

Die Casting Tolerances

Die casting tolerances are based not only the [alloys](#) used, but also the length, shape and location of each feature. Our specialized team at ChinaSavvy knows that the important factors to be considered when tolerancing a specific component involves the functional requirements to be achieved as well as which features and dimensions are critical.

When tolerancing a component, it is important to note that it is not how tight a tolerance can be or the [process capability](#) that can be achieved, but rather achieving tolerances that are as tight as required.

In cases where tolerances are looser than required, poor product quality and life is a result, and in cases where tolerances are higher than required, it results in a higher scrap rate and higher product cost.

Because of these various factors, our first step is to highlight the functional requirements needed, as well as the dimensions and features that are critical. From here, an appropriate process will be chosen in order to meet all the highlighted specifications and requirements.

While standard tolerances can be achieved coupled with a good tool maintenance, critical casting tolerances can be achieved on a limited number of features.

The following factors will be taken into consideration when assessing the achievable tolerances:

- The shape or form of the part.
- The wear and life span of the tool (seeing as it will affect the long- and short-term process capabilities).
- The proximity of features within the tool itself.
- The relation of these features to each other on the part itself.

Below you will find more information concerning:

1. [The Minimum Tolerances for Precision Aluminum Die Casting](#)
2. [Minimum Tolerances in Die Casting for Conventional Zinc](#)
3. [Minimum Tolerances in Die Casting for Multi-Slide Zinc](#)
4. [Linear Casting Tolerances](#)
5. [Tolerances for Flatness](#)
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7. [Tolerances for Moving Die Parts](#)

The Minimum Tolerances for Precision Aluminum Die Casting

Note: You can click on the table to view a larger image.

	In Inches	In Millimeters
Basic Tolerances of up to 254mm2 (10"2)	Linear Tolerance +0.0035"	Linear Tolerance + 0.0889
Across the Parting Line	Linear Tolerance +0.0035"	Linear Tolerance + 0.0889
Inside Diameters		
Inside Diameter ≤ Ø6.35mm (Ø0.25")	+/- 0.002"	+/- 0.0508
Inside Diameter >Ø6.35mm (Ø0.25")	+/- 0.003"	+/- 0.0762
Linear Dimensions		
Within Cavity ≤ 25.4mm (1.0")	+/- 0.002"	+/-0.0508
Within Cavity per additional 25.4mm (1.0")	+/- 0.001"	+/-0.0254

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Note: Numbers are rounded off to nearest decimal.

Minimum Tolerances in Die Casting for Conventional Zinc

Note: You can click on the table to view a larger image.

	In inches	In Millimeters
Basic tolerance of up to 254 mm2 (10"2)	Linear Tolerance + 0.003"	Linear Tolerance + 0.076
Across the parting line	Linear Tolerance + 0.003"	Linear Tolerance + 0.076
Inside Diameters		
Inside Diameter ≤ Ø6.35mm (Ø0.25")	+/- 0.001"	+/- 0.0254
Inside Diameter >Ø6.35mm (Ø0.25")	+/- 0.002"	+/- 0.0508
Linear Dimensions		
Within Cavity ≤ 25.4mm (1.0")	+/- 0.002"	+/- 0.0508
Within Cavity per additional 25.4mm (1.0")	+/- 0.001"	+/- 0.0254

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Note: Numbers are rounded off to nearest decimal.

Minimum Tolerances in Die Casting for Multi-Slide Zinc

Note: You can click on the table to view a larger image.

	In inches	In Millimeters
Parting Lines		
Across Parting Line ≤ 25.4 mm (1.0")	Linear Tolerance + 0.0015"	Linear Tolerance + 0.0381
Across Parting Line > 25.4mm (1.0")	Linear Tolerance + 0.002"	Linear Tolerance + 0.0508
Inside Diameters		
Inside Diameter ≤ Ø6.35mm (Ø0.25")	+/- 0.0005"	+/- 0.0127
Inside Diameter >Ø6.35mm (Ø0.25")	+/- 0.0010"	+/- 0.0254
Linear Dimensions		
Within Cavity ≤ 25.4mm (1.0")	+/- 0.0005"	+/- 0.0127
Within Cavity > 25.4mm (1.0")	+/- 0.001"	+/- 0.0254

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Note: Numbers are rounded off to nearest decimal.

Linear Casting Tolerances

Note here that the tolerances mentioned will increase in cases where the parting line of the die affects the dimensions, or where moving parts in the die affects the dimension.

Tolerances for Non- Critical Dimensions

Note: You can click on the table to view a larger image.

