International Standard

ISO 1101

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

Dessins techniques — Tolérancement géométrique — Tolérancement de forme, orientation, position et battement — Généralités, définitions, symboles, indications sur les dessins

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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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

International Standard ISO 1101 was developed by Technical Committee ISO/TC 10, *Technical drawings*, and was circulated to the member bodies in December 1980.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Romania
Austria	India	South Africa, Rep. of
Brazil	Iraq	Spain
Canada	Italy	Sweden
China	Japan	Switzerland
Czechoslovakia	Korea, Dem. P. Rep. of	United Kingdom
Denmark	Korea, Rep. of	USA
Finland	Netherlands	USSR
France	New Zealand	
Germany, F.R.	Norway	

The member body of the following country expressed disapproval of the document on technical grounds :

Belgium

This International Standard cancels and replaces ISO Recommendation R 1101/1-1969, of which it constitutes a technical revision.

A more detailed, bilingual (English, French) version of Table 1 "Symbols for toleranced characteristics" and Table 2 "Additional symbols" has been made up in A4 plastic-coated format. This represents an extract of this International Standard, which lends itself to everyday use on the shop floor.

This extract is available separately.

Contents

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

0 Introduction

For uniformity all figures in this International Standard are in first angle projection.

It should be understood that the third angle projection could equally well have been used without prejudice to the principles established.

For the definitive presentation (proportions and dimensions) of symbols for geometrical tolerancing, see ISO 7083.

1 Scope and field of application

1.1 This International Standard gives the principles of symbolization and indication on technical drawings of tolerances of form, orientation, location and run-out, and establishes the appropriate geometrical definitions. Hence the term "geometrical tolerances" will be used in this document as synonymous with these groups of tolerances.

1.2 Geometrical tolerances shall be specified only where they are essential, that is, in the light of functional requirements, interchangeability and probable manufacturing circumstances.

1.3 Indicating geometrical tolerances does not necessarily imply the use of any particular method of production, measurement or gauging.

2 References

ISO 128, *Technical drawings — General principles of presentation.*

ISO 129, *Engineering drawings — Dimensioning — General principles, definitions, methods of execution, and special indications.* [1]

ISO 1660, *Technical drawings — Dimensioning and tolerancing of profiles.*

ISO 2692, *Technical drawings — Geometrical tolerancing — Maximum material principle.* [2]

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

ISO 7083, *Technical drawings — Symbols for geometrical tolerancing — Proportions and dimensions.*

ISO 8015, *Technical drawings — Fundamental tolerancing principle.* [3]

3 General

3.1 A geometrical tolerance applied to a feature defines the tolerance zone within which the feature (surface, axis, or median plane) is to be contained (see 3.7 and 3.8).

3.2 According to the characteristic which is to be toleranced and the manner in which it is dimensioned, the tolerance zone is one of the following :

— the area within a circle;

— the area between two concentric circles;

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[1] At present at the stage of draft. (Revision of ISO/R 129-1959.)

[2] At present at the stage of draft. (Revision of ISO 1101/2-1974.)

[3] At present at the stage of draft.

— the area between two equidistant lines or two parallel straight lines;

— the space within a cylinder;

— the space between two coaxial cylinders;

— the space between two equidistant planes or two parallel planes;

— the space within a parallelepiped.

3.3   The toleranced feature may be of any form or orientation within this tolerance zone, unless a more restrictive indication is given, for example by an explanatory note (see figures 8 and 9).

3.4   Unless otherwise specified as in clauses 9 and 11, the tolerance applies to the whole length or surface of the considered feature.

3.5   The datum feature is a real feature of a part, which is used to establish the location of a datum (see ISO 5459).

3.6   Geometrical tolerances which are assigned to features related to a datum do not limit the form deviations of the datum feature itself. The form of a datum feature shall be sufficiently accurate for its purpose and it may therefore be necessary to specify tolerances of form for the datum features.

3.7   The straightness or flatness of a single toleranced feature is deemed to be correct when the distance of its individual points from a superimposed surface of ideal geometrical form is equal to or less than the value of the specified tolerance. The orientation of the ideal line or surface shall be chosen so that the maximum distance between it and the actual surface of the feature concerned is the least possible value.

Example :
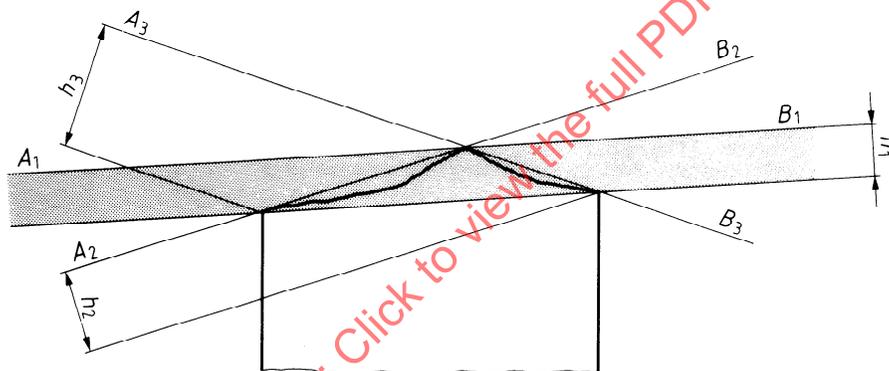
Figure 1

Possible orientations of the line or surface :

$A_1 - B_1$ $A_2 - B_2$ $A_3 - B_3$

Corresponding distances :

h_1 h_2 h_3

In the case of figure 1 :

h_1 $<$ h_2 $<$ h_3

Therefore the correct orientation of the ideal line or surface is $A_1 - B_1$. The distance h_1 is to be equal to or less than the specified tolerance.

3.8   For the definition of circularity and cylindricity, the location of the two concentric circles or coaxial cylinders shall be chosen so that the radial distance between them is the minimum.
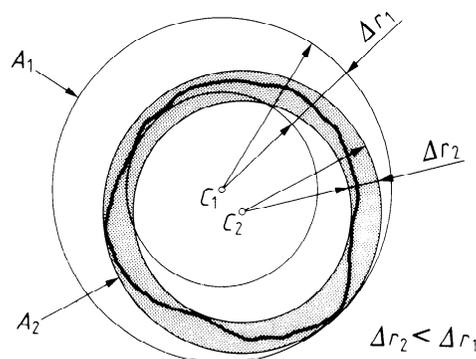
Example :

$\Delta r_2 < \Delta r_1$

Figure 2

2

Possible location of the centres of the two concentric circles or the axes of the two coaxial cylinders and their minimal radial distances.

