International Standard 3443/2

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

Tolerances for building — Part 2 : Statistical basis for predicting fit between components having a normal distribution of sizes

Tolérances pour le bâtiment — Partie 2 : Base statistique pour la prévision de possibilités d'assemblage entre composants, relevant d'une distribution normale des dimensions

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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 3443/2 was developed by Technical Committee ISO/TC 59, *Building construction*, and was circulated to the member bodies in October 1977.

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

Australia	Hungary	Portugal
Austria	Israel	Romania
Belgium	Italy	South Africa, Rep. of
Canada	Japan	Spain
Czechoslovakia	Korea, Rep. of	Sweden
Denmark	Mexico	United Kingdom
Egypt, Arab Rep. of	New Zealand	USSR
Finland	Norway	
Germany, F.R.	Poland	

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

France
Netherlands

Printed in Switzerland

This International Standard forms one of a series concerning tolerances for components and construction of predictable variability. This series includes the following :

ISO 1803, *Tolerances for building — Vocabulary.*[1)]

ISO 3443/1, *Tolerances for building — Part 1 : Basic principles for evaluation and specification.*[2)]

ISO 4464, *Tolerances for building — Identification of tolerances and their relationship.*[3)]

It is envisaged that a group of standards in the series will deal with calculation methods for relating tolerances, work sizes and joint width.[4)] This International Standard describes the statistical basis of such calculation methods, and subsequent standards within the group will describe modifications and additions to this statistical basis to take account of various factors that arise in practice.

The annex is for information and does not form an integral part of this International Standard.

1) Under revision.

2) At present at the stage of draft.

3) In preparation.

4) The expression "joint width" is used in this International Standard as it is the term currently used. In this case, it should be made clear that it indicates the notion which is expressed in ISO 2444 by the less commonly used term "joint clearance" as follows :

joint clearance : The distance between the joint faces of two components set side by side, i.e. the distance considered in order to achieve fit.

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Tolerances for building — Part 2 : Statistical basis for predicting fit between components having a normal distribution of sizes

1 SCOPE

This International Standard describes the fundamental characteristics of dimensional variability in building and of the particular case of combination of random unrelated variables; it sets out the need to relate dimensional variability to the limits imposed on joint widths by the need for satisfactory functioning.

2 FIELD OF APPLICATION

This International Standard applies to all forms of building construction that have predictable variability which follows a Gaussian distribution.

3 REFERENCE

ISO 3207, *Statistical interpretation of data — Determination of a statistical tolerance interval.*

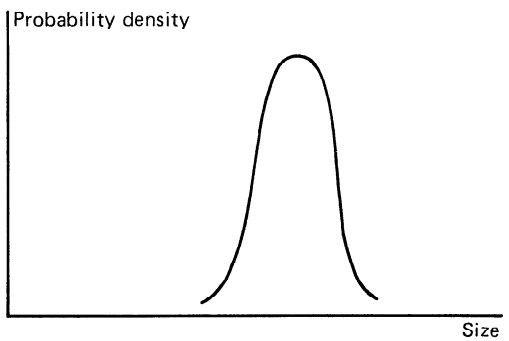
4 GENERAL

Although this International Standard does not deal in detail with the design of joