

70 10

INTERNATIONAL STANDARD



1302

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

Technical drawings — Method of indicating surface texture on drawings

Dessins techniques — Indication des états de surface sur les dessins

Second edition — 1978-09-01

ITeCh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 1302:1978](https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978)

<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978>

UDC 744.43

Ref. No. ISO 1302-1978 (E)

Descriptors : drawings, engineering drawings, surface condition, roughness, symbols, graphical symbols.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 1302 was developed by Technical Committee ISO/TC 10, *Technical drawings*. The first edition (ISO 1302-1974) had been approved by the member bodies of the following countries :

Australia	Hungary	Portugal
Austria	India	Romania
Belgium	Iran	South Africa, Rep. of
Brazil	Israel	Spain
Canada	Italy	Sweden
Czechoslovakia	Japan	Switzerland
Denmark	Korea, Rep. of	Thailand
Egypt, Arab Rep. of	Netherlands	United Kingdom
Finland	New Zealand	U.S.S.R.
Germany	Norway	
Greece	Poland	

The member bodies of the following countries expressed disapproval of the Recommendation on technical grounds :

France
U.S.A.

<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978>

This second edition, which supersedes ISO 1302-1974, incorporates draft Addendum 1, which features at present as annex B, and which was circulated to the member bodies in October 1976. This draft addendum has been approved by the member bodies of the following countries :

Australia	Korea, Rep. of	Spain
Belgium	Mexico	Sweden
Chile	Netherlands	Switzerland
Denmark	New Zealand	Turkey
Finland	Poland	United Kingdom
India	Romania	U.S.A.
Italy	South Africa, Rep. of	U.S.S.R.

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Canada
France
Germany
Japan

CONTENTS

	Page
1 Scope and field of application	1
2 References	1
3 Symbols used for indication of surface texture	1
4 Indications added to the symbols	2
4.1 Indication of surface roughness	2
4.2 Indication of special surface texture characteristics	3
4.3 Symbols for the direction of lay	5
4.4 Indication of machining allowance	6
4.5 Position of the specifications of surface texture in the symbol	6
5 Indications on drawings	6
6 Important notes	9
Annexes	
A Synoptic table	10
B Proportions and dimensions of symbols	12

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978>
ISO 1302:1978

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 1302:1978

<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978>

Technical drawings – Method of indicating surface texture on drawings

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the symbols and additional indications of surface texture to be indicated on technical drawings.

NOTE – For uniformity all figures in this International Standard are in first angle projection (method E). It should be understood that the third angle projection (method A) could equally well have been used without prejudice to the principles established.

2 REFERENCES

ISO/R 129, *Engineering drawing – Dimensioning*.

ISO/R 468, *Surface roughness*.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3 SYMBOLS USED FOR INDICATION OF SURFACE TEXTURE

3.1 The basic symbol consists of two legs of unequal length inclined at approximately 60° to the line representing the considered surface, as shown in figure 1.

ISO 1302:1978

This symbol alone has no meaning except as in sub-clauses 5.4 and 5.6.

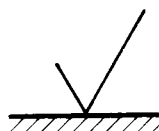


FIGURE 1

3.2 If the removal of material by machining is required, a bar is added to the basic symbol, as shown in figure 2.



FIGURE 2

3.3 If the removal of material is not permitted, a circle is added to the basic symbol, as shown in figure 3.



FIGURE 3

3.4 The symbol in figure 3 may also be used in a drawing relating to a production process to indicate that a surface is to be left in the state resulting from a preceding manufacturing process, whether this state was achieved by removal of material or otherwise.

In this case none of the indications given in clause 4 are added to the symbol.

3.5 When special surface characteristics have to be indicated (see 4.2) a line is added to the longer arm of any of the above symbols, as shown in figure 4.

