

ICS 71.080.15

CCS G16



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

GB/T 12688.10-2020

**Test method of styrene for industrial use - Part 10:
Determination of oxygenates - Gas chromatography**

工业用苯乙烯试验方法 第10部分:含氧化合物的测定 气相色谱法

Issued on: November 19, 2020

Implemented on: October 1, 2021

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

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Foreword

GB/T 12688 "Test Methods of Styrene for Industrial Use" is divided into the following parts.

- 1.Determination of purity and hydrocarbon impurities by gas chromatography;
- 3.Determination of polymer content;
- 4.Determination of peroxide content by titration;
- 5.Titration method for determination of total aldehyde content;
- 8.Determination of polymerization inhibitor (p-tert-butylcatechol) content spectrophotometric method;
- 9.Determination of trace benzene gas chromatography;
- 10.Determination of oxygenated compounds by gas chromatography. This part is Part 10 of GB/T 12688. This section was drafted in accordance with the rules given in GB/T 1.1-2009. This part was proposed by the China Petroleum and Chemical Industry Federation. This part is under the jurisdiction of the National Chemical Standardization Technical Committee (SAC/TC63). Drafting organizations of this section. China Petroleum & Chemical Corporation Shanghai Research Institute of Petrochemical Industry, Shanghai SECCO Petrochemical Co., Ltd. Company, Guangdong Xinhua Yuehuade Technology Co., Ltd., China Petroleum & Chemical Corporation Beijing Yanshan Branch. The main drafters of this section. Peng Zhenlei, Liu Zhaoxia, Zhang Yuhong, Qiao Jianjun, Lu Tenglong, Cui Guanghong, Wang Chuan. Test method of styrene for industrial use Part 10. Determination of oxygenated compounds by gas chromatography Warning

--- This section is not intended to explain all safety issues related to its use. The user is responsible for taking appropriate safety and Health measures to ensure compliance with relevant national laws and regulations.

1 Scope

GB/T 12688.10-2020 is the Chinese national standard on test method of styrene for

industrial use - part 10: determination of oxygenates - gas chromatography, in the field of chemical technology. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 19 November 2020 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 October 2021. Classification: ICS 71.080.15, CCS G16. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This part of GB/T 12688 specifies benzaldehyde, phenylacetaldehyde, styrene oxide, acetophenone, phenol and p-tert-butyl in styrene for industrial use. Gas chromatographic method for determining the content of oxygen-containing compounds such as catechol (TBC). This section applies to benzaldehyde content in the range of 5mg/kg ~ 300mg/kg, phenylacetaldehyde, styrene oxide, acetophenone, phenol and Determination of industrial styrene with oxygen-containing compounds such as TBC in the range of 1mg/kg to 100mg/kg.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document. For undated references, the latest version (including all amendments) applies to this document.

GB/T 3723 General rules for the sampling safety of industrial chemical products

GB/T 6678 General Rules for Sampling of Chemical Products

GB/T 6680 General Rules for Sampling of Liquid Chemical Products

GB/T 8170 Numerical rounding rules and the expression and determination of limit values

3 Principles of the method

Inject an appropriate amount of sample into a gas chromatograph equipped with a capillary column and a flame ionization detector (FID), benzaldehyde, phenylacetaldehyde, Oxygen-containing compounds such as styrene oxide, acetophenone, phenol and TBC and other components are effectively separated on the capillary column, and measured by FID Quantify and record the peak area of oxygenated compounds, quantify by external standard method, and the results are expressed in milligrams per kilogram (mg/kg).

4 Reagents and materials

4.1 Carrier gas. nitrogen, with a purity of not less than 99.99% (volume fraction), dried and

purified by silica gel and 5A molecular sieve.

4.2 Combustion gas. hydrogen, with a purity of not less than 99.99% (volume fraction), dried and purified by silica gel and 5A molecular sieve.

4.3 Combustion gas. air, oil-free, dried and purified by silica gel and 5A molecular sieve.

4.4 Standard reagents. benzaldehyde, phenylacetaldehyde, styrene oxide, acetophenone, phenol and p-tert-butylcatechol (TBC), each standard reagent is pure. The degree is not less than 99% (mass score). If the purity of the standard reagent does not meet the requirements, its content in the calibration mixture should be corrected.

4.5 High-purity p-xylene. purity not less than 99.999% (mass fraction). It can be prepared in the following manner. Put a certain amount of p-xylene in an explosion-proof refrigerator at $(-10 \pm 5)^{\circ}\text{C}$. When about 1/2~3/4 p-xylene crystallizes, take it out. Pour out the liquid part, and the remaining crystal part is purified p-xylene. After the p-xylene crystals have melted, repeat this recrystallization operation until Use gas chromatography to check that no target impurity peak appears.