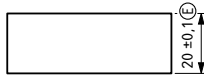


Tolerancing by Dimensions

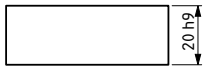
Linear size (the diameter of a cylinder or the distance between two parallel flat opposite surfaces). ISO 129, ISO 286-1, ISO 1938, ISO 8015 and MISO 14405 .

Two methods for unambiguous tolerancing of size exist. The two methods do not result in the same tolerance limits:

Method #1 - ISO 8015, \pm tolerances and envelope requirement E

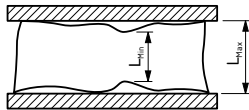


Method #2 - ISO 286-1 and ISO/R 1938 - Tolerance code



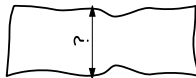
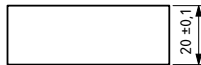
Explanations:

$L \leq L_{\max}$, distance between two parallel tangential planes or the diameter of the minimum circumscribed cylinder. $L \geq L_{\min}$, two-point distance or diameter. The two-point distance/diameter and the direction are defined in ISO 14660-2.



Linear size indicated by \pm tolerance without indication of operator

A linear size indicated by a \pm tolerance without supplementary indication (modifier symbol) according to method 1 or 2 above is not defined on the real work piece.

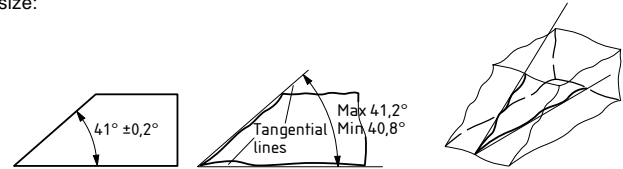


MISO 14405 will include a number of symbols (modifiers) in addition to E , which can specify which diameter definition (specification operator) is required by the drawing, e.g.: P , S , G , X and N .

Tolerancing by Dimensions

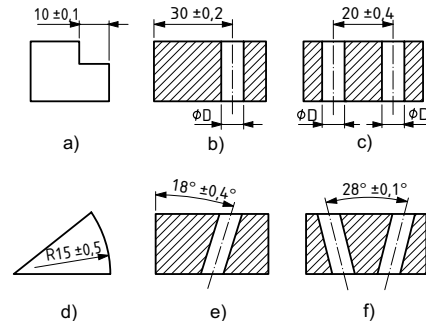
Angular size - ISO 8015 (The definition is only active if a reference is made to ISO 8015 on the drawing - otherwise angular size has no operator definition). The angle between two tangential lines in the surfaces.

Angular size between two flat opposing surfaces of approximately the same size:



Dimension indication for non linear size

All other types of dimensions, except size, with \pm tolerances, see examples a) through f), are not defined on the real work piece. The result is specification uncertainty. Dimension tolerancing with \pm tolerances, therefore, should not be used on new drawings. Use geometrical tolerances instead.



- a) Linear distance between two integral features (step height)
- b) Linear distance between an integral and a derived feature
- c) Linear distance between two derived features
- d) Radial distance for an integral or a derived feature
- e) Angular distance between an integral and a derived feature
- f) Angular distance between two derived features

Fund.

Global

Dim.

Tol.

Datum

TED

Geom.

Tol.

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Gen.
Tol.

Y14.5