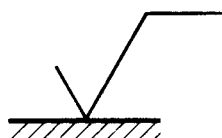


FIGURE 4

4 INDICATIONS ADDED TO THE SYMBOLS

4.1 Indication of surface roughness

4.1.1 The value or values defining the principal criterion of roughness (see 4.1.5) are added to the symbols given in figures 1, 2 and 3, as shown in figures 5, 6 and 7.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

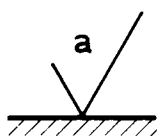


FIGURE 5

ISO 1302:1978
<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-876227922726-1302-1978>

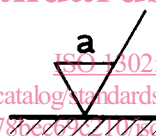


FIGURE 6

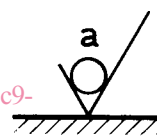


FIGURE 7

4.1.2 A surface texture specified

- as in figure 5 may be obtained by any production method;
- as in figure 6 must be obtained by removal of material by machining;
- as in figure 7 must be obtained without removal of material.

4.1.3 When only one value is specified it represents the maximum permissible value of surface roughness.

4.1.4 If it is necessary to impose maximum and minimum limits of the principal criterion of surface roughness, both values shall be shown as in figure 8, with the maximum limit (a_1) above the minimum limit (a_2).

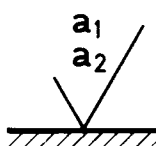


FIGURE 8

4.1.5 The principal criterion of roughness, R_a , may be indicated by the corresponding roughness grade number shown in table 1.

This is to avoid misinterpretation of numerical values, which may be indicated in different units (micrometre or microinch).

TABLE 1

Roughness values R_a		Roughness grade numbers
μm	μin	
50	2 000	N 12
25	1 000	N 11
12,5	500	N 10
6,3	250	N 9
3,2	125	N 8
1,6	63	N 7
0,8	32	N 6
0,4	16	N 5
0,2	8	N 4
0,1	4	N 3
0,05	2	N 2
0,025	1	N 1

4.2 Indication of special surface texture characteristics

4.2.1 In certain circumstances, for functional reasons it may be necessary to specify additional special requirements concerning surface texture.

4.2.2 If it is required that the final surface texture be produced by one particular production method, this method shall be indicated in plain language on an extension of the longer arm of the symbol given in figure 4, as shown in figure 9.

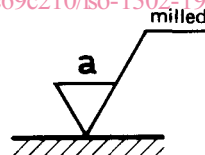


FIGURE 9

4.2.3 Also on this extension line shall be given any indications relating to treatment or coatings.

Unless otherwise stated, the numerical value of the roughness applies to the surface texture after treatment or coating.

If it is necessary to define surface texture both before and after treatment, this shall be explained in a suitable note or in accordance with figure 10.

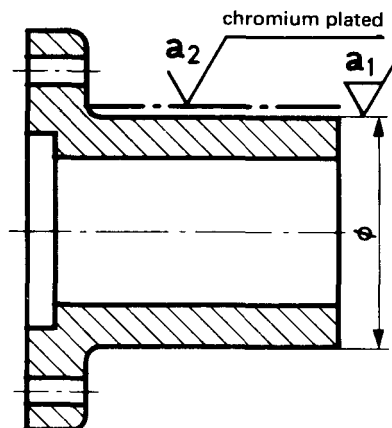


FIGURE 10

4.2.4 If it is necessary to indicate the sampling length, it shall be selected from the series given in ISO/R 468 and be stated adjacent to the symbol, as shown in figure 11.

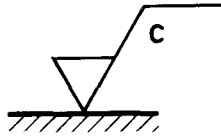


FIGURE 11

4.2.5 If it is necessary to control the direction of lay, it is specified by a symbol (see 4.3) added to the surface texture symbol as shown in figure 12.



