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# International Standard



# 8062

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Castings — System of dimensional tolerances

*Pièces moulées — Système de tolérances dimensionnelles*

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8062 was prepared by Technical Committee ISO/TC 3,  
*Limits and fits.*

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# Castings — System of dimensional tolerances

## 0 Introduction

This International Standard relates to a system of tolerances for cast metals and their alloys.

The tolerance specified for a casting may determine the method of casting. It is therefore recommended, before the design or the order is finalized, for the customer to liaise with the foundry to discuss

- a) the proposed casting design and accuracy required;
- b) machining requirements;
- c) method of casting;
- d) the number of castings to be manufactured; [ISO 8062:1984](https://standards.iteh.ai/catalog/standards/sist/c80a0eb8-a0a2-4a82-aa0e-5bf45d960a3b/iso-8062-1984)
- e) the casting equipment involved; <https://standards.iteh.ai/catalog/standards/sist/c80a0eb8-a0a2-4a82-aa0e-5bf45d960a3b/iso-8062-1984>
- f) any special requirements, for instance, datum target systems.

Because the dimensional accuracy of a casting is related to production factors, tolerances which can be achieved for various methods and metals are described in the annex for

- a) long series and mass production, where development, adjustment and maintenance of casting equipment make it possible to achieve close tolerances;
- b) short series and single production.

## 1 Scope and field of application

This International Standard specifies a system of tolerances for the dimensions of castings. It is applicable to the dimensions of cast metals and their alloys produced by sand moulding, gravity die casting, low pressure die casting, high pressure die casting and investment casting.

This International Standard applies both to general tolerances given on a drawing and to individual and particular tolerances which are shown immediately following a specific dimension (see clause 9).

It applies where the casting producer provides the pattern equipment or accepts responsibility for proving it.

## 2 References

ISO 1101, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

ISO 5459, *Technical drawings — Geometrical tolerancing — Datums and datum-systems for geometrical tolerances.*

## 3 Basic dimensions

The basic dimensions given in this International Standard refer to the dimensions of a raw casting before machining (see figure 1). The necessary machining allowances are therefore included (see figure 2).

## 4 Tolerances

There are 16 tolerance grades, designated CT1 to CT16 (see table 1 and figure 3).

NOTE — Values are not given for grades CT 1 and CT 2; these are reserved for finer values which may be required in the future.

## 5 Mismatch

Mismatch shall lie within the tolerance shown in table 1. When it is important to restrict further the value of mismatch, it shall be stated on the drawing (see clause 9), and shall lie within the tolerances shown in table 1 or table 2 whichever is smaller (see figure 4). This value shall not be added to that given in table 1.

## 6 Wall thickness

Unless otherwise specified the tolerance for wall thickness in grades CT3 to CT15 will be one grade coarser than the general tolerance for other dimensions; for example, if there is a general tolerance on a drawing of CT10, the tolerance on wall thicknesses will be CT11.

## 7 Tolerances on tapered features

Where a design requires a tapered feature, the tolerance shall be applied symmetrically along the surface (see figure 5).

**8 Position of tolerance zone**

The tolerance zone, unless otherwise stated, is to be symmetrically disposed with respect to a basic dimension, i.e. with one half on the positive side and one half on the negative side (see figure 3). However, when agreed by both manufacturer and purchaser for specific reasons, the tolerance zone may be asymmetric, i.e. on either the positive or negative side.

"General tolerances ISO 8062-CT16", or

b) if further restriction of the mismatch is required (see clause 5), for example

"General tolerances ISO 8062-CT16 maximum mismatch 2,5", and/or

c) following the basic dimension, in millimetres, for example,

"95 ± 1,1"

**9 Indication of casting tolerances on drawings**

Tolerances according to this International Standard shall be stated on the drawing in the following ways :

Dimensions for which general tolerances are not suitable shall be allocated individual tolerances. These may be finer or coarser than the general tolerances which would normally be applied to the basic dimensions, but the particular values should be chosen from table 1.

