

# BUREAU OF ANALYSED SAMPLES LTD



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Certificate No Q 3993

## ANALYSIS REPORT

### COPPER BASE ALLOY REFERENCE MATERIAL

### CURM No. 71.32-5

### LEADED GUNMETAL

The material for this CURM was prepared specially for Bureau of Analysed Samples Ltd using a method of casting known to provide material of uniform composition in a form suitable for use as calibration reference materials in XRF and optical emission spectroscopic analysis. Using Optical Emission Spectrometry the samples have been shown, by statistically designed procedures, to produce reproducible results.

The chemical analysis of representative turnings was carried out independently by both Bureau of Analysed Samples Ltd., and another laboratory experienced in the analysis of non-ferrous materials. The values reported are the overall Means and Standard Deviations (s.d.) of three separate determinations made in each laboratory.

## ANALYSIS

mass content in %

Element	Mean	s.d.	Element	Mean	s.d.
Cu	<b>82.69</b>	0.08	Mn	<b>&lt;0.0005</b>	-
Sn	<b>6.07</b>	0.04	As	<b>0.213</b>	0.003
Pb	<b>4.14</b>	0.02	Sb	<b>&lt;0.002</b>	-
Zn	<b>6.02</b>	0.04	Bi	<b>&lt;0.002</b>	-
Ni	<b>0.570</b>	0.006	Al	<b>&lt;0.001</b>	-
P	<b>&lt;0.001</b>	-	S	<b>0.082</b>	0.002
Fe	<b>0.056</b>	0.003	Cr	<b>&lt;0.0005</b>	-
Si	<b>&lt;0.001</b>	-	Ag	<b>0.029</b>	0.003

Note: This CURM is available in bottles of 100 g of turnings or as a chill cast disc, approximately 50 mm diameter x 12 mm thick, with a single chilled working face (smaller diameter). Spectroscopic reproducibility has been shown to be reliable to a depth of 5 mm below the chilled surface as supplied. The disc should therefore be discarded when the thickness is reduced to 7 mm.

It has been established that materials of similar composition from different sources may respond differently on Optical Emission Spectrometers. CURMs are intended primarily 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.

N.B. Although these samples have been carefully analysed by both BAS Ltd and an independent laboratory, using the methods detailed overleaf, they have been classified as Reference Materials (RM)\* and not Certified Reference Materials (CRM)\* in order to distinguish them from the BAS Certified Reference Materials which are normally analysed by at least five laboratories.

\* See over for ISO definitions.

# CURM No. 71.32-5

## INFORMATION ON METHODS USED

Element	Chemical Methods used for the Analysis of this RM
Copper	Electrolytic deposition
Tin	Iodometric titration, nickel coil reduction after separation with ammonium hydroxide. Flame Atomic Absorption Spectrometry (FAAS)
Lead	FAAS
Zinc	FAAS
Nickel	FAAS
Phosphorus	Photometric as phosphovanadomolybdate, with extraction
Iron	FAAS
Silicon	Photometric as molybdenum blue FAAS
Manganese	FAAS
Arsenic	FAAS
Antimony	FAAS
Bismuth	FAAS
Aluminium	FAAS
Sulphur	Gravimetric High frequency combustion, infra-red absorption
Chromium	FAAS
Silver	FAAS

\* According to the International Organisation for Standardization (ISO Guide 30-1992/Amd 1:2008) the definitions for RM and CRM are as follows:-

**Reference Material (RM):** Material, sufficiently homogeneous and stable with respect to one or more 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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for **BUREAU OF ANALYSED SAMPLES LTD.**  
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