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**Geometrical product specifications  
(GPS) — Dimensional and geometrical  
tolerances for moulded parts —**

**Part 2:  
Rules**

*Spécification géométrique des produits (GPS) — Tolérances  
dimensionnelles et géométriques des pièces moulées —*

*Partie 2: Règles d'utilisation*

Please see the administrative notes on page iii

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This draft Technical Specification is hereby submitted to a parallel three-month P-member vote in the ISO/TC concerned and three-month vote in CEN.

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 8062-2 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO/TS 8062-2, together with ISO 8062-1 and ISO 8062-3, cancels and replaces ISO 8062:1994, of which it constitutes a technical revision.

ISO 8062 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts*:

- *Part 1: Vocabulary*
- *Part 2: Rules* [Technical Specification]
- *Part 3: General dimensional and geometrical tolerances and machining allowances for castings*

## Introduction

This part of ISO 8062 is to be regarded as a complementary process-specific tolerance geometrical production specification (GPS) standard (see ISO/TR 14638). It influences chain links 1, 2 and 3 of the chain of standards on mouldings.

For more detailed information about the relation of this part of ISO 8062 to other standards and the GPS matrix model, see Annex F.

This part of ISO 8062 takes into account experiences with the application of previous standards (e.g. ISO 8062:1994, ASME Y14-8M:1996, and ISO 1101).

The tolerancing methods in this part of ISO 8062 are not yet fully developed within the new approach of geometrical product specifications (GPS) according to ISO 17450. The requirements for castings (mainly due to the uncertainty in the calculation of the shrinking of the casting) remain incompatible with the GPS standards. Therefore, this Technical Specification has been issued in order to gather further experience in the tolerancing of castings.

It is intended that the next version of this document include more realistic ways of calculating the nominal dimension  $d_C$  of the final moulded part by elaborating GPS-conformant ways of combining linear dimensions and tolerance zones.

This document is intended to cover all types of moulded parts. However, most of the examples refer to castings.

When the methods of this part of ISO 8062 are used in 3D models, provisions have to be made in order to distinguish between theoretically exact dimensions (TEDs) and linear and angular dimensions with plus/minus tolerances.

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# Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts —

## Part 2: Rules

### 1 Scope

This part of ISO 8062 gives the rules for geometrical dimensioning and tolerancing of final moulded parts and parts machined out of moulded parts. It also gives rules and conventions for the indications of these requirements in technical product documentation and specifies the proportions and dimensions of the graphical symbols to be used.

This part of ISO 8062 provides symbols which may be used to identify the relative completeness of the moulded features and parts. These graphical symbols should not be confused with the graphical symbols for surface texture according to ISO 1302, which are notably larger.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 129-1, *Technical drawings — Indication of dimensions and tolerances — Part 1: General principles*

ISO 406, *Technical drawings — Tolerancing of linear and angular dimensions*

ISO 1101:2004, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 2692, *Geometrical product specifications (GPS) — Geometrical tolerancing — Maximum material requirement (MMR), least material requirement (LMR) and reciprocity requirement (RPR)*

ISO 5458, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Positional tolerancing*

ISO 5459, *Geometrical product specifications (GPS) — Geometrical tolerancing — Datums and datum-systems*

ISO 7083, *Technical drawings — Symbols for geometrical tolerancing — Proportions and dimensions*

ISO 8015, *Technical drawings — Fundamental tolerancing principle*

ISO 8062-1, *Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts — Part 1: Vocabulary*

ISO 8062-3:2007, *Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts — Part 3: General dimensional and geometrical tolerances and machining allowances for castings*

ISO 10135, *Geometrical product specifications (GPS) — Drawing indications for moulded parts in technical product documentation (TPD)*

ISO 10578, *Technical drawings — Tolerancing of orientation and location — Projected tolerance zone*

ISO 10579, *Technical drawings — Dimensioning and tolerancing — Non-rigid parts*

ISO 13715, *Technical drawings — Edges of undefined shape — Vocabulary and indications*

ISO 14660-1, *Geometrical Product Specifications (GPS) — Geometrical features — Part 1: General terms and definitions*

ISO/TR 16570, *Geometrical Product Specifications (GPS) — Linear and angular dimensioning and tolerancing: +/- limit specifications — Step dimensions, distances, angular sizes and radii*

ISO 81714-1, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8062-1, ISO 1101, ISO 5459, ISO 14660-1 and the following apply.

#### 3.1

##### **moulded feature**

⟨of a moulded part⟩ feature which has not been machined on a moulded part

#### 3.2

##### **intermediate machined feature**

⟨of a moulded part⟩ feature of a moulded part which has undergone machining and which subsequently will be machined to its final condition

NOTE 1 An intermediate machined feature is typically a roughly machined **moulded feature** (3.1).

NOTE 2 An intermediate machined feature can be used as a datum for subsequent machining of the moulded part.

#### 3.3

##### **final machined feature**

⟨of a moulded part⟩ feature of a moulded part which has been machined to its final condition

#### 3.4

##### **final moulded part**

moulded part after fettling

NOTE A final moulded part only consists of features which are moulded and have not been finished except by fettling.