a) with general information relating to tolerances, for example,

**Table 1 – Casting tolerances**

Raw casting basic dimension mm		Total casting tolerance <sup>1)</sup> mm															
		Casting tolerance grade CT															
over	up to and including	12)	22)	3	4	5	6	7	8	9	10	11	12	13	14	15	16
—	10			0,18	0,26	0,36	0,52	0,74	1,0	1,5	2,0	2,8	4,2	—	—	—	—
10	16			0,20	0,28	0,38	0,54	0,78	1,1	1,6	2,2	3,0	4,4	—	—	—	—
16	25			0,22	0,30	0,42	0,58	0,82	1,2	1,7	2,4	3,2	4,6	6	8	10	12
25	40			0,24	0,32	0,46	0,64	0,90	1,3	1,8	2,6	3,6	5,0	7	9	11	14
40	63			0,26	0,36	0,50	0,70	1,0	1,4	2,0	2,8	4,0	5,6	8	10	12	16
63	100			0,28	0,40	0,56	0,78	1,1	1,6	2,2	3,2	4,4	6	9	11	14	18
100	160			0,30	0,44	0,62	0,88	1,2	1,8	2,5	3,6	5,0	7	10	12	16	20
160	250			0,34	0,50	0,70	1,0	1,4	2,0	2,8	4,0	5,6	8	11	14	18	22
250	400			0,40	0,56	0,78	1,1	1,6	2,2	3,2	4,4	6,2	9	12	16	20	25
400	630				0,64	0,90	1,2	1,8	2,6	3,6	5	7	10	14	18	22	28
630	1 000					1,0	1,4	2,0	2,8	4,0	6	8	11	16	20	25	32
1 000	1 600						1,6	2,2	3,2	4,6	7	9	13	18	23	29	37
1 600	2 500							2,6	3,8	5,4	8	10	15	21	26	33	42
2 500	4 000								4,4	6,2	9	12	17	24	30	38	49
4 000	6 300									7,0	10	14	20	28	35	44	56
6 300	10 000										11	16	23	32	40	50	64

1) See clause 8.

2) See note to clause 4.

**NOTES**

1 For wall thicknesses in grades CT3 to CT15, one grade coarser applies (see clause 6).

2 For sizes up to 16 mm, general tolerances from CT13 to CT16 are not available. For these sizes individual tolerances shall be indicated.

**Table 2 – Mismatch**

Tolerance grade CT	Mismatch <sup>1)</sup> mm
3 and 4	Within tolerance in table 1
5	0,3
6	0,5
7 and 8	0,7
9 and 10	1,0
11 to 13	1,5
14 to 16	2,5

1) These values shall not be added to those given in table 1.

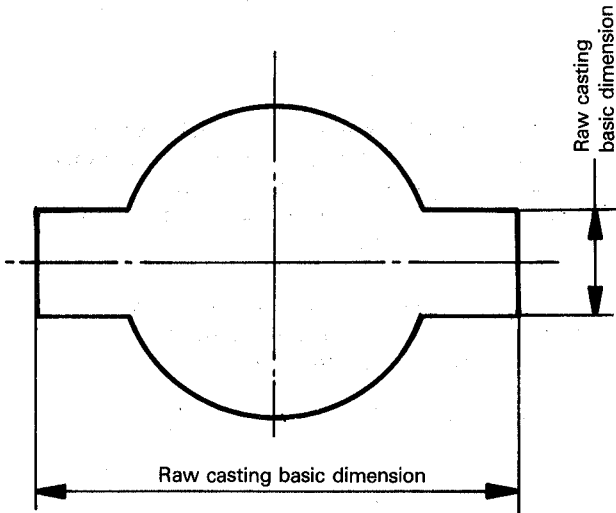


Figure 1 — Drawing indications (see clause 3)

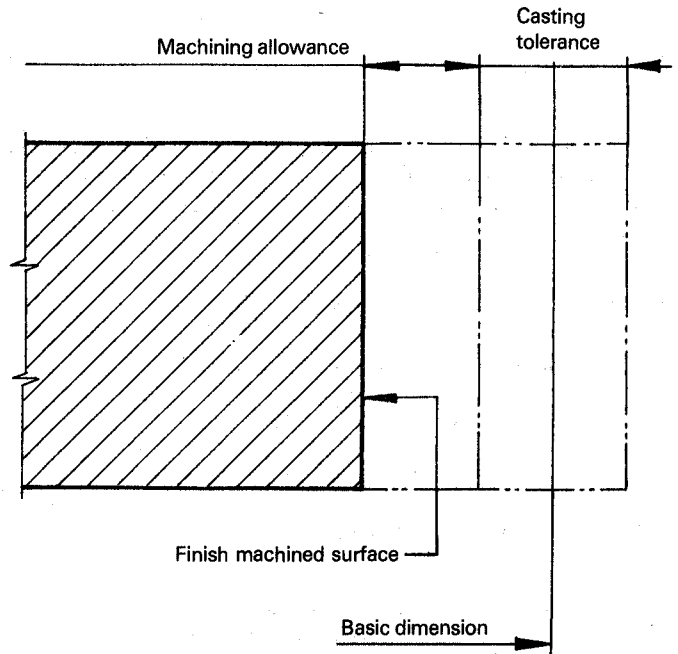


Figure 2 — Relationship of component with machining allowance showing the tolerance symmetrically disposed about the basic dimension

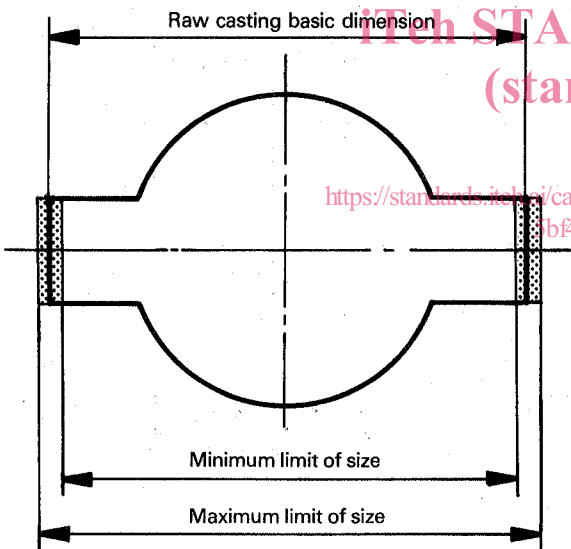


Figure 3 — Tolerance limits

NOTE — Any mismatch shall lie within the limits of size shown (see clauses 3, 4 and 5).