Centre (C_1) of A_1 locates two concentric circles or two coaxial cylinders.

Centre (C_2) of A_2 locates two concentric circles or two coaxial cylinders with minimal radial distance.

Corresponding radial distances :	Δr_1	Δr_2
In the case of figure 2 :	Δr_2 $<$	Δr_1

Therefore the correct location of the two concentric circles or the two coaxial cylinders is the one designated A_2. The radial distance Δr_2 should then be equal to or less than the specified tolerance.

4 Symbols

Table 1 — Symbols for toleranced characteristics

Features and tolerances		Toleranced characteristics	Symbols	Subclauses
Single features	Form tolerances	Straightness	▬	14.1
		Flatness	▱	14.2
		Circularity	◯	14.3
		Cylindricity	⌭	14.4
Single or related features		Profile of any line	⌒	14.5
		Profile of any surface	⌓	14.6
Related features	Orientation tolerances	Parallelism	//	14.7
		Perpendicularity	⊥	14.8
		Angularity	∠	14.9
	Location tolerances	Position	⊕	14.10
		Concentricity and coaxiality	◎	14.11
		Symmetry	=	14.12
	Run-out tolerances	Circular run-out	↗	14.13
		Total run-out	↗↗	14.14

3

Table 2 — Additional symbols

Descriptions		Symbols	Clauses
Toleranced feature indications	direct		6
	by letter	A	7.4
Datum indications	direct		8
	by letter	A A	
Datum target		$\dfrac{\varnothing\,2}{A\,1}$	ISO 5459
Theoretically exact dimension		$\boxed{50}$	10
Projected tolerance zone		Ⓟ	11
Maximum material condition		Ⓜ	12

5 Tolerance frame

5.1 The tolerance requirements are shown in a rectangular frame which is divided into two or more compartments. These compartments contain, from left to right, in the following order (see figures 3, 4 and 5) :

— the symbol for the characteristic to be toleranced;

— the tolerance value in the unit used for linear dimensions. This value is preceded by the sign ø if the tolerance zone is circular or cylindrical;

— if appropriate, the letter or letters identifying the datum feature or features (see figures 4 and 5).

—	0,1

Figure 3

//	0,1	A

Figure 4

⊕	ø 0,1	A	C	B
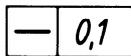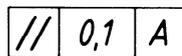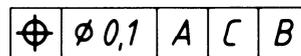
Figure 5

5.2 Remarks related to the tolerance, for example "6 holes", "4 surfaces" or "6x" shall be written above the frame (see figures 6 and 7).

6 holes

⊕	ø 0,1

Figure 6

6 ×

⊕	ø 0,1
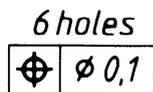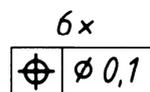
Figure 7

5.3 Indications qualifying the form of the feature within the tolerance zone shall be written near the tolerance frame and may be connected by a leader line (see figures 8 and 9).

▢	0,3

not convex

Figure 8

not convex

▢	0,1	A

Figure 9

4
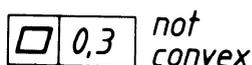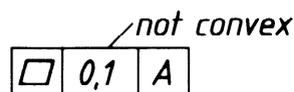
5.4 If it is necessary to specify more than one tolerance characteristic for a feature, the tolerance specifications are given in tolerance frames one under the other (see figure 10).

Figure 10

6 Toleranced features

The tolerance frame is connected to the toleranced feature by a leader line terminating with an arrow in the following way :

— on the outline of the feature or an extension of the outline (but clearly separated from the dimension line) when the tolerance refers to the line or surface itself (see figures 11 and 12).
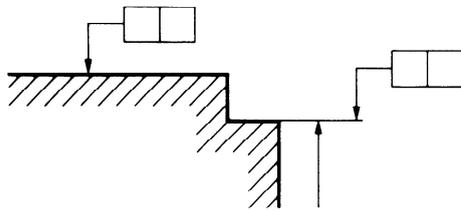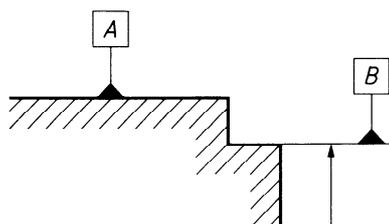

Figure 11
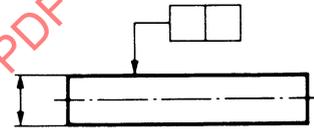
Figure 12

— as an extension of a dimension line when the tolerance refers to the axis or median plane defined by the feature so dimensioned (see figures 13 to 15).
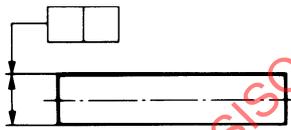
Figure 13
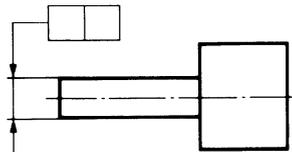
Figure 14
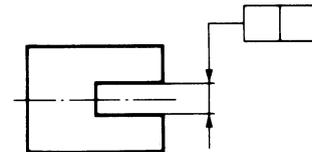
Figure 15

— on the axis when the tolerance refers to the axis or median plane of all features common to that axis or median plane (see figures 16, 17 and 18).
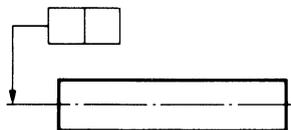
Figure 16
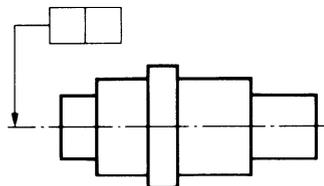
Figure 17
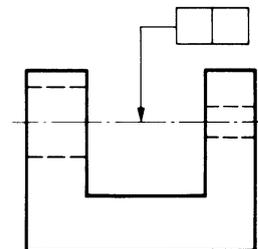
Figure 18

NOTE — Whether a tolerance should be applied to the contour of a cylindrical or symmetrical feature or to its axis or median plane respectively depends on the functional requirements.

