

ICS 77.040.30
CCS H 13

YS

**NONFERROUS METALS INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YS/T 746.1-2010

**Methods for chemical analysis of lead-free tin-based solders.
Part 1: Determination of tin content. Pyrogalllic acid
demasking-lead nitrate titrimetric method**

无铅锡基焊料化学分析方法 第1部分：锡含量的测定 焦性没食子酸解蔽—硝酸铅
滴定法

(English Translation)

Issued on: November 22, 2010

Implemented on: March 1, 2011

Issued by: Ministry of Industry and Information Technology

Table of Contents

- Foreword
- 1 Scope
- 2 Method summary
- 3 Reagents

Foreword

YS/T 746 "non-Pb-based solder chemical analysis method" is divided into 17 parts.

- Part 1 Determination of tin content Coke sexual gallic acid Covering - lead nitrate titration method
- Part 2 of silver content - Flame atomic absorption spectrometry and potentiometric titration with potassium thiocyanate
- Part 3 of copper content - Flame atomic absorption spectrometry and titration with sodium thiosulfate
- Part 4 of lead content - Flame Atomic Absorption Spectrometry
- Part 5 of bismuth content - Flame atomic absorption spectrometry and titration Na₂EDTA
- Part 6 of antimony content - Flame Atomic Absorption Spectrometry
- Part 7 Determination of iron content by flame atomic absorption spectrometry
- Part 8 of arsenic content of arsenic, antimony molybdenum blue spectrophotometric method
- Part 9 Determination of zinc content by flame atomic absorption spectrometry and titration Na₂EDTA Part 10 Determination of aluminum content --- first electrothermal atomic absorption spectrometry
- Part 11 of cadmium content - Flame Atomic Absorption Spectrometry
- Part 12 Determination of indium titration Na₂EDTA
- Part 13 Determination of nickel content by flame atomic absorption spectrometry
- Part 14 Determination of the phosphorus content of the first crystal violet - heteropoly acid phosphovanadomolybdate spectrophotometry
- Part 15 Determination of germanium content salicylfluorone spectrophotometry
- Part 16 Determination of rare earth Arsenazo III spectrophotometry

--- Part 17 silver, copper, lead, bismuth, antimony, iron, arsenic, zinc, aluminum, cadmium, nickel, indium content was measured by inductively coupled plasma optical emission Spectroscopy this is Part 1.

This section is in accordance with GB/T 1.1-2009 given rules drafted.

The non-ferrous metal part by the National Standardization Technical Committee (SAC/TC243) centralized.

This section is drafted. Yunnan Tin Group Co., Ltd.

Participated in the drafting of this section. Guangxi China Tin Group Co., Ltd.

1 Scope

YS/T 746 This section specifies the determination method based solder lead-free solder in tin content.

This section applies to the determination of non-Pb-based solder in tin content.

Measurement range. 30.00% - 99.50%.

2 Method summary

Sample the mixed acid is dissolved in 0.5mol/L ~ 2mol/L acidity, with complex Na₂EDTA tin and other metal ions, in pH value hexamethylenetetramine buffer solution from 5.8 to 6.0, with xylenol orange as indicator, titrate with lead nitrate excess Na₂EDTA, in Coke sexual gallic acid enable EDTA-Sn complex Exposed release titration with lead nitrate standard solution titration out EDTA.

P > 0.5mg, titanium > 0.2mg interfere with the determination.

3 Reagents

Unless otherwise indicated in the analysis using only recognized as analytical grade reagents and distilled or deionized water or equivalent purity.

3.1

Coke sexual gallic acid.

3.2

hydrochloride (rho1.19g/mL).

3.3

hydrochloride (11).

Nitrate 3.4 (rho1.42g/mL).

3.5

mixed acid. 30mL nitric acid (3.4), 70mL of hydrochloric acid (3.2), 100mL of water.

3.6

Na₂EDTA solution (100g/L). Weigh 100g Na₂EDTA, 100g in 2000mL beaker of sodium hydroxide, was added 800mL Water, dissolved by heating, cooled to room temperature, diluted with water to 1000mL, and mix.

3.7

tartaric acid solution (10g/L).

3.8

thiourea solution (50g/L).

3.9

hexamethylenetetramine solution A (300g/L). the acidity adjusted with hydrochloric acid (3.3) to a pH of 5.8.

3.10

hexamethylenetetramine solution B (300g/L). the acidity adjusted with hydrochloric acid (3.3) to a pH of 7.0.

3.11

sodium bicarbonate solution (saturated).

3.12

Lead nitrate solution [cPb (NO₃)₂ = 0.4mol/L].

3.13

standard lead nitrate titration solution [cPb (NO₃)₂ = 0.04mol/L].

3.13.1

preparation. Weigh 13.3g of lead nitrate in 500mL beaker, dissolved in water and transferred to 1000mL volumetric flask, dilute with water to Volume, and mix.

3.13.2

Calibration. Weigh 0.1500g three tin (>=99.99%) in 300mL conical flask, 10mL mixed acid, low temperature Heated to dissolve completely. 4.4.2 - 4.4.4 by the following conduct. While doing the blank test.

According to formula (1) calculate the standard lead nitrate titration solution actual concentration (c).

$$c = \frac{m}{118.70} \times \frac{(V_1 - V_0)}{V} \times 10^{-3} \quad (1)$$