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Plastics moulded parts - Tolerances and acceptance conditions

塑料模塑件 公差和验收条件

(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 modified to adopt ISO 20457:2018 "Tolerances and acceptance criteria for molded plastic parts".

This document has undergone the following structural adjustments compared to ISO 20457:2018.

---Note 3 in section 6.2 corresponds to note in ISO 20457:2018;

---Appendices B to H correspond to Appendices A to G in ISO 20457:2018.

This document differs significantly from ISO 20457:2018. The relevant clauses are indicated in vertical single lines on the blank pages outside the relevant sections.

The lines (I) are marked. A summary of these technical differences and their reasons is provided in Appendix A.

The following editorial changes have been made to this document.

---ISO 17450-1 (see 3.1, 7.1.1) has been replaced by GB/T 24637.1 (reference standard);

---ISO 17450-2 and ISO 17450-3 have been replaced with GB/T 24637.2 and GB/T 24637.3 (see GB/T 24637.2 for reference purposes).

---In ISO 20457:2018, note 3, change "see ISO 17450" to "see GB/T 38762.1-2020", and change the source to...

"GB/T 38762.1-2020, 3.4, with modifications" (see 3.2);

---The titles of Figures 2 and 3 have been updated with the symbols "y" and "x". In Figure 2,

the dimension label has been changed from "x" to "y" (see 7.1.1);

---Added Appendix A (informative) "Technical differences between this document and ISO 20457:2018 and the reasons thereof".

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 Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Plastics Standardization (SAC/TC15).

Introduction

Compared to metals, plastics have higher deformability and lower rigidity, resulting in greater dimensional and shape deviations during the manufacturing of plastic molded parts.

Large, therefore, in order to economically manufacture molded parts while meeting functional requirements, during molding applications and/or molding processes (such as injection molding) Molding, compression molding, rotational molding), with relatively low precision requirements related to dimensional accuracy, and the evaluation of geometric tolerances of plastic molded parts and the quantification cannot be consistent with that of metallic materials, which is why this document was developed.

Due to the unique properties of plastics, it is necessary to consider the three different size reference grades defined in Appendix B, and to take into account the main influencing factors.

To be determined.

The following are the preferred steps to ensure effective collaboration when designing and developing plastic molded parts.

a) Designers of plastic molded parts determine the tolerances that meet the functional requirements based on application requirements, including function, operating environment, and assembly requirements.

Require.

b) To avoid unrealistic tolerances, plastic molding manufacturers must confirm that the selected manufacturing processes and raw material types meet the requirements.

Design tolerances must be met; otherwise, it will adversely affect economic or production efficiency. Tolerances with functional requirements are specified in the design document.

Defined in the document.

c) The design documents provide tolerance requirements to meet functional needs, thus

providing a basis for determining the molding shrinkage rate. This also avoids...

The inability to meet functional tolerances results in excessive scrap and high costs. After the order is placed, the plastic mold...

The plastic parts manufacturer and the mold manufacturer or mold designer agree on the calculated value of the molding shrinkage rate, and if necessary, consult with the material supplier.

Negotiate with the supplier.

The dimensional control of plastic molded parts is mainly affected by the material, design, cavity layout, and processing technology.

In addition, other factors, including anisotropy, uneven wall thickness, and uneven cooling rates leading to warping/deformation and mold filling conditions, can also affect the mold.

Dimensions, integrity of molded plastic parts, and mechanical properties. Due to these factors and the complexity of polymer materials, their standardization is more stringent than that of traditional materials such as metals.

The materials are more complex. The dimensions of molded plastic parts may deviate due to unavoidable process factors. The procedures for handling these deviations depend on Whether the dimensional tolerance affects its normal use and the function of the plastic molded part shall be subject to the contract agreement.

---Eliminate deviations by optimizing the design (optimizing reinforcing ribs, material thickness, molding process, etc.).

--- Reduce deviations by optimizing the processing technology and procedures (such as extending the cooling cycle).

---Accepting the concession.

Concessionary acceptance requires the corresponding documentation, including drawing changes, manufacturing deviation documents, or updated reference plastic molded parts.

Note 1: Reduce process-related deviations by effectively designing plastic molded parts and optimizing production processes.

Note 2: Traditional tolerance calculations are based on rigid bodies and are not applicable to plastic molded parts in most cases.

Tolerances and acceptance criteria for plastic molded parts

1 Scope

This document specifies the manufacturing tolerances and acceptance conditions for plastic molded parts (hereinafter referred to as "molded parts").