USED
<b>Carbon</b>	Combustion, gravimetric.
<b>Silicon</b>	Gravimetric, double dehydration with perchloric acid.
<b>Manganese</b>	Inductively coupled plasma-optical emission spectrometry. Flame atomic absorption spectrometry.
<b>Phosphorus</b>	Photometric as phosphovanadomolybdate, extraction.
<b>Sulphur</b>	Combustion, acidimetric titration. Inductively coupled plasma-optical emission spectrometry.
<b>Chromium</b>	Inductively coupled plasma-optical emission spectrometry. Flame atomic absorption spectrometry.
<b>Molybdenum</b>	Flame atomic absorption spectrometry. Inductively coupled plasma-optical emission spectrometry.
<b>Nickel</b>	Flame atomic absorption spectrometry Inductively coupled plasma-optical emission spectrometry.
<b>Aluminium</b>	Inductively coupled plasma-optical emission spectrometry.
<b>Arsenic</b>	Inductively coupled plasma-optical emission spectrometry.
<b>Cobalt</b>	Inductively coupled plasma-optical emission spectrometry. Flame atomic absorption spectrometry.
<b>Copper</b>	Flame atomic absorption spectrometry Inductively coupled plasma-optical emission spectrometry.
<b>Tin</b>	Inductively coupled plasma-optical emission spectrometry.
<b>Titanium</b>	Inductively coupled plasma-optical emission spectrometry.
<b>Vanadium</b>	Inductively coupled plasma-optical emission spectrometry.
<b>Magnesium</b>	Inductively coupled plasma-optical emission spectrometry.

**NB:** Although these samples have been carefully analysed by both BAS Ltd and another experienced laboratory, using the methods detailed above, they have been classified as Reference Materials (RMs)\* and not Certified Reference Materials (CRMs)\* in order to distinguish them from the Spectroscopic Certified Reference Materials (SCRMs) of Cast Iron which are normally analysed by at least five laboratories.

According to the International Organisation for Standardisation Guide 30 (ISO Guide 30: 2015), the definitions for RM & CRM are as follows :-

**Reference Material (RM):** Material, sufficiently homogeneous and stable with respect to one or more specified properties, which has been established to be fit for its intended use in a measurement process.

**Certified Reference Material (CRM):** Reference Material characterised by a metrologically valid procedure for one or more specified properties, accompanied by a Certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability.

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