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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 17037.5-2020

Plastics. Injection moulding of test specimens of thermoplastic materials - Part 5: Preparation of standard specimens for investigating anisotropy

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Foreword

GB/T 17037 "Preparation of Injection Molding Specimens of Plastic Thermoplastic Materials" is divided into 5 parts:

---Part 1: General principles and preparation of multi-purpose specimens and long strip specimens;

---Part 2: Small tensile specimen;

---Part 3: Small square test piece;

---Part 4: Determination of mold shrinkage;

---Part 5: Preparation of standard samples for anisotropy evaluation:

This part is Part 5 of GB/T 17037:

This section was drafted in accordance with the rules given in GB/T 1:1-2009:

This part uses the redrafting method to amend and adopt ISO 294-5:2017 ``Preparation of Plastic Thermoplastic Material Injection Specimen No: 5

Part: Preparation of Standard Samples for Anisotropy Evaluation:

The technical differences between this part and ISO 294-5:2017 and the reasons are as follows:

---Regarding normative reference documents, this section has made adjustments with technical differences to adapt to my country's technical conditions and adjustments:

The situation is collectively reflected in Chapter 2 "Normative Reference Documents", and the specific adjustments are as follows:

* Replace ISO 294-1:2017 with GB/T 17037:1-2019 which is modified to adopt international standards;

* Replace ISO 20753:2018 with GB/T 37426-2019, which is modified to adopt international standards:

This part was proposed by the China Petroleum and Chemical Industry Federation:

This part is under the jurisdiction of the National Plastics Standardization Technical Committee (SAC/TC15):

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Introduction

Reinforced and self-reinforced thermoplastic injection molding materials have a very wide range of uses, including safety-related uses: In the material injection

During the process, the reinforcing fibers are preferentially arranged according to the flow direction of the melt, not perpendicular to the flow direction of the melt: This preferential arrangement makes the molded thermoplastic

Plastics are unbalanced in performance, so the strength and stiffness in the melt flow direction where a large number of reinforcing fibers are arranged will be higher than that of a small number of reinforcing fibers:

The dimensional arrangement perpendicular to the direction of melt flow has high strength and rigidity: This difference in performance is the anisotropy of thermoplastic materials

Sex: For this reason, the actual strength of the injection molding material may be lower than the expected or designed strength: To help designers understand

The potential strength of plastic materials, knowing the anisotropy of injection molding material performance is very valuable:

Research during the formulation of this standard shows that the same fiber arrangement is not shown in the cross section of the thickness of the injection molded sample, and the fiber is preferentially arranged:

The skin layer is listed in the molding filling direction, while the core layer has almost no oriented fibers (for example, no preferential arrangement): The amount of ordered fibers (thickness of the skin)

The ratio of degree) to the amount of unoriented fibers (core layer thickness) in the cross section is affected by the thickness of the sample and the filling speed such as the average injection rate:

The proportion of ordered fibers in thicker samples is less than that in thinner samples: Lower mold filling speed results in a thicker skin of ordered fibers

Floor: Therefore, in order to obtain meaningful data about the molding design, the researcher should prepare the sample with the largest anisotropic characteristic, because this

These data best represent the upper and lower limits of the composite structure: Since the thickness of the sample and the injection rate have a significant effect on the final anisotropy,

This section is only used to obtain useful information in the molding design, not for quality control tests of plastic materials:

From:2010 to:2013, the working group of the ISO 294-5 standard adopted in this section conducted adjustments to more than 10 raw material suppliers around the world:

The investigation clearly shows that in order to prepare a plate with a suitable degree of anisotropy, a non-square plate shape is required to ensure that the fibers flow in the melt:

Orientation in the direction: Under the conditions of this study, a rectangular plate specimen with a size of 120mmx80mmx2mm was used to obtain the highest

The anisotropy: It can be considered that the rectangular plate-shaped sample over 120mm will at least show good results: Square plate specimen (e:g:

80mmx80mmx2mm, or even 150mmx150mmx2mm) sometimes produce some problems that have nothing to do with size: this research

In any case, the 90mmx80mmx2mm rectangular plate shape specified in the previous edition of the ISO 294-5 standard adopted in this part

None of the samples showed good effects:

Preparation of Injection Molding Specimen of Plastic Thermoplastic Materials

Part 5: For anisotropy assessment

Preparation of standard samples

1 Scope

This part of GB/T 17037 specifies the mold (Type F GB /ISO) used to inject rectangular plate-shaped specimens to obtain single-point and multi-point data:

Mold), the minimum sample size is >=90mmx80mm, the preferred size is 120mmx80mm,

and the preferred thickness is 2mm: Found

This size sample can provide the largest anisotropic properties, and only has a slight sensitivity to the injection rate: The use of a two-cavity mold is preferred:

For the design of plastic parts, this will provide upper and lower limits for tensile properties: Due to the anisotropy of mold filling rate and part geometry

Due to the impact of performance, it is not appropriate to match the thickness of the injection molded sample to the thickness of the given part:

The study of material anisotropy is used to guide mold design rather than a method of quality control:

In the thermoplastic injection molding process, the flow of molten polymer can affect the orientation or polymerization of similar fillers such as glass fibers:

The orientation of the material chain, which will lead to the anisotropy of the material:

In this section, the flow direction is defined as the direction from the gate to the distal end of the mold cavity, and the transverse direction refers to the direction perpendicular to the flow direction:

The F-type GB /ISO mold is not used to replace the D-type mold prepared by measuring the shrinkage rate of thermoplastic plastics:

This section applies to the preparation of reproducible rectangular plate-shaped specimens by injection molding of thermoplastic materials:

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 article

Pieces: For undated references, the latest version (including all amendments) applies to this document:

GB/T 17037:1-2019 Preparation of injection molded specimens of plastic thermoplastic materials Part 1: General principles and multi-purpose tests

Preparation of samples and long strip samples (ISO 294-1:2017, MOD)

GB/T 37426-2019 plastic sample (ISO 20753:2018, MOD)

3 Terms and definitions

The terms and definitions defined in GB/T 17037:1-2019 apply to this document:

Note: ISO and IEC use the following website to maintain terminology databases: