Approved by State Bureau of Technical Supervision
The People 's Republic of China
GBW 02111——GBW 02115

Certificate of Certified Reference Material
Pure Copper
(for use with optical emission spectroscopic methods)

Sample Number

Date of Certification

Shenyang Nonferrous Metals Works

Shenyang China

1. A Brief Introduction

This CRM is intended primarily for use in optical emission spectroscopic analysis of simi-lar materials in order to help in the quality control process as well as for checking the reliabili-ty of instruments, and evaluating methods.

2. Method of Preparation

pure copper, tin, lead and copper alloys of parts of elements were selected to produce the reference material, which were melted in medium freiquency induction furnace and cast into ingots with cast iron mould. The ingots were shaped into rods of φ08× 140mm, by extruding and drawing. After they were qualified for inspections on structure and homogeneity with the reliable chemical analysis by five laboratories, their certified value and accuracy were determined by means of statistical processing data of reference material certification.

3. Certified Value and Standard Deviation

No	Certified Value standard Deviation	Chemical Composition (Weight Percent)							
		Bi	So	Fe	As	Ni	Pb	Sn	Zn
GBW02 111	Certified Value Standard Deciation (s)	0.00050 0.00002	0.00084 0.00001	0.00093 0.00007	0.0135 0.0006	0.0015 0.0001	0.0012 0.0001	0.00062 0.00005	0.0123 0.0006
GBW02 112	Certified Value Standard Deviation (S)	0.0053 0.0001	0.0025 0.0002	0.0026 0.0003	0.0022 0.0002	0.0089 0.0003	0.0110 0.0004		
GBW02 113	Certified Calue Standard Deviation (S)	0.0013 0.0001	0.0018 0.0001	0.0048 0.0003	0.0013 0.0001	0.0173 0.0007	0.0083 0.0004	0.0017 0.0002	0.0021 0.0002
GBW02 114	Certified Calue Standard Deviation (S)	0.0026 0.0002	0.0042 0.0002	0.0089 0.0004	0.0043 0.0003	0.0050 0.0003	0.0047 0.0001	0.0037 0.0002	0.0046 0.0002
GBW02 115	Certified Calue Standard Deviation (S)	0.010 0.001	0.0074 0.0004	0.0157 0.0008	0.0074 0.0005	0.0031 0.0001	0.0031 0.0001	0.0112 0.0005	0.0083 0.0004

4. Method of Analysis

Element	Method
Ni	Dimethylglyoxirne photometric method. Atomic absorption Spectrometric method.
Fe	Ortho—phenanthroline photometric method. Atomic absorption spectrometric method. Methyl iso—butylktone extraction photometric method.
Zn	Atomic absorption spectrometric method. Electrolytic separation—Atomic absorption spectrometric method.
Pb	Atomic absorption spectrometric method. Flameless atomic absorption spectrometric method.
As	Molybdenum blue photometric method. Silver disthyldithiocarbamate photometric method.
Sn	Phenylfluorone — polyethylene glycal octyl phenylether photometric method. Salicylfluorone—Myristyl pyridinium chloride photomeric method.
Bi	Potassium iodide brucine photometric method. Flameless atomic absorption spectrometric method.

Sb	Grystal vilet photometric method Flameless atomic absorption spectrometric method PADAP—photometric method.

5. Packing Specification

This CRM is in the form of metal rods of Φ8 × 140mm. There are five kinds of rods in each box and each kind have two rods.

6. Usage and Storage

When using it, you should mill the CRM and analysis specimen into a wedze by machine tool. The diametre at the end of working place is from 2 to 2. 5millimetres. The analytical specimen and the CRM are analyzed by alternating—current are excitation.

7. Co—operating Units

Beijing General Research Institute for Nonferrous Metals
Beijing General Research Inspection Station for Nonferrous Metal Working Products
Shenyang Nonferrous Metals Works