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

YS/T 746.10-2010

**Methods for chemical analysis of lead-free tin-based solders.
Part 10: Determination of aluminum content. Electrothermal
atomic absorption spectrometric method**

无铅锡基焊料化学分析方法 第10部分：铝含量的测定 电热原子吸收光谱法
(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 section 10.

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. Beijing Nonferrous Metal Research Institute, Guangzhou Nonferrous Metal Research Institute.

1 Scope

YS/T 746 This section provides lead-free tin-based solders Determination of aluminum content.

This section applies to the determination of tin-based solders without aluminum content. Measurement range. 0.0005% to 0.050%.

2 Method summary

Sample dissolved in hydrochloric acid and nitric acid, hydrochloric acid, citric acid, thiourea medium, the solution is introduced into a volume of electrothermal atomizer, in Atomic absorption spectrometer at a wavelength of 309.3nm, measure the peak area of aluminum.

3 Reagents

Unless otherwise indicated in the analysis using only recognized as an analytical reagent and water.

Containers are used in the experiments with hydrochloric acid (119) was thoroughly soaked, washed with three water, a water clean.

3.1

hydrochloric acid ($\rho=1.19\text{g/mL}$), pure class distinctions.

3.2

nitrate ($\rho=1.42\text{g/mL}$), pure class distinctions.

3.3

hydrochloride (19).

3.4

citric acid solution (200g/L).

3.5

thiourea solution (50g/L).

3.6

standard aluminum stock solution. Weigh 0.5000g aluminum ($\geq 99.99\%$) in 200mL quartz beaker, blown about 5mL water added 10mL of hydrochloric acid (3.1), 3.5 mL of nitric acid (3.2), low-temperature heating to dissolve completely cooled, transferred to 500mL volumetric flask, add 20mL salt Acid (3.1), dilute to the mark and mix. 1mL solution containing 1mg aluminum.

3.7

aluminum standard solution. Pipette 10.00mL aluminum standard stock solution (3.6) in 100mL volumetric flask, was added 2mL of hydrochloric acid (3.1), Diluted with water to volume, and mix. This solution 1mL containing 100 μ g aluminum.

3.8

aluminum standard solution. Pipette 5.00mL aluminum standard stock solution (3.7) in 500mL volumetric flask, was added 10mL of hydrochloric acid (3.1), Diluted with water to volume, and mix. This solution 1mL containing 1 μ g aluminum. Store in plastic bottle.

4 Instrument

Atomic absorption spectrometer, heat distribution atomizer, autosampler, pyrolytic coating graphite tube platform, aluminum hollow cathode lamp and background subtraction school Positive means.

Under optimum working conditions for those who can reach the following indicators can be used.

--- Characteristic concentration. a solution in the matrix is consistent with the measured solution, characteristic concentration of aluminum should not exceed 34pg.

--- Precision. measure 10 times the absorbance of the highest concentration of the standard solution, the standard deviation should not exceed 1% of the average absorbance; with the lowest concentration of standard solution (not "zero" concentration of the standard) measuring the absorbance of 10 times, the standard deviation should not exceed the maximum concentration