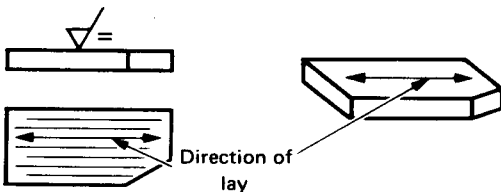
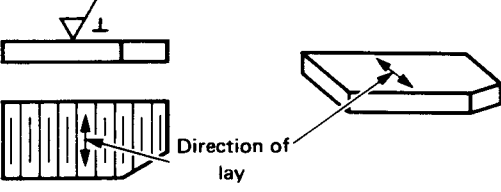
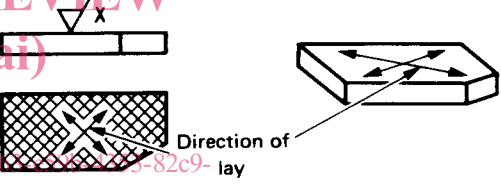
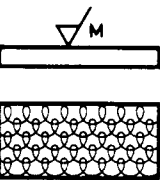
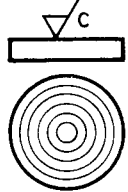
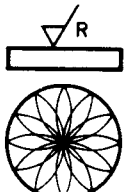
ISO 1302:1978
FIGURE 12
<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978>

NOTE – The direction of lay is the direction of the predominant surface pattern, ordinarily determined by the production method employed.

4.3 Symbols for the direction of lay

The series of symbols shown in table 2 specifies the common directions of lay.

TABLE 2

Symbol	Interpretation
<p>=</p>	<p>Parallel to the plane of projection of the view in which the symbol is used</p> 
<p>⊥</p>	<p>Perpendicular to the plane of projection of the view in which the symbol is used</p> 
<p>X</p>	<p>Crossed in two slant directions relative to the plane of projection of the view in which the symbol is used</p>  <p><i>(standards.iteh.ai)</i></p> <p>ISO 1302:1978</p> <p>https://standards.iteh.ai/catalog/standards/sist/8884dbb2-2225-4205-82c9-878bcc69c210/iso-1302-1978</p>
<p>M</p>	<p>Multi-directional</p> 
<p>C</p>	<p>Approximately circular relative to the centre of the surface to which the symbol is applied</p> 
<p>R</p>	<p>Approximately radial relative to the centre of the surface to which the symbol is applied</p> 

NOTE — Should it be necessary to specify a direction of lay not clearly defined by these symbols then this must be achieved by a suitable note on the drawing.

4.4 Indication of machining allowance

Where it is necessary to specify the value of the machining allowance, this shall be indicated on the left of the symbol as shown in figure 13. This value shall be expressed in millimetres or inches, according to the general system used for dimensioning the drawing.

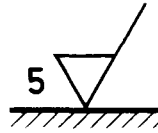


FIGURE 13

4.5 Position of the specifications of surface texture in the symbol

The specifications of surface texture shall be placed relative to the symbol as shown in figure 14.

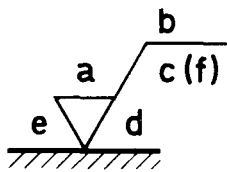


FIGURE 14

- a = Roughness value R_a in micrometres or microinches
or
Roughness grade number N1 to N12
- b = Production method, treatment or coating
- c = Sampling length
- d = Direction of lay
- e = Machining allowance
- f = Other roughness values (in brackets)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/8884db63-e59b-4353-82c9-878bec69c210/iso-1302-1978>

5 INDICATIONS ON DRAWINGS

5.1 In conformity with ISO/R 129, the symbol, as well as the inscriptions, shall be orientated so they may be read from the bottom or the right-hand side of the drawing (see figure 15).

If it is not practicable to adopt this general rule, the symbol may be drawn in any position, but only provided that it does not carry any indications of special surface texture characteristics or of machining allowances (as given in 4.2 to 4.4). Nevertheless, in such cases the inscription defining the value of the principal criterion of roughness (if present) must always be written in conformity with the general rule (see figure 16).

If necessary, the symbol may be connected to the surface by a leader line terminating in an arrow.