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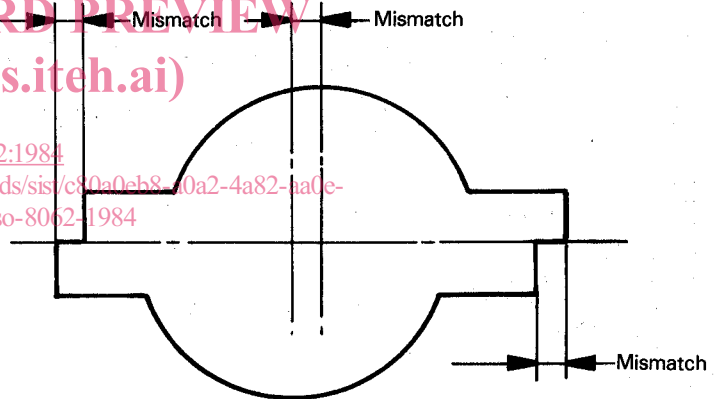


Figure 4 — Examples of mismatch (see clause 5)

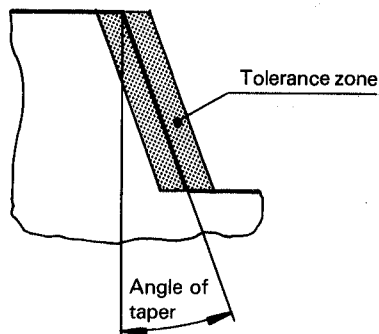


Figure 5 — Tapered feature (see clause 7)

## Annex

**A.1** Table 3 shows tolerances which can normally be expected in casting processes. As indicated in clause 0, the accuracy of a casting process is dependent upon many factors including

- a) complexity of the design;
- b) type of pattern equipment or dies;
- c) the metal or alloy concerned;
- d) the condition of patterns or dies;
- e) the foundry working methods.

For long series of repetition work it may be possible to make adjustments and to control core positions carefully to achieve closer tolerances than those indicated in table 3.

**A.2** For short production series and for single castings, it is generally impractical and uneconomic to use metal patterns and to develop equipment and casting procedures resulting in close tolerances. The wider tolerances for this class of manufacture are shown in table 4.

**A.3** Tolerances in table 1 are based on foundry data from a number of countries. These data were used to construct a series of smooth curves using increments of

$\sqrt{2}$  for grades CT 3 to CT 13; and

$\sqrt[3]{2}$  for grades CT 13 to CT 16.

Many dimensions of a casting are affected by the presence of a mould joint or a core requiring increased dimensional tolerance. Since the designer will not necessarily be aware of the mould and core layout to be used, increases have already been included in table 1.

**Table 3 — Tolerances for long series production raw castings (see note)**

Method	Tolerance grade CT								
	Steel	Grey iron	S.G. iron	Malleable iron	Copper alloys	Zinc alloys	Light metal alloys	Nickel-based alloys	Cobalt-based alloys
Sand cast, hand-moulded	11 to 13	11 to 13	11 to 13	11 to 13	10 to 12		9 to 11		
Sand cast, machine-moulded and shell moulding	8 to 10	8 to 10	8 to 10	8 to 10	8 to 10		7 to 9		
Metallic permanent mould (gravity and low pressure)		7 to 9	7 to 9	7 to 9	7 to 9	7 to 9	6 to 8		
Pressure die casting					6 to 8	4 to 6	5 to 7		
Investment casting	4 to 6	4 to 6	4 to 6		4 to 6		4 to 6	4 to 6	4 to 6

NOTE — The tolerances indicated are those which can normally be held for castings produced in long series and when production factors influencing the dimensional accuracy of the casting have been fully developed.

Table 4 — Tolerances for short series or single production raw castings (see notes)

Moulding material	Tolerance grade CT					
	Steel	Grey iron	S.G. iron	Malleable iron	Copper alloys	Light metal alloys
Green sand	13 to 15	13 to 15	13 to 15	13 to 15	13 to 15	11 to 13
Self-setting materials	12 to 14	11 to 13	11 to 13	11 to 13	10 to 12	10 to 12

## NOTES

- 1 The tolerances indicated are those which can normally be held for sand castings produced in short series or as single castings.
- 2 The values in this table apply generally to basic sizes greater than 25 mm. For smaller sizes, finer tolerances can normally be economically and practically held as follows :
  - a) basic size up to 10 mm : three grades finer;
  - b) basic size 10 to 16 mm : two grades finer;
  - c) basic size 16 to 25 mm : one grade finer.

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