

---

---

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

**Part 3:  
General dimensional and geometrical  
tolerances and machining allowances  
for castings using  $\pm$  tolerances for  
indicated dimensions**

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

*Partie 3: Tolérances dimensionnelles et géométriques générales  
et surépaisseurs d'usinage pour les pièces moulées utilisant des  
tolérances  $\pm$  pour les dimensions indiquées*



This document is a preview generated by EUS



# **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword.....	iv
Introduction.....	vi
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>2</b>
<b>4 Abbreviated terms.....</b>	<b>3</b>
<b>5 Taper.....</b>	<b>3</b>
<b>6 Draft angles (taper).....</b>	<b>4</b>
<b>7 Tolerance grades.....</b>	<b>7</b>
7.1 General.....	7
7.2 Dimensional casting tolerance grades (DCTG).....	7
7.3 Geometrical casting tolerance grades (GCTG).....	9
7.3.1 General.....	9
7.3.2 Nominal dimensions.....	9
7.3.3 Datums.....	9
<b>8 Surface mismatch (SMI).....</b>	<b>12</b>
<b>9 Wall thickness.....</b>	<b>12</b>
<b>10 Required machining allowances (RMA).....</b>	<b>12</b>
10.1 General.....	12
10.2 Required machining allowance grades (RMAG).....	13
<b>11 Indication on drawings.....</b>	<b>13</b>
11.1 Indication of general DCTs.....	13
11.2 Indication of machining allowances.....	14
11.3 Indication of geometrical casting tolerances (GCTs).....	14
<b>12 Rejection.....</b>	<b>15</b>
<b>Annex A (informative) Dimensional and geometrical tolerances for castings.....</b>	<b>16</b>
<b>Annex B (informative) Required machining allowance grades (RMAG).....</b>	<b>19</b>
<b>Annex C (informative) Concept of general tolerancing of characteristics.....</b>	<b>20</b>
<b>Annex D (informative) Datums for general geometrical tolerances.....</b>	<b>22</b>
<b>Annex E (informative) Application of general geometrical tolerances for castings.....</b>	<b>26</b>
<b>Annex F (informative) Relation to the GPS matrix model.....</b>	<b>33</b>
<b>Bibliography.....</b>	<b>34</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 190, *Foundry technology*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 8062-3:2007), which has been technically revised. It also incorporates the Technical Corrigendum ISO 8062-3:2007/Cor 1:2009.

The main changes are as follows:

- clarified in title and scope that this document specifies general dimensional and geometrical tolerances as well as machining allowance grades for castings using  $\pm$  tolerances for indicated dimensions;
- definitions for the terms “draft angle”, “external draft value” and “internal draft angle” have been added;
- [Clause 4](#) and [Clause 5](#), including [Tables 2](#) to [6](#), have been added and subsequent clauses and tables have been renumbered;
- in [Table 7](#) the linear dimensional casting tolerance grade DCTG 16 has been changed to DCTG 15wt to clarify the concept of wall thickness;
- the nominal dimension to be used in the tables indicating casting tolerances for straightness, flatness, roundness, parallelism, perpendicularity, symmetry and coaxiality ([Tables 8](#) to [11](#)) has been changed;
- [Clause 12](#) on rejection has been clarified;
- the correction according to ISO 8062-3:2007/Cor 1:2009 has been added in [Table A.3](#), footnote b;
- the examples given in [Annex E](#) have been corrected;

— inconsistencies have been clarified.

A list of all parts in the ISO 8062 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is a geometrical product specification (GPS) standard and is regarded as a complementary process-specific tolerance standard (see ISO 14638). It influences chain links A and B on size and A, B and C on distance in the ISO GPS standards matrix model (see [Annex F](#)) but is not in full accordance with the ISO GPS rules.

For more detailed information on the relation of this document to other standards and the GPS matrix model, see [Annex F](#).

This document defines a system of tolerance grades and machining allowance grades for cast metals and their alloys. Guidance on its application is given in ISO/TS 8062-2.

It is noted that the dimensional specifications introduced by the application of this document can be ambiguous when applied to a dimension which is not a size (see ISO 14405-2).

The tolerances specified for a casting may determine the casting method. It is therefore recommended, before the design or the order is finalized, that the customer liaises with the foundry to discuss:

- a) the proposed casting design and accuracy required;
- b) machining requirements;
- c) moulding method, for example with or without core;
- d) location of the parting surfaces and the necessary draft angles;
- e) the number of castings to be manufactured;
- f) the casting equipment involved;
- g) the consequences of the equipment wearing out during its life cycle;
- h) datum system according to ISO 5459;
- i) casting alloy;
- j) any special requirements, for instance individual dimensional and geometrical tolerances, fillet radii, tolerances and individual machining allowances;

NOTE Tolerance grades which can be achieved for various methods and metals are described in [Annex A](#), because dimensional and geometrical accuracy of a casting is related to production factors.

- k) dimensional tolerances for long series and mass production, where development, adjustment and maintenance of casting equipment make it possible to achieve close tolerances;
- l) dimensional tolerances for short series and single production;
- m) geometrical tolerances.

Information on typical required machining allowance grades is given in [Annex B](#).

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

## Part 3:

## General dimensional and geometrical tolerances and machining allowances for castings using $\pm$ tolerances for indicated dimensions

### 1 Scope

This document specifies general dimensional and geometrical tolerances as well as machining allowance grades for castings using  $\pm$  tolerances for indicated dimensions as delivered to the purchaser according to ISO/TS 8062-2. It is applicable for tolerancing of dimensions and geometry of castings in all cast metals and their alloys produced by various casting manufacturing processes.

This document does not apply to 3D CAD models used without indicated dimensions.

This document applies to both general dimensional and general geometrical tolerances (referred to in or near the title block of the drawing), unless otherwise specified and where specifically referred to on the drawing by one of the references in [Clause 11](#).

The dimensional tolerances covered by this document are tolerances for linear dimensions.

The geometrical tolerances covered by this document are tolerances for:

- straightness;
- flatness;
- roundness;
- parallelism;
- perpendicularity;
- symmetry;
- coaxiality.

This document does not cover other position tolerances, angular dimensional tolerances or cylindricity tolerances.

This document can be used for the selection of tolerance values for individual indications.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 product documentation (TPD) — Presentation of dimensions and tolerances — Part 1: General principles*

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 1302,<sup>1)</sup> *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

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

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

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

ISO 10579, *Geometrical product specifications (GPS) — Dimensioning and tolerancing — Non-rigid parts*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1101, ISO 5459, ISO 8062-1 and ISO 10135 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1 draft angle taper

value of inclination (angle) that is added to a geometrical feature of a pattern or mould to ensure the removal of the pattern or moulded part from the mould

#### 3.2 external draft value

*draft angle* (3.1) on a surface that has no opposite surface in the direction outward of the part

Note 1 to entry: See [Figure 1](#).

#### 3.3 internal draft angle

*draft angle* (3.1) on a surface that has an opposite surface in the direction outward of the part

Note 1 to entry: See [Figure 1](#).

---

1) Cancelled and replaced by ISO 21920-1.