**3.5****intermediate machined moulded part**

moulded part which has undergone some machining and which subsequently will be machined further

NOTE 1 An intermediate machined moulded part consists of at least one **moulded feature** (3.1) to be subsequently machined or at least one **intermediate machined feature** (3.2) and

— moulded features not to be machined (if any) and

— **final machined features** (3.3) (if any).

NOTE 2 An intermediate moulded part can be produced from a final moulded part or from another intermediate moulded part.

**3.6****final machined moulded part**

moulded part which has been machined to its final condition

NOTE 1 A final machined moulded part consists of **final machined features** (3.3) and can include **moulded features** (3.1) not to be machined. A final machined moulded part cannot include **intermediate machined moulded features**.

NOTE 2 A final machined moulded part can be produced from a **final moulded part** (3.4) or from an **intermediate machined moulded part** (3.5).

**3.7****moulded-part condition**

manufacturing stage of a moulded part

NOTE 1 Listed in chronological order of manufacturing, a moulded part can be in **final moulded-part** (3.4) condition, **intermediate machined moulded-part** (3.5) condition or **final machined moulded-part** (3.6) condition.

NOTE 2 Only one final moulded-part condition exists.

NOTE 3 Various intermediate machined moulded-part conditions can exist.

NOTE 4 Only one final machined moulded-part condition can exist.

NOTE 5 A moulded part does not need to exist in an intermediate machined moulded-part condition before the final machined moulded-part condition.

NOTE 6 Heat treatment or straightening (correction of unintended distortion) can be carried out in any moulded-part condition.

**3.8****single drawing**

(of a moulded part) drawing of a moulded part giving requirements for one moulded-part condition only

**3.9****combined drawing**










(of a moulded part) drawing of a moulded part giving requirements for more than one moulded-part condition

## 4 Symbols

Table 1 — Letter symbols used in this document

Term, quantity	Letter symbol
Required machining allowance	$A_{RMA}$
Nominal dimension of the final moulded part	$d_C$
Nominal dimension of the final machined moulded part	$d_M$
Dimensional or size tolerance	$t_D$
Machining tolerance	$t_M$
Dimensional tolerance for the final machined moulded part	$t_{DMT}$
Form tolerance	$t_F$
Form tolerance for the final machined moulded part	$t_{FMT}$
Form tolerance for the final moulded part	
Specific form tolerance of geometrical casting tolerance (GCT) for the final moulded part (casting)	$t_{FCT}$
Casting form tolerance	
Dimensional tolerance for the final moulded part (casting)	$t_{DCT}$
Geometrical tolerance for the final moulded part (casting)	$t_{GCT}$
Cutting depth for machining	$c$
Parallelism tolerance for the final moulded part (casting)	$t_{PARC}$
Flatness tolerance for the final moulded part (casting)	$t_{FLAC}$
Casting tolerance	$t_C$
Positional tolerance	$t_{POS}$
Inclination contribution value	$c_{inclin}$
Length of datum	$l_d$
Length of tolerated feature	$l_t$
Surface profile tolerance	$t_{PROF}$
Maximum material virtual size	$S_{MMVS}$
Least material virtual size	$S_{LMVS}$

Table 2 — Graphical symbols used in this part of ISO 8062

Name of symbol	Graphical symbol	Clause	Reference document
Drawing identifier for final moulded part		6.2	ISO/TS 8062-2
Drawing identifier for intermediate machined moulded part		6.3	ISO/TS 8062-2
Drawing identifier for final machined moulded part		6.4	ISO/TS 8062-2
Identifier for machining by the supplier		6.5	ISO/TS 8062-2
Part condition identifier for final moulded part		7.2	ISO/TS 8062-2
Part condition identifier for intermediate machined moulded part		7.2	ISO/TS 8062-2
Part condition identifier for final machined moulded part		7.2	ISO/TS 8062-2
Surface texture — removal of material not permitted		7.1.2	ISO 1302
Surface texture — removal of material required		7.1.3	ISO 1302

See Annex A for the proportions and dimensions of the graphical symbols referenced in this part of ISO 8062.

## 5 Designation on drawings

When drawing indications according to this part of ISO 8062 apply, the drawing shall be designated in or near the drawing title block:

### ISO/TS 8062-2

However, this reference is superfluous if general tolerances or required machining allowances according to other parts of ISO 8062 are referenced.

## 6 Drawing type indicator

### 6.1 Single and combined drawings

The requirements for the three types of moulded-part conditions (final moulded, intermediate and final machined) can be specified on a combined drawing or separately on single drawings as appropriate.

If a combined drawing for a complex casting becomes too difficult to read, it is recommended to use single drawings.

Information, as to which part condition or conditions the stated specifications on the drawing apply, shall be indicated on the drawing in accordance with the following clauses; therefore, on combined drawings, all part conditions to which the drawing applies shall be stated.

On combined drawings, only the outline of the most advanced part condition for which the drawing is valid shall be illustrated. Requirements for the most advanced condition and for the preceding moulded-part condition in question shall be stated.