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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 27857-2011

**Chemicals -- Anaerobic biodegradability of organic compounds
in digested sludge -- By measurement of gas production**

化学品 有机物在消化污泥中的厌氧生物降解性 气体产量测定法

(English Translation)

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules.

The OECD standard and Economy (OECD) Guidelines for the Testing of Chemicals 311 (2006), "born in the anaerobic digestion of organic matter in the sludge Biodegradable gas production assay, "the same (in English) technical content.

This standard configuration and do the following editorial changes.

--- The preamble of the original submissions of introduction;

--- The units of measurement to our legal units of measurement.

This standard is managed by the National Standardization Technical Committee chemicals dangerous (SAC/TC251) and focal points.

This standard was drafted. Guangdong Province, microbiological analysis Testing Center, Ministry of Environmental Protection Chemical Registration Center, China Inspection and

Quarantine Science RESEARCH Study hospital, the Guangdong Fine Chemical Co., Ltd. Germany and the United States.

Introduction

Currently, there are a series of screening tests used to evaluate aerobic biodegradation of organic matter (OECDTestGuidelines301A-F;

302A-C; 303A) [1-2], the results have been successfully used to predict the aerobic environment in a variety of chemicals normalized trend, especially in the sewage treatment plant Aerobic phase. Various proportions of insoluble in water and waste water chemicals adsorbed to suspended solids (SS) on the presence of sewage in the settlement, Therefore aerobic way to deal with. Most of these chemicals adhere to the primary settling tank sludge, primary settling tank sludge in sewage prepare oxygen Prior to treatment, and raw sewage in sedimentation tanks or separated from the supernatant; internal liquid sludge containing soluble chemical substances are transferred to the preheating extinction Reactor anaerobic treatment. Series evaluation methods has not digested in the anaerobic reactor, anaerobic biodegradation of organic matter present the purpose of the standard is to fill this gap; but not necessarily applicable to other types of hypoxia.

Determination under anaerobic conditions to produce methane (CH₄) and carbon dioxide (CO₂) gas production mainly respiratory measurement technology has been successfully Applied to the organic matter anaerobic biodegradation evaluation. In Birch et al [3] is the most comprehensive work, they would test procedures were reviewed, on the basis of Shelton and Tiedje [4] on preliminary studies [5-7] are summarized. This method [8] Later, after further development has Became the American National Standards [9-10], but this standard is still unresolved CO₂ and CH₄ in the test medium solubility discrepancies, and How to statistical theory of gases production test substance. ECETOC report recommended an increase in the measured liquid suspension of dissolved inorganic carbon (DIC), which Respiratory metrology techniques broader range of applications. ECETOC is committed to the international calibration Seminar Series (or comparison test Test) became ISO standard ISO 11734 [11].

This standard is based on ISO 11734, is described in a particular anaerobic environment (for example, at a certain time and inoculum concentration range Anaerobic digestion reactor) was used to evaluate the potential of anaerobic biodegradation of organic matter of screening. Because with a relatively dilute sludge Higher concentrations of the test substance used in conjunction with the test duration significantly longer than the actual anaerobic digestion reactor residence time, therefore, the test Conditions are not entirely consistent with the need to maintain the anaerobic digestion reactor environmental conditions, but it does not apply in other different environmental conditions Organic matter anaerobic biodegradation evaluation. 60d subjects were exposed to sludge, anaerobic digestion than normal for this time in the reactor sludge stop Retention time (25d ~ 30d) is

longer, although the industrial real residence time may be longer. According to the results of this standard is not expected to draw more than Aerobic biodegradation results more credible, because the simulation test test substance aerobic rapid degradation behavior and aerobic environments reliable enough, the results table They must contact exists between Ming; and for the anaerobic environment, there is little evidence of similar. Therefore, if the biogas production can be the theoretical gas production from 75% to 80% of the amount, it can infer is fully anaerobic biodegradation. Anaerobic digestion reactor, chemical phase the ratio of amount of inoculum was utilized higher, indicating that the added test substance is more likely to be degraded by digestion reactor. Test does not Material gas is not necessary to produce simulated environment better than the actual test substance and inoculum ratio; Additionally, the anaerobic reactor can also occur only the test substance is degraded molecular moiety, e.g. dechlorination, this method can not be measured this reaction. However, the analysis may be employed in other specific Method for determining the degradation of the test substance, and monitor the process of disappearing.

Organic chemicals in anaerobic digestion of biological sludge Degradation gas production assay

1 Scope

This standard specifies the test substance information on chemicals in the digestion of organic matter in the sludge anaerobic biodegradability gas production assay, the method Overview, test preparation, test procedures, data processing, quality assurance and quality control and test reports.

This standard applies to the known water-soluble chemicals. Such as the use of precise dosages formulated standard ISO 10634 [13] provided further Suitable for poorly water-soluble and non-water soluble chemicals. When this standard for volatile substances, the specific steps to be taken step by step Verify, for example, to determine the tightness test during the testing system and the like.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

ISO 10634:1995 Quality aqueous medium poorly soluble in water and organic compounds biodegradable continuous assessment of class Organic handling and preparation guidelines (WaterQuality-Guidanceforthe preparationandtreatmentofpoorly water-solubleorganic compoundsforthesubsequentevaluationoftheirbiodegradabilityinanaqueous medium)

3 Test substance information

Test substances should include.

- a) purity;
- b) molecular formula;
- c) solubility in water;
- d) volatile;
- e) vapor pressure;
- f) adsorption;
- g) organic carbon content (mass fraction,%);
- h) anaerobic microorganisms toxic or inhibitory [12].

4.1 Principle

After low concentrations (