Length of the Dimension	Aluminum	Magnesium	Zinc
Basic Tolerance of up to 25 mm / 0.984"			
	+/- 0.25 mm +/- 0.01"	+/- 0.25 mm +/- 0.01"	+/- 0.25 mm +/- 0.01"
Tolerance for each additional 25 mm / 0.984"			
Over 25 mm / 0.984" to 300 mm / 11.81"	+/- 0.05 mm +/- 0.002"	+/- 0.05 mm +/- 0.002"	+/- 0.04 mm +/- 0.0015"
Over 300 mm / 11.81"	+/- 0.03 mm +/- 0.001"	+/- 0.03 mm +/- 0.001"	+/- 0.03 mm +/- 0.001"

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*Note: Un-toleranced or rounded to the nearest whole number.

Note: Numbers are rounded off to nearest decimal.

Tolerances for Critical Dimensions

Note: You can click on the table to view a larger image.

Length of the Dimension	Aluminum	Magnesium	Zinc
Basic Tolerance of up to 25 mm / 0.98"			
	+/- 0.10 mm +/- 0.004"	+/- 0.10 mm +/- 0.004"	+/- 0.08 mm +/- 0.003"
Tolerance for each additional 25 mm / 0.98"			
Over 25 mm / 0.98" to 300 mm / 11.81"	+/- 0.04 mm +/- 0.002"	+/- 0.04 mm +/- 0.002"	+/- 0.03 mm +/- 0.001"
Over 300 mm / 11.81"	+/- 0.03 mm +/- 0.001"	+/- 0.03mm +/- 0.001"	+/- 0.03 mm +/- 0.001"

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*One or two decimal places

Note: Numbers are rounded off to nearest decimal.

Tolerances for Flatness

Measured with a feeler gauge from three widely separated points on a continuous plane. Dimensions in the table below refers to either the diagonal of a rectangular surface or the diameter of a circular surface.

Note: You can click on the table to view a larger image.

Maximum dimension of casting	All alloys
A basic tolerance of up to 75 mm / 2.95"	0.20 mm / 0.008"
Additional tolerances for every 25 mm / 0.98"	0.08 mm / 0.003"

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Note: Numbers are rounded off to nearest decimal.

Die Casting Tolerances for Parting Lines

Linear dimensional tolerances must, in addition with parting line tolerances, provide for the movement of the die itself.

Note: You can click on the table to view a larger image.

Projected area of the casting in cm ² / inch ² at the parting line	Aluminum	Magnesium	Zinc
Up to 325 cm ² / 127.95" ²	+/- 0.13 mm +/- 0.005"	+/- 0.13 mm +/- 0.005"	+/- 0.10 mm +/- 0.004"
From 325 cm ² / 127.95" ² to 650 cm ² / 255.9" ²	+/- 0.20 mm +/-0.008"	+/- 0.20 mm +/-0.008"	+/- 0.15 mm +/- 0.006"
From 650 cm ² / 255.9" ² to 1,300 cm ² / 511.81" ²	+/- 0.30 mm +/- 0.012"	+/- 0.30 mm +/- 0.012"	+/- 0.20 mm +/-0.008"
From 1,300 cm ² / 511.81" ² to 2,000 cm ² / 787.40" ²	+/- 0.40 mm +/- 0.016"	+/- 0.40 mm +/- 0.016"	+/- 0.30 mm +/- 0.012"

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Note: Numbers are rounded off to nearest decimal.

Tolerances for Moving Die Parts

When a moving die part affects the dimension, both linear dimensional tolerances and moving part tolerances are required.

Note: You can click on the table to view a larger image.

Projected are in cm ² / inch ² of the portion that is affected by the moving die part	Aluminum	Magnesium	Zinc
Up to 65 cm ² / 25.59" ²	+/- 0.13 mm +/- 0.005"	+/- 0.13 mm +/- 0.005"	+/- 0.10 mm +/- 0.004"
From 65 cm ² / 25.59" ² to 130 cm ² / 51.18" ²	+/- 0.20 mm +/-0.008"	+/- 0.20 mm +/-0.008"	+/- 0.15 mm +/- 0.006"
From 130 cm ² / 51.18" ² to 325 cm ² / 127.95" ²	+/- 0.30 mm +/- 0.012"	+/- 0.30 mm +/- 0.012"	+/- 0.20 mm +/-0.008"
From 325 cm ² / 127.95" ² and more	+/- 0.40 mm +/- 0.016"	+/- 0.40 mm +/- 0.016"	+/- 0.30 mm +/- 0.012"

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Note: Numbers are rounded off to nearest decimal.

If you would like more information on our die casting tolerances or if you could not find any information relevant to your project, please feel free to [contact us](#) for a detailed analysis.

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Further Suggested Reading:

- [Metals That Can Be Cast](#)
- [Precision Die Casting](#)
- [Wall Thicknesses in Die Cast Parts](#)
- [Assembly Methods for Die Cast Parts](#)

- [Finishes for Precision Die Castes Parts](#)

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