5

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7 Tolerance zones

7.1 The width of the tolerance zone is in the direction of the arrow of the leader line joining the tolerance frame to the feature which is toleranced, unless the tolerance value is preceded by the sign ⌀ (see figures 19 and 20).
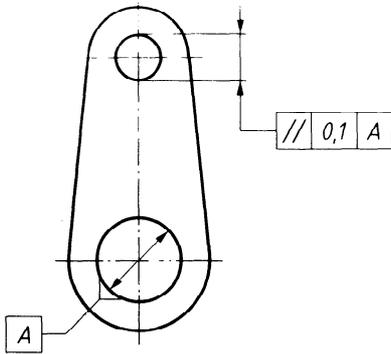
Figure 19
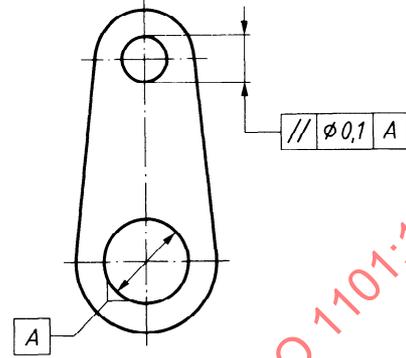
Figure 20

7.2 In general, the direction of the width of the tolerance zone is normal to the specified geometry of the part (see figures 21 and 22).
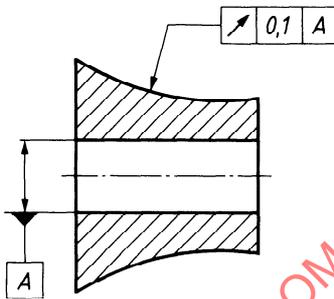
Figure 21
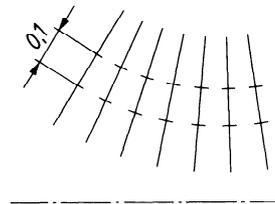
Figure 22

7.3 The direction of the width of the tolerance zone shall be indicated when desired **not** normal to the specified geometry of the part (see figures 23 and 24).
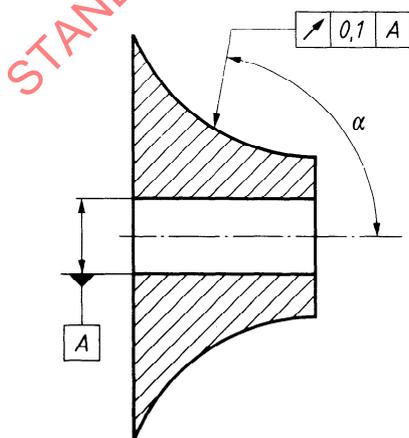
Figure 23

Figure 24

6
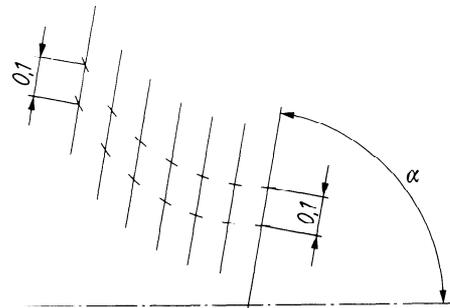
7.4 **Individual tolerance zones** of the same value applied to several separate features can be specified as shown in figures 25 and 26.
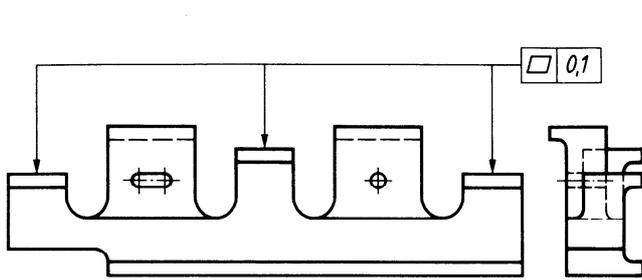
Figure 25
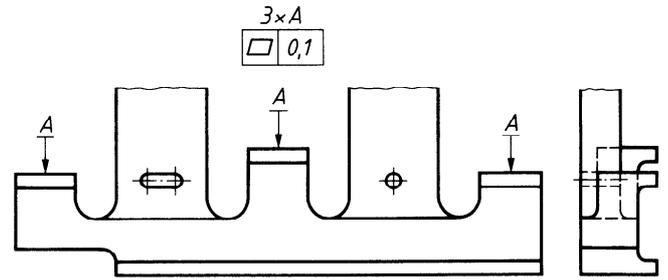
Figure 26

7.5 Where a **common tolerance zone** is applied to several separate features, the requirement is indicated by the words "common zone" above the tolerance frame (see figures 27 and 28).
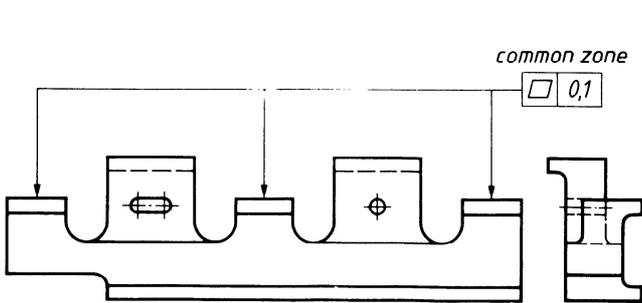
Figure 27
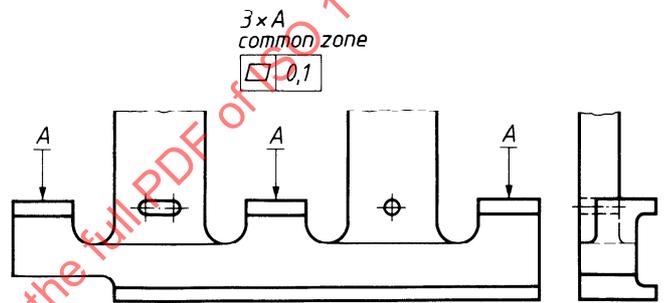
Figure 28

8 Datums

8.1 When a toleranced feature is related to a datum, this is generally shown by datum letters. The same letter which defines the datum is repeated in the tolerance frame.

To identify the datum, a capital letter enclosed in a frame is connected to a solid or blank datum triangle (see figures 29 and 30).
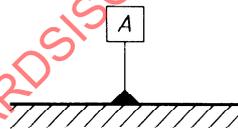
Figure 29
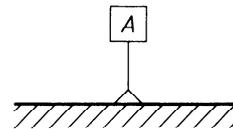
Figure 30

8.2 The datum triangle with the datum letter is placed :

— on the outline of the feature or an extension of the outline (but clearly separated from the dimension line), when the datum feature is the line or surface itself (see figure 31).

Figure 31

— as an extension of the dimension line when the datum feature is the axis or median plane (see figures 32 to 34).

NOTE — If there is insufficient space for two arrows, one of them may be replaced by the datum triangle (see figures 33 and 34).
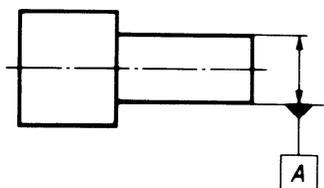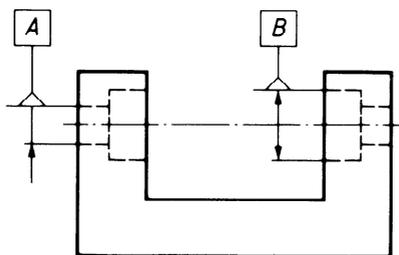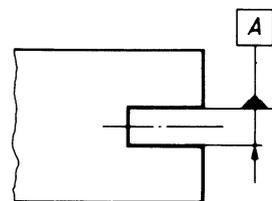
Figure 32   **Figure 33**   **Figure 34**

— on the axis or median plane when the datum is :

a) the axis or median plane of a single feature (for example a cylinder);

b) the common axis or plane formed by two features (see figure 35).
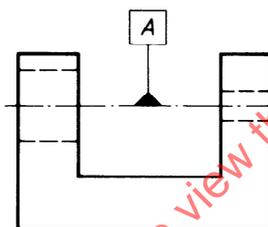
Figure 35

8.3 If the tolerance frame can be directly connected with the datum feature by a leader line, the datum letter may be omitted (see figures 36 and 37).
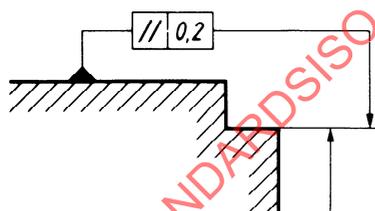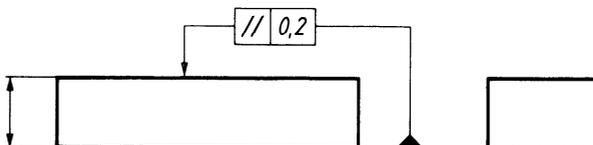
Figure 36   **Figure 37**

8.4 A single datum is identified by a capital letter (see figure 38).

A common datum formed by two datum features is identified by two datum letters separated by a hyphen (see figure 39).

If the sequence of two or more datum features **is** important the datum letters are placed in different compartments (see figure 40), where the sequence from left to right shows the order of priority.

If the sequence of two or more datum features **is not** important the datum letters are indicated in the same compartment (see figure 41).
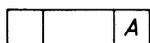
Figure 38   **Figure 39**   **Figure 40**   **Figure 41**

8
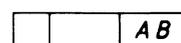
9 Restrictive specifications

9.1 If the tolerance is applied to a restricted length, lying anywhere, the value of this length shall be added after the tolerance value and separated from it by an oblique stroke.

In the case of a surface, the same indication is used. This means that the tolerance applies to all lines of the restricted length in any position and any direction (see figure 42).
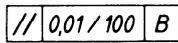

Figure 42

9.2 If a smaller tolerance of the same type is added to the tolerance on the whole feature, but restricted over a limited length, the restrictive tolerance shall be indicated in the lower compartment (see figure 43).
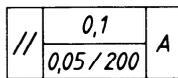
Figure 43

9.3 If the tolerance is applied to a restricted part of the feature only, this shall be dimensioned as shown in figure 44.
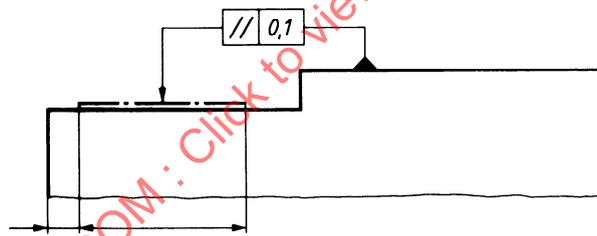
Figure 44

9.4 If the datum is applied to a restricted part of the datum feature only, this shall be dimensioned as shown in figure 45.
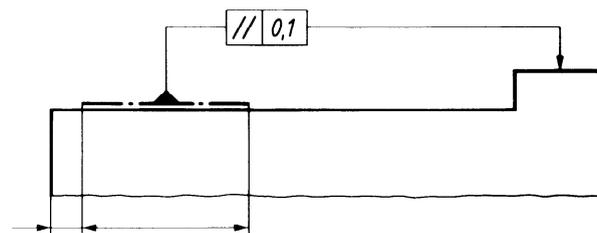
Figure 45

9.5 Restrictions to the form of the feature within the tolerance zone are shown in 5.3.

10 Theoretically exact dimensions

If tolerances of position or of profile or of angularity are prescribed for a feature, the dimensions determining the theoretically exact position, profile or angle respectively, shall not be toleranced.

