MAIN EDITION

BCIRA
and
BUREAU OF ANALYSED SAMPLES LTD

SPECTROSCOPIC REFERENCE MATERIAL

ANALYSIS REPORT
LARM 1
LOW ALLOY CAST IRON

The material for this sample was prepared at the laboratories of the BCIRA, Alvechurch, Birmingham, U.K., 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 drillings 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 %.

	Cr	Ni	B	Cu	Ti	V	Bi	Ce
Mean	**0.50**	**0.49**	**0.006**	**2.49**	**0.14**	**0.11**	**0.011**	**0.005**
SD	0.007	0.005	0.001	0.01	0.005	0.004	0.001	0.001

SD: standard deviation of the mean values from each laboratory.

Nominal base content of this iron:- C 3.0%, Si 2.0%, Mn 0.3%, P 0.05%, S <0.01%

Approximate contents obtained by one laboratory:- Mo 0.002%, $Al_{(Total)}$ 0.002%, Pb 0.0003%

Using vacuum direct reading optical emission spectrometers it has been established that materials of similar composition from different sources may respond differently. This LARM, together with the four other in the series (LARM 1 – LARM 5/1) 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.

NB: Although these samples have been carefully analysed by both BAS Ltd and another experienced laboratory, using the methods detailed overleaf, 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.

Date of this edition: December 2017.

(The current edition is available at www.basrid.co.uk)

LARM 1 LOW ALLOY CAST IRON

NOTES ON METHODS USED

ELEMENT	METHODS USED
Chromium	Titrimetric with Fe (II), persulphate oxidation
Nickel	Flame Atomic Absorption Spectrometry
Boron	Photometric with curcumin, EN Method No. 10200
Copper	Flame Atomic Absorption Spectrometry
Titanium	Flame Atomic Absorption Spectrometry Inductively Coupled Plasma - Optical Emission Spectrometry
Vanadium	Flame Atomic Absorption Spectrometry Inductively Coupled Plasma - Optical Emission Spectrometry
Bismuth	Flame Atomic Absorption Spectrometry Graphite Furnace Atomic Absorption Spectrometry
Cerium	Inductively Coupled Plasma - Optical Emission Spectrometry Photometric with 8-hydroxyquinoline, after ion exchange separation

DESCRIPTION OF SAMPLE

The material for this LARM was prepared at the laboratories of the BCIRA, Alvechurch, Birmingham, U.K. using a special method of casting known to provide material of uniform composition in a form suitable for use as a Reference Material (RM) for optical emission spectrometric analysis. Blocks from this cast have been shown, by statistically designed procedures, to provide reproducible results using optical emission spectrometry.

LARM 1 is sold as a chill cast rectangular block, approximately 40mm x 37mm x 10mm thick with a single chilled working face. Spectroscopic reproducibility has been shown to be reliable to a depth of 5mm below the original working surface of the block. Sparking should only be made on the fully ground surface and the sample should be discarded when the face has been ground back as far as the small shoulder around the edge of the sample.

INTENDED USE

LARM 1 is intended for establishing and checking the calibration of Optical Emission and X-Ray Spectrometers for the analysis of similar materials.

STABILITY

LARM 1 will remain stable provided that the block is stored in a dry atmosphere and is not subjected to excessive heat (e.g. during preparation of the working surface).

COMMUTABILITY

It has been established that, when using optical emission spectrometers, materials of similar composition from different sources may respond differently. The user should be aware that the metallurgical history of this RM may not accurately reflect the metallurgical history of the user's own materials.

Further information and advice on this or other Certified Reference Materials or Reference Materials produced by Bureau of Analysed Samples Ltd may be obtained from the address below.

NEWHAM HALL, NEWBY,
MIDDLESBROUGH, ENGLAND, TS8 9EA
Email: enquiries@basrid.co.uk
Website: www.basrid.co.uk

For BUREAU OF ANALYSED SAMPLES LTD

R.P. MEERES,
Managing Director

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