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# Light metal alloy raw castings
## Pressure die castings
## General tolerances, machining allowances

DIN 1688 Part 4

Gußrohteile aus Leichtmetallegierungen;
Druckguß; Allgemeintoleranzen, Bearbeitungszugaben

Supersedes August 1974 edition.

*In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.*

Dimensions in mm

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## 1 Field of application

This standard specifies permissible deviations and machining allowances for light metal alloy raw castings produced by the pressure die casting process. Its specifications are based on the principles established in DIN 1680 Parts 1 and 2 with regard to general tolerances for raw castings, and are to be applied in conjunction with the technical delivery conditions specified in DIN 1690 Part 1.

## 2 Concepts

The concepts "general tolerances" and "accuracy grade", as defined in DIN 7182 Part 1, have been applied in DIN 1680 Part 1 to raw castings.

The concept "machining allowance" is defined in DIN 1680 Part 1.

For the purposes of this standard, light metal alloys are pressure die casting alloys based on aluminium and magnesium, e.g. as specified in DIN 1725 Part 2 and DIN 1729 Part 2.

## 3 Accuracy grades

### 3.1 Dimensional deviations

The main factors influencing the dimensional deviations of light metal alloy raw castings produced by the pressure die casting process are essentially:

a) the dimensional and functional accuracy of the casting die, as a function of the accuracy grade;

b) the location of the die parting line, by which the dimensions are subdivided into dimensions intrinsic to the die halves and composite dimensions made up by two or more die members (see DIN 1680 Part 1);

c) the shape or size of the casting, as characterized by the body diagonal (see subclause 3.3);

d) the magnitude of the basic dimensions.

### 3.2 Application of accuracy grades

The specification of permissible deviations shall be based on the accuracy grades given in tables 1 and 2.

### 3.3 Calculation of the body diagonal

The length of the body diagonal, $R$, is a function of the greatest extent of the casting. It is to be calculated by the following formula from the basic sizes of length, $l$, width, $b$, and height, $h$, of the prismatic envelope enclosing the casting of any given shape:

$$R = \sqrt{l^2 + b^2 + h^2}$$

The value obtained for $R$ shall be rounded to the nearest whole number in accordance with DIN 1333 Part 2.

## 4 Machining allowances

The machining allowance, $BZ$, is a function of the maximum external dimension of the raw casting and is the same for all accuracy grades, except for the cases given in DIN 1680 Part 1; see table 3.

## 5 Designation

a) Where the general tolerance is to be indicated as accuracy grade GTA 14/5 without any machining allowance, the designation shall be

Tolerance DIN 1688 – GTA 14/5

b) Where the general tolerance is to be indicated as accuracy grade GTA 14/5 in conjunction with a machining allowance specified in the present standard (BZN), the designation shall be

Tolerance DIN 1688 – GTA 14/5 – BZN

c) Where the general tolerance is to be indicated as accuracy grade GTA 14/5 in conjunction with a machining tolerance not specified in the present standard for that grade (e.g. 0,8 mm), but applying to all surfaces to be machined (BZ 0,8), the designation shall be

Tolerance DIN 1688 – GTA 14/5 – BZ 0,8

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Table 1. **Permissible deviations for linear dimensions (length, width, height, centre line distance, diameter, radii)**

| Accuracy grade | Relation to die | Basic size range *) | | | | | | | | | | | | | | Corresponds to general tolerance series for castings as in DIN 1680 Part 2 | Applicable to body diagonal lengths |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Up to 18 | Over 18 up to 30 | Over 30 up to 50 | Over 50 up to 80 | Over 80 up to 120 | Over 120 up to 180 | Over 180 up to 250 | Over 250 up to 315 | Over 315 up to 400 | Over 400 up to 500 | Over 500 up to 630 | Over 630 up to 800 | Over 800 up to 1000 | Over 1000 up to 1250 | | |
| **GTA 14/5** | Intrinsic | ± 0,25 | ± 0,35 | ± 0,4 | ± 0,45 | ± 0,55 | ± 0,65 | ± 0,75 | ± 0,8 | ± 0,85 | ± 0,95 | ± 1,1 | ± 1,2 | ± 1,4 | ± 1,6 | GTA 14/5 | over 500 |
| | Not intrinsic | ± 0,55 | ± 0,65 | ± 0,7 | ± 0,75 | ± 0,85 | ± 0,95 | ± 1,0 | ± 1,1 | ± 1,1 | ± 1,2 | ± 1,4 | ± 1,5 | ± 1,7 | ± 1,9 | GTA 14/5 plus allowance | |
| **GTA 14** | Intrinsic | ± 0,22 | ± 0,26 | ± 0,31 | ± 0,37 | ± 0,44 | ± 0,5 | ± 0,6 | ± 0,65 | ± 0,7 | ± 0,8 | ± 0,9 | ± 1,0 | ± 1,2 | ± 1,3 | GTA 14 | over 180 |
| | Not intrinsic | ± 0,42 | ± 0,46 | ± 0,51 | ± 0,57 | ± 0,64 | ± 0,7 | ± 0,8 | ± 0,85 | ± 0,9 | ± 1,0 | ± 1,1 | ± 1,2 | ± 1,4 | ± 1,5 | GTA 14 plus allowance | |
| **GTA 13/5** | Intrinsic | ± 0,17 | ± 0,2 | ± 0,25 | ± 0,3 | ± 0,35 | ± 0,4 | ± 0,45 | ± 0,5 | ± 0,55 | ± 0,6 | – | – | – | – | GTA 13/5 | over 50 up to 500 |
| | Not intrinsic | ± 0,32 | ± 0,35 | ± 0,4 | ± 0,45 | ± 0,5 | ± 0,55 | ± 0,6 | ± 0,65 | ± 0,7 | ± 0,75 | – | – | – | – | GTA 13/5 plus allowance | |
| **GTA 13** | Intrinsic | ± 0,14 | ± 0,17 | ± 0,2 | ± 0,23 | ± 0,27 | ± 0,32 | – | – | – | – | – | – | – | – | GTA 13 | up to 180 |
| | Not intrinsic | ± 0,24 | ± 0,27 | ± 0,3 | ± 0,33 | ± 0,37 | ± 0,42 | – | – | – | – | – | – | – | – | GTA 13 plus allowance | |
| **GTA 12/5** | Intrinsic | ± 0,11 | ± 0,14 | ± 0,16 | – | – | – | – | – | – | – | – | – | – | – | GTA 12/5 | up to 50 |
| | Not intrinsic | ± 0,21 | ± 0,24 | ± 0,2 | – | – | – | – | – | – | – | – | – | – | – | GTA 12/5 plus allowance | |

