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

GB/T 48043.1-2026

**Thermoplastic piping systems - Preliminary evaluation of the
resistance to chemicals - Part 1: Test method**

热塑性塑料管道系统 耐化学性初步评价 第1部分：试验方法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 1 of GB/T 48043 "Preliminary evaluation of chemical resistance of thermoplastic piping systems". GB/T 48043 has been...

The following sections were published.

---Part 1: Test Methods;

---Part 2: Polyolefin Pipes and Components;

---Part 3: Rigid Polyvinyl Chloride (PVC-U), High-Impact Polyvinyl Chloride (PVC-HI), Modified Polyvinyl Chloride (PVC-M), Oriented Polyvinyl Chloride Polyvinyl chloride (PVC-O) and chlorinated polyvinyl chloride (PVC-C) pipes and components;

This document is modified to adopt ISO 4433-1:1997 "Thermoplastic pipes - Classification of resistance to liquid chemicals - Part 1: Immersion test".

Law".

This document has undergone the following structural adjustments compared to ISO 4433-1:1997.

---Chapters 3 and 9 have been added.

The technical differences between this document and ISO 4433-1:1997, and the reasons therefor, are as follows.

---The term "thermoplastic pipes" has been changed to "thermoplastic pipes, fittings,

sheets/plates and valve components" (see Chapter 1) for better accuracy.

The practical application scope of this document;

---The soaking temperature has been changed, and "PA-U, ECTFE, PFA, PTFE" has been added, simplifying PE (LD, MD, HD) materials to...

PE, PVC(U,HI) is simplified to PVC (see Table 1, 8.4). The material list in the table only lists the major material categories, which is more in line with the classification.

Logicity;

---Generally, at least 4 mL of liquid should be used per square centimeter of the total sample area, or at least 60 mL of liquid per sample, to ensure adequate absorption.

The larger value shall prevail. This should be changed to "If the sample does not contain extractable or easily corrosive components, the volume of the test medium can be determined based on the total surface area of the sample." Calculate that at least 4 mL is used per square centimeter, or at least 30 mL per sample (whichever is greater). If at the test temperature...

If the chemical medium is gaseous, the air in the container should be purged first, and then the test medium should be added until the pressure reaches one standard atmosphere.

"Press." (See 8.6) to increase operability;

---Change "replace at least every 7 days" to "replace at least every 30 days" (see 8.8) to improve operability;

---The testing speeds for PA-U, ECTFE, PFA, and PTFE have been increased (11.3) to adapt to my country's technical conditions and enhance operability.

Actual nature;

---The statement "Different groups of samples should be used for tests a) and b)" has been revised (see 11.3) to improve logical coherence and operability;

---Added "c) Dimensional information of the specimen; g) Appearance changes;" (see Chapter 12), improving the test results and increasing operability.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China National Light Industry Council.

This document is under the jurisdiction of the National Technical Committee on Standardization of Plastic Products (SAC/TC48).

Introduction

Thermoplastic piping systems are widely used and frequently need to transport or come into contact with various substances and their vapors, such as chemical products, fuels, and lubricants.

Under the influence of these chemical fluids, plastic piping systems may undergo two changes simultaneously. physical changes, such as the pipe walls absorbing the liquid.

The liquid swells, and soluble components in the pipe wall may be extracted into the liquid; chemical reactions may also affect the performance of the plastic piping system.

Significant changes may occur. These physical or chemical changes can also be caused by the internal and external stresses of the pipes, fittings, sheets, or valves used to transport the product.

It varies depending on the individual.

Stress refers to the stress per unit area caused by internal or external factors (such as temperature, changes, internal pressure, bending, and internal stress).

While cracking can occur, it can also induce cracking in products subjected to stress; this phenomenon is called environmental stress cracking. GB/T 43316 (all parts) establishes...

A method has been developed to evaluate the environmental stress cracking susceptibility of materials. This method can also be used to evaluate the environmental stress cracking resistance of polyolefin pipes.

GB/T 19279.

GB/T 11547 provides a test procedure applicable to the evaluation of chemical resistance of various plastic materials, but this method is not specific to thermoplastics.

Evaluation methods for pipes, fittings, sheets/plates, and valve components. Because the application conditions of plastic piping systems vary greatly, how to evaluate them...

It is very important to use simple and direct testing methods to make a preliminary judgment on its chemical resistance.

GB/T 48043 "Preliminary evaluation of chemical resistance of thermoplastic piping systems" is proposed to include the following 5 parts.

---Part 1: Test Methods. The aim is to establish preliminary methods for the chemical resistance of plastic pipes and their components.

---Part 2: Polyolefin Pipes and Components. The aim is to establish grading criteria and preliminary assessment of the chemical resistance of polyolefin pipes and components.

Evaluation methods.

---Part 3: Rigid Polyvinyl Chloride (PVC-U), High-Impact Polyvinyl Chloride (PVC-HI), Modified Polyvinyl Chloride (PVC-M), Oriented Polyvinyl Chloride Polyvinyl chloride (PVC-O) and chlorinated polyvinyl chloride (PVC-C) pipes and components. The purpose is to establish the pipes and components made of the aforementioned materials.

Grading criteria and preliminary evaluation methods for the chemical resistance of components.

---Part 4: Fluoropolymer Pipes and Components. The aim is to establish a classification standard for the chemical resistance of pipes and components made of the above materials.

Then and preliminary evaluation methods.

---Part 5: Rigid Polyamide (PA-U) Pipes and Components. The purpose is to establish the chemical resistance of pipes and components made of the above materials.

Grading criteria and preliminary evaluation methods.

This document is Part 1 of GB/T 43316 and is applicable to pipes, fittings, plates/sheets, or valve components manufactured under no-pressure or no-stress conditions (e.g., not subject to pressure).

This provides preliminary information on the suitability of transporting chemical media under soil loading, no dynamic stress, and internal stress conditions. The above evaluation results are applicable to pipe...

S (resistance to corrosion), L (limited resistance to corrosion), NS (not resistant to corrosion). Evaluation results for some plastics can be found in ISO/T R10358.

The above preliminary evaluation results are relatively reliable when the pipe wall stress is not high. However, if the pipe or fittings show preliminary chemical resistance to a certain substance...

The evaluation result is S or L. To further evaluate its chemical resistance when delivering the substance under pressure or other stresses, it is necessary to conduct further research.

Further testing, such as in the case of conveying pressurized fluids, can be performed using applicable test methods such as DIN 16463 to determine the effect of the chemical medium on the fluid.

The influence of long-term hydrostatic pressure strength on pressure plastic pipes.

This document does not take into account the effects of chemical media on the fatigue strength, impermeability, and resistance to rapid gas depressurization of the piping system.

Chemical resistance of thermoplastic piping systems Preliminary Evaluation Part 1: Test Methods Warning---Personnel using this document should have practical experience working in a formal laboratory. This document does not address all possible safety issues.