These dimensions are enclosed, for example $\boxed{30}$. The corresponding actual dimensions of the part are subject only to the position tolerance, profile tolerance or angularity tolerance specified within the tolerance frame (see figures 46 and 47).
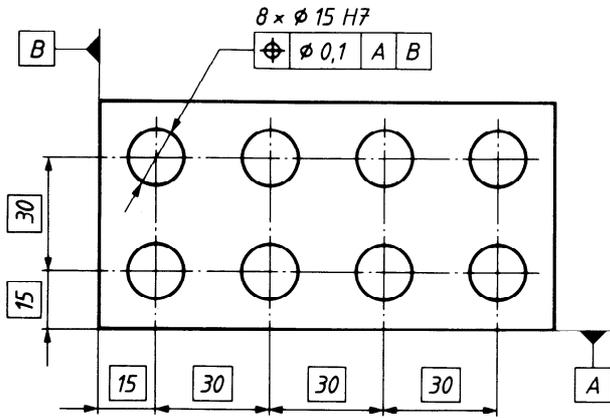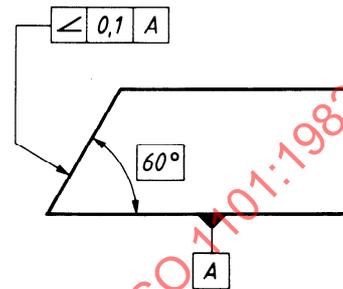
Figure 46

Figure 47

11 Projected tolerance zone

In some cases the tolerances of orientation and location shall apply not to the feature itself but to the external projection of it. Such projected tolerance zones are to be indicated by the symbol (P) (see figure 48).
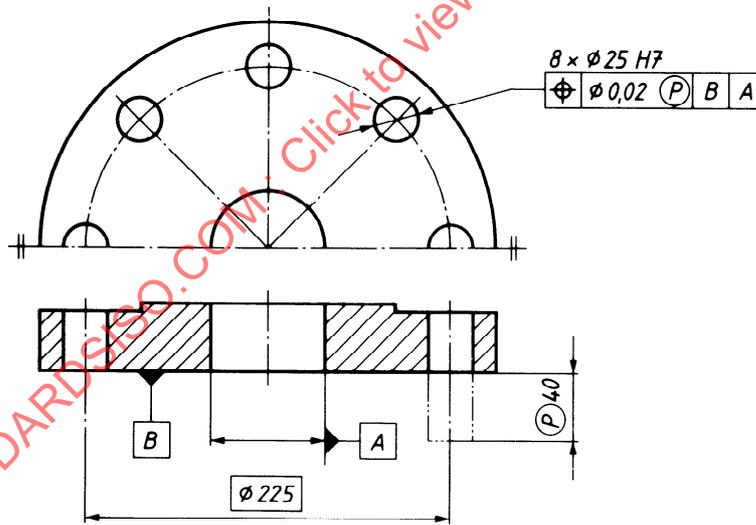
Figure 48

12 Maximum material condition

The indication that the tolerance value applies at the maximum material condition is shown by the symbol (M) placed after :

— the tolerance value (see figure 49);

— the datum letter (see figure 50);

— or both (see figure 51);

according to whether the maximum material principle is to be applied respectively to the toleranced feature, the datum feature or both.
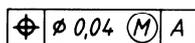
Figure 49
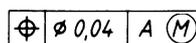
Figure 50

Figure 51

10
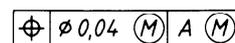
13 Definitions of tolerances

13.1 The various geometrical tolerances are defined with their tolerance zones in the following pages. In all the illustrations of the definitions only those deviations are shown with which the definitions deal.

13.2 Where required for functional reasons, one or more characteristics will be toleranced to define the geometrical accuracy of a feature. When the geometrical accuracy of a feature is defined by a certain type of tolerance, other deviations of this feature in some cases will be controlled by this tolerance (for example, straightness deviation is limited by parallelism tolerance). Thus it would rarely be necessary to symbolize all of these characteristics, since the other deviations are included on the zone of tolerance defined by the symbol specified.

However, certain other types of tolerances do not control other deviations (for example, straightness tolerance does not control deviation of parallelism).

13.3 For some tolerance zones (for example, for straightness of a line or axis in one direction only) there are two possible methods of graphical representation :

— by two parallel planes a distance *t* apart (see figure 52);

— by two parallel straight lines a distance *t* apart (see figure 53).

Figure 52 shows a three-dimensional representation, figure 53 its projection in a plane.
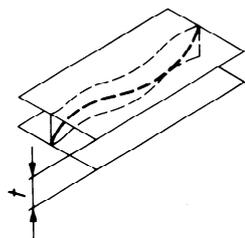
Figure 52
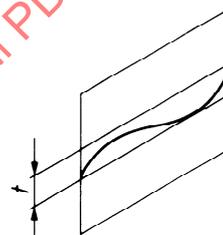
Figure 53

There is no difference in the meaning of the two representations (such a tolerance does not restrict the deviation in any direction perpendicular to the arrow). The simpler method as shown in figure 53 is normally used in this International Standard.

Values in millimetres

## 14 Detailed definitions of tolerances

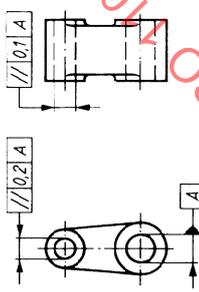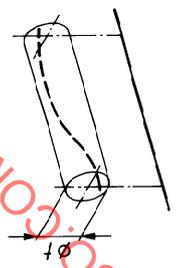| Symbol	Definition of the tolerance zone	Indication and interpretation
	14.1 Straightness tolerance	
—	The tolerance zone when projected in a plane is limited by two parallel straight lines a distance *t* apart. Figure 54	Any line on the upper surface parallel to the plane of projection in which the indication is shown shall be contained between two parallel straight lines 0,1 apart. ┌─ 0,1 ─┐ Figure 55
	The tolerance zone is limited by a parallelepiped of section $t_1 \times t_2$ if the tolerance is specified in two directions perpendicular to each other. Figure 57	Any portion of lengths 200 of any generator of the cylindrical surface indicated by the arrow shall be contained between two parallel straight lines 0,1 apart in a plane containing the axis. ┌─ 0,1/200 ─┐ Figure 56 The axis of the bar shall be contained within a parallelepipedic zone of width 0,1 in the vertical and 0,2 in the horizontal direction. ┌─ 0,1 ─┐ ┌─ 0,2 ─┐ Figure 58
	The tolerance zone is limited by a cylinder of diameter *t* if the tolerance value is preceded by the sign ⌀. Figure 59	The axis of the cylinder to which the tolerance frame is connected shall be contained in a cylindrical zone of diameter 0,08. ┌─ ⌀ 0,08 ─┐ Figure 60
	14.2 Flatness tolerance	
▱	The tolerance zone is limited by two parallel planes a distance *t* apart. Figure 61	The surface shall be contained between two parallel planes 0,08 apart. ┌─ ▱ 0,08 ─┐ Figure 62
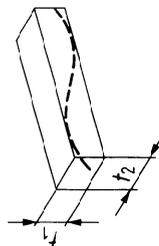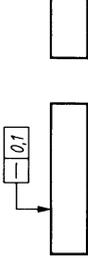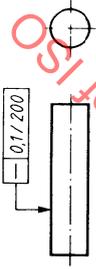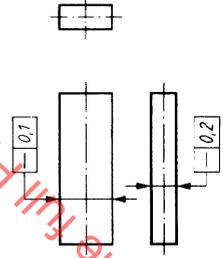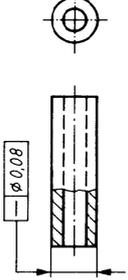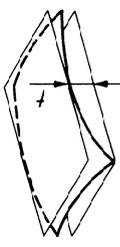
12

Values in millimetres

Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)
◯	**14.3 Circularity tolerance** The tolerance zone in the considered plane is limited by two concentric circles a distance *t* apart. Figure 63	The circumference of each cross-section of the outer diameter shall be contained between two co-planar concentric circles 0,03 apart. Figure 64 The circumference of each cross-section shall be contained between two co-planar concentric circles 0,1 apart. Figure 65
⌭	**14.4 Cylindricity tolerance** The tolerance zone is limited by two coaxial cylinders a distance *t* apart. Figure 66	The considered surface shall be contained between two coaxial cylinders 0,1 apart. Figure 67
⌒	**14.5 Profile tolerance of any line** The tolerance zone is limited by two lines enveloping circles of diameter *t*, the centres of which are situated on a line having the true geometrical form. Figure 68	In each section parallel to the plane of projection the considered profile shall be contained between two lines enveloping circles of diameter 0,04, the centres of which are situated on a line having the true geometrical profile. Figure 69
⌓	**14.6 Profile tolerance of any surface** The tolerance zone is limited by two surfaces enveloping spheres of diameter *t*, the centres of which are situated on a surface having the true geometrical form. sphere ⌀ *t* Figure 70	The considered surface shall be contained between two surfaces enveloping spheres of diameter 0,02, the centres of which are situated on a surface having the true geometrical form. Figure 71
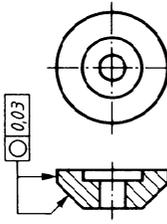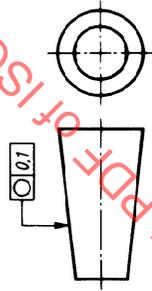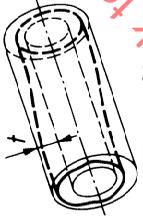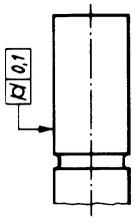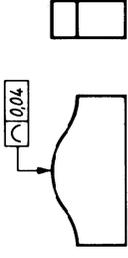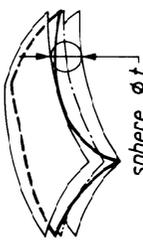
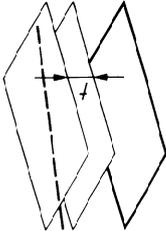Values in millimetres

Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)

14.7 Parallelism tolerance

14.7.1 Parallelism tolerance of a line with reference to a datum line

The tolerance zone when projected in a plane is limited by two parallel straight lines a distance t apart and parallel to the datum line, if the tolerance is only specified in one direction.
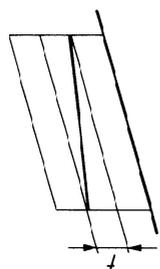
Figure 72
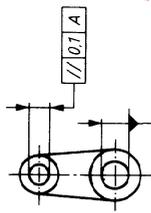
Figure 73

The toleranced axis shall be contained between two straight lines 0,1 apart, which are parallel to the datum axis **A** and lie in the vertical direction (see figure 73 or 74).
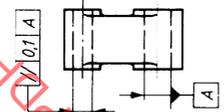
Figure 74
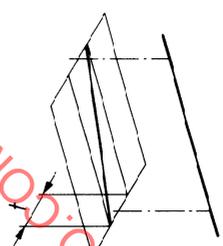
Figure 75
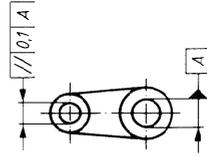
Figure 76

The toleranced axis shall be contained between two straight lines 0,1 apart, which are parallel to the datum axis **A** and lie in the horizontal direction.
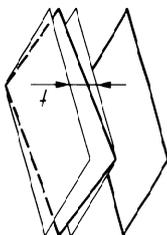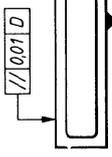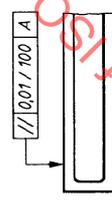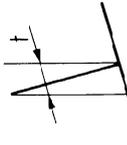
Symbol: //

Values in millimetres

Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)

14.7.1 Parallelism tolerance of a line with reference to a datum line (concluded)

The tolerance zone is limited by a parallelepiped of section $t_1 \times t_2$ and parallel to the datum line if the tolerance is specified in two planes perpendicular to each other.

Figure 77

The tolerance zone is limited by a cylinder of diameter t parallel to the datum line if the tolerance value is preceded by the sign ⌀.
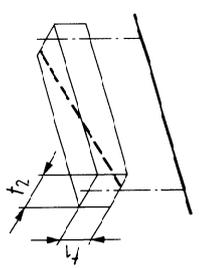
Figure 80

The toleranced axis shall be contained in a parallelepipedic tolerance zone having a width of 0,2 in the horizontal and 0,1 in the vertical direction and which is parallel to the datum axis **A** (see figures 78 or 79).
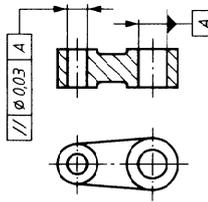
Figure 78

Figure 79

The toleranced axis shall be contained in a cylindrical zone of diameter 0,03 parallel to the datum axis **A** (datum line).

