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

YS/T 746.12-2010

**Methods for chemical analysis of lead-free tin-based solders.
Part 12: Determination of Indium content. Na₂EDTA titrimetric
method**

无铅锡基焊料化学分析方法 第12部分：铟含量的测定 Na₂EDTA滴定法
(English Translation)

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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 12.

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.

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1 Scope

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

This section applies to the determination of lead-free tin-based solders in indium content. Measurement range. 20.00% - 60.00%.

2 Method summary

Samples with hydrochloric acid, hydrogen peroxide dissolved in hydrochloric acid, hydrobromic exclude volatile tin, antimony tartrate in pH2.0 ~ 2.5 - the slow sodium tartrate Red liquid, with xylenol orange as indicator, titrated with a standard solution titration Na₂EDTA indium.

Bismuth > 0.5mg 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

hydrochloride (rho1.19g/mL).

3.2

sulfate (rho1.84g/mL).

3.3

sulfate (11).

3.4

hydrobromide (rho1.49g/mL).

3.5

Hydrogen peroxide (30%).

3.6

tartaric acid - sodium tartrate buffer solution. Weigh 45g 23g tartaric acid and sodium tartrate in 200mL beaker, 200mL aqueous Solutions diluted with water to 1000mL, and mix.

3.7

Indium standard solution. Weigh 2.0000g indium ($\geq 99.99\%$) in 300mL beaker, add 50mL hydrochloric acid, cover sheet pan, over low heat Completely dissolved, cooled to room temperature. Water moved into 500mL volumetric flask and dilute to volume, and mix. This solution containing 4mg per ml of indium.

3.8

Na₂EDTA Standard Solution (cNa₂EDTA = 0.03mol/L).

3.8.1

preparation. Weigh 110gNa₂EDTA dissolved in 1000mL water, heated, and stirred to dissolve completely, cooled to room temperature, diluted with water 10L, and mix.

3.8.2

Calibration. Pipette three 25.00mL indium standard solution (3.7) were placed in 300mL beaker, add 5mL hydrochloric acid (3.1), Low temperature steam until nearly dry, coolish, along Beibi 25mL tartaric acid - sodium tartrate buffer solution (3.6), add a little water, low-temperature heating to about 60 °C, ascorbic acid 0.2g, shake, add 1 drop of xylenol orange solution was still hot Na₂EDTA standard titration (3.8) was titrated to Solution from red to bright yellow as the end point. While doing the blank test.

According to formula (1) calculate the actual concentration Na₂EDTA standard titration solution.

$$c = \rho$$

$$(V_2 - V_0) \times 114.82$$

Where.

The actual concentration c --- Na₂EDTA standard titration solution, expressed in moles per milliliter (mol/mL);

Mass concentration ρ --- indium standard solution, in milligrams per milliliter (mg/mL);