*) Dashes indicate that no deviations have been specified.

Table 2. **Permissible deviations for thicknesses (wall, web, and rib thicknesses)**

| Accuracy grade | Relation to die | Basic size range: Up to 3 | Basic size range: Over 3 up to 6 | Basic size range: Over 6 up to 10 | Corresponds to general tolerance series for castings as in DIN 1680 Part 2 *) | Applicable to body diagonal lengths |
|---|---|---|---|---|---|---|
| **GTA 14/5** | Intrinsic | ± 0,3 | ± 0,4 | ± 0,45 | GTA 16 | over 500 |
| | Not intrinsic | ± 0,55 | ± 0,65 | ± 0,7 | GTA 16 plus allowance | |
| **GTA 14** | Intrinsic | ± 0,25 | ± 0,3 | ± 0,35 | GTA 15/5 | over 180 |
| | Not intrinsic | ± 0,45 | ± 0,5 | ± 0,55 | GTA 15/5 plus allowance | |
| **GTA 13/5** | Intrinsic | ± 0,2 | ± 0,25 | ± 0,3 | GTA 15 | over 50 up to 500 |
| | Not intrinsic | ± 0,35 | ± 0,4 | ± 0,45 | GTA 15 plus allowance | |
| **GTA 13** | Intrinsic | ± 0,15 | ± 0,2 | ± 0,2 | GTA 14/5 | up to 180 |
| | Not intrinsic | ± 0,25 | ± 0,3 | ± 0,3 | GTA 14/5 plus allowance | |
| **GTA 12/5** | Intrinsic | ± 0,13 | ± 0,15 | ± 0,18 | GTA 14 | up to 50 |
| | Not intrinsic | ± 0,23 | ± 0,25 | ± 0,28 | GTA 14 plus allowance | |

*) For the same accuracy grade, the deviations for thicknesses have been derived from a coarser tolerance series than those specified in table 1 for linear dimensions.

Table 3. **Machining allowances,** *BZN*

| Basic size range / Body diagonal | Up to 18 | Over 18 up to 30 | Over 30 up to 50 | Over 50 up to 80 | Over 80 up to 120 | Over 120 up to 180 | Over 180 up to 250 | Over 250 up to 315 | Over 315 up to 400 | Over 400 up to 500 | Over 500 up to 630 | Over 630 up to 800 | Over 800 up to 1000 | Over 1000 up to 1250 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Up to 50 | 0,3 | 0,3 | 0,3 | – | – | – | – | – | – | – | – | – | – | – |
| Over 50 up to 180 | – | – | – | 0,3 | 0,3 | 0,4 | – | – | – | – | – | – | – | – |
| Over 180 up to 500 | – | – | – | – | – | – | 0,4 | 0,5 | 0,5 | 0,6 | – | – | – | – |
| Over 500 | – | – | – | – | – | – | – | – | – | – | 0,7 | 0,8 | 0,9 | 1,0 |

## Standards referred to

DIN 1333 Part 2 Rounding of numbers
DIN 1680 Part 1 Raw castings; general tolerances and machining allowances; general
DIN 1680 Part 2 Raw castings; system of general tolerances
DIN 1690 Part 1 Technical delivery conditions for castings of metallic materials; general conditions
DIN 1725 Part 2 Aluminium alloys; casting alloys; sand castings, gravity die castings, pressure die castings, investment castings
DIN 1729 Part 2 Magnesium alloys; castings alloys; sand castings, gravity die castings, pressure die castings
DIN 7182 Part 1 Dimensions, deviations, tolerances and fits; basic concepts

## Other relevant standards

DIN 1688 Part 1 Light metal alloy raw castings; sand castings; general tolerances, machining allowances
DIN 1688 Part 3 Light metal alloy raw castings; gravity die castings; general tolerances, machining allowances

## Previous editions

DIN 1688 Part 4: 08.74.

## Amendments

The following amendments have been made to the August 1974 edition.

a) Machining allowances have been adopted for the first time.
b) The title and field of application have been amended.
c) The text has been editorially revised.

## International Patent Classification

B 22 B 17/00
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