The symbol or the arrow shall point from outside the material of the piece, either to the line representing the surface, or to an extension of it (see figure 15).

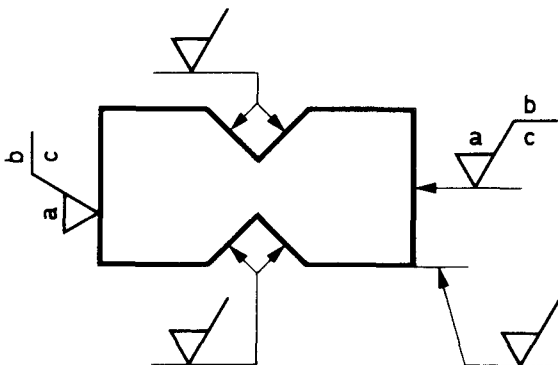


FIGURE 15

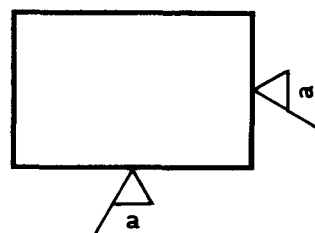
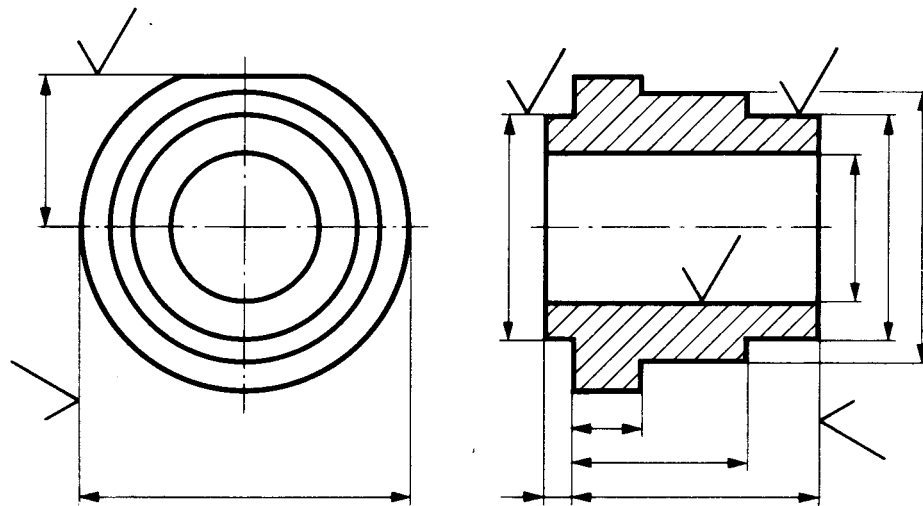


FIGURE 16

5.2 In accordance with the general principles of dimensioning, the symbol is only used once for a given surface and, if possible, on the view which carries the dimension defining the size or position of the surface (see figure 17).



iTeh STANDARD PREVIEW
FIGURE 17
(standards.iteh.ai)

ISO 1302:1978

5.3 If the same texture is required on all the surfaces of a part, it is specified

- either by a note near a view of the part (figure 18), near the title block, or in the space devoted to general notes;
- or following the part number on the drawing (figure 19).

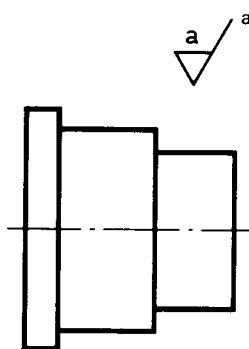


FIGURE 18

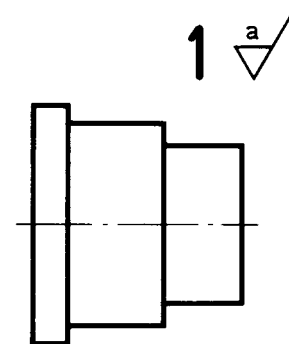


FIGURE 19