Figure 81

15

Values in millimetres

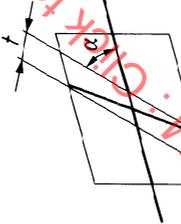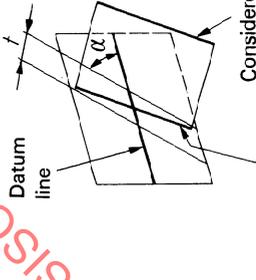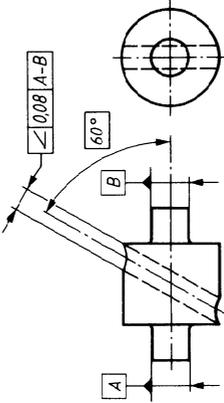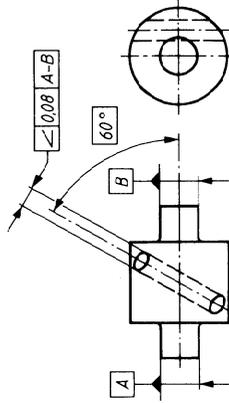| Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)
//	**14.7.2 Parallelism tolerance of a line with reference to a datum surface** The tolerance zone is limited by two parallel planes a distance t apart and parallel to the datum surface. Figure 82	The axis of the hole shall be contained between two planes 0,01 apart and parallel to the datum surface **B**. Figure 83
	14.7.3 Parallelism tolerance of a surface with reference to a datum line The tolerance zone is limited by two parallel planes a distance t apart and parallel to the datum line. Figure 84	The toleranced surface shall be contained between two planes 0,1 apart and parallel to the datum axis **C** of the hole. Figure 85
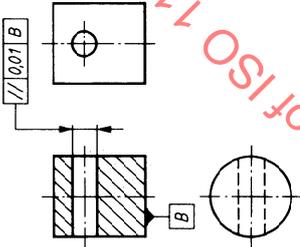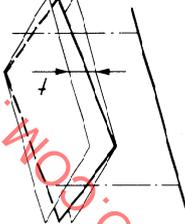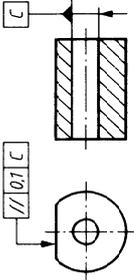
Values in millimetres

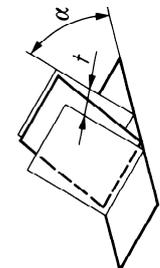| Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)
//	**14.7.4 Parallelism tolerance of a surface with reference to a datum surface** The tolerance zone is limited by two parallel planes a distance t apart and parallel to the datum surface. **Figure 86**	The toleranced surface shall be contained between two parallel planes 0,01 apart and parallel to the datum surface **D**. **Figure 87** All the points on the toleranced surface in a length of 100, placed anywhere on this surface, shall be contained between two parallel planes 0,01 apart and parallel to the datum surface **A**. **Figure 88**
⊥	**14.8 Perpendicularity tolerance** **14.8.1 Perpendicularity tolerance of a line with reference to a datum line** The tolerance zone when projected in a plane is limited by two parallel straight lines a distance t apart and perpendicular to the datum line. **Figure 89**	 **Figure 90** The axis of the inclined hole shall be contained between two parallel planes 0,06 apart and perpendicular to the axis of the horizontal hole **A** (datum line).
	14.8.2 Perpendicularity tolerance of a line with reference to a datum surface The tolerance zone when projected in a plane is limited by two parallel straight lines a distance t apart and perpendicular to the datum plane if the tolerance is specified only in one direction. **Figure 91** The tolerance zone is limited by a parallelepiped of section $t_1 \times t_2$ and perpendicular to the datum plane if the tolerance is specified in two directions perpendicular to each other. **Figure 93** The tolerance zone is limited by a cylinder of diameter t perpendicular to the datum plane if the tolerance value is preceded by the sign ⌀. **Figure 95**	The axis of the cylinder, to which the tolerance frame is connected, shall be contained between two parallel planes 0,1 apart, perpendicular to the datum surface. **Figure 92** The axis of the cylinder shall be contained in a parallelepipedic tolerance zone of 0,1 × 0,2 which is perpendicular to the datum surface. **Figure 94** The axis of the cylinder to which the tolerance frame is connected shall be contained in a cylindrical zone of diameter 0,01 perpendicular to the datum surface **A**. **Figure 96**
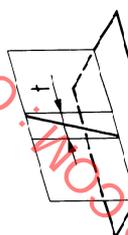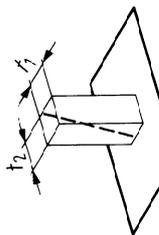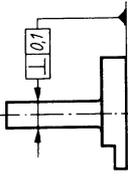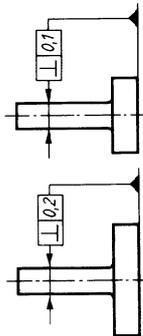
Values in millimetres

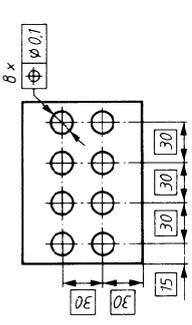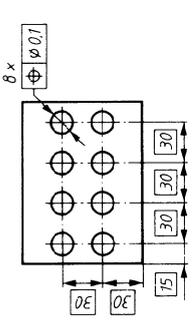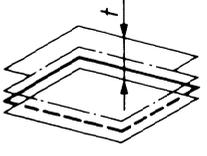| Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)
⊥	**14.8.3 Perpendicularity tolerance of a surface with reference to a datum line** The tolerance zone is limited by two parallel planes a distance t apart and perpendicular to the datum line. **Figure 97**	The toleranced face of the piece shall be contained between two parallel planes 0,08 apart and perpendicular to the axis **A** (datum line). ⊥ 0,08 A A **Figure 98**
	14.8.4 Perpendicularity tolerance of a surface with reference to a datum surface The tolerance zone is limited by two parallel planes a distance t apart and perpendicular to the datum surface. **Figure 99**	The toleranced surface shall be contained between two parallel planes 0,08 apart and perpendicular to the horizontal datum surface **A**. ⊥ 0,08 A A **Figure 100**
∠	**14.9 Angularity tolerance** **14.9.1 Angularity tolerance of a line with reference to a datum line** a) Line and datum line in the same plane. The tolerance zone when projected in a plane is limited by two parallel straight lines a distance t apart and inclined at the specified angle to the datum line. Datum line **Figure 101** b) Line and datum line in different planes. If the considered line and the datum line are not in the same plane, the tolerance zone is applied to the projection of the considered line on the plane containing the datum line and parallel to the considered line. Projected considered line Considered line **Figure 103**	The axis of the hole shall be contained between two parallel straight planes 0,08 apart which are inclined at 60° to the horizontal axis **A-B** (datum line). ∠ 0,08 A-B B 60° A **Figure 102** The axis of the hole, projected on a plane containing the datum axis, shall be contained between two parallel straight lines 0,08 apart which are inclined at 60° to the horizontal axis **A-B** (datum line). ∠ 0,08 A-B B 60° A **Figure 104**
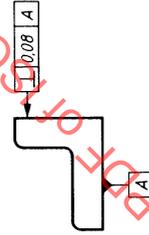
18

Values in millimetres

Symbol	Definition of the tolerance zone (*continued*)	Indication and interpretation (*continued*)
	14.9.2 Angularity tolerance of a line with reference to a datum surface	
	The tolerance zone when projected in a plane is limited by two parallel straight lines a distance t apart and inclined at the specified angle to the datum surface.	The axis of the hole shall be contained between two parallel planes 0,08 apart which are inclined at 60° to the surface **A** (datum surface).
	Figure 105	Figure 106
∠	**14.9.3 Angularity tolerance of a surface with reference to a datum line**	
	The tolerance zone is limited by two parallel planes a distance t apart and inclined at the specified angle to the datum line.	The inclined surface shall be contained between two parallel planes 0,1 apart which are inclined at 75° to the axis **A** (datum line).
	Figure 107	Figure 108
	14.9.4 Angularity tolerance of a surface with reference to a datum surface	
	The tolerance zone is limited by two parallel planes a distance t apart and inclined at the specified angle to the datum surface.	The inclined surface shall be contained between two parallel planes 0,08 apart which are inclined at 40° to the surface **A** (datum surface).
	Figure 109	Figure 110
	14.10 Positional tolerance	
⊕	**14.10.1 Positional tolerance of a point**	
	The tolerance zone is limited by a circle of diameter t, the centre of which is in the theoretically exact position of the considered point.	The actual point of intersection shall lie inside a circle of 0,3 diameter, the centre of which coincides with the theoretically exact position of the considered point of intersection.
	Figure 111	Figure 112
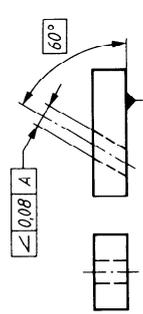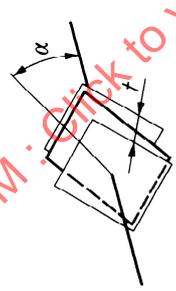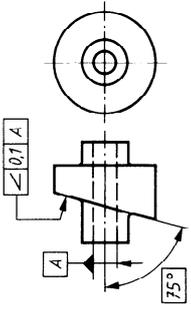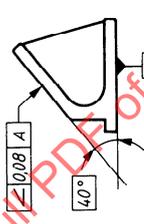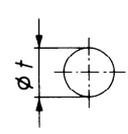
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Values in millimetres
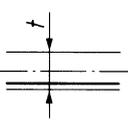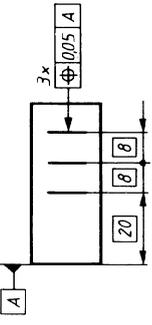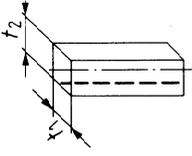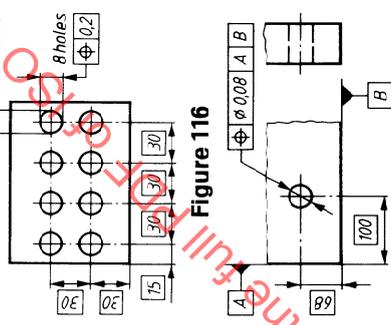
Symbol	Definition of the tolerance zone (continued)	Indication and interpretation (continued)
	14.10.2 Positional tolerance of a line	
⊕	The tolerance zone is limited by two parallel straight lines a distance t apart and disposed symmetrically with respect to the theoretically exact position of the considered line if the tolerance is specified only in one direction. Figure 113	Each of the lines shall be contained between two parallel straight lines 0,05 apart which are symmetrically disposed about the theoretically exact position of the considered line, with reference to the surface **A** (datum plane). Figure 114
	The tolerance zone is limited by a parallelepiped of section $t_1 \times t_2$ the axis of which is in the theoretically exact position of the considered line if the tolerance is specified in two directions perpendicular to each other. Figure 115	Each of the axes of the eight holes shall be contained within a parallelepipedic zone of width 0,05 in the horizontal and 0,2 in the vertical direction and the axis of which is in the theoretically exact position of the considered hole. Figure 116
	The tolerance zone is limited by a cylinder of diameter t the axis of which is in the theoretically exact position of the considered line if the tolerance value is preceded by the sign ø. Figure 117	The axis of the hole shall be contained within a cylindrical zone of diameter 0,08 the axis of which is in the theoretically exact position of the considered line, with reference to the surfaces **A** and **B** (datum planes). Figure 118
		Each of the axes of the eight holes shall be contained within a cylindrical zone of diameter 0,1 the axis of which is in the theoretically exact position of the considered hole. Figure 119
	14.10.3 Positional tolerance of a flat surface or a median plane	
	The tolerance zone is limited by two parallel planes a distance t apart and disposed symmetrically with respect to the theoretically exact position of the considered surface. Figure 120	The inclined surface shall be contained between two parallel planes which are 0,05 apart and which are symmetrically disposed with respect to the theoretically exact position of the considered surface with reference to the surface **A** (datum plane) and the axis of the datum cylinder **B** (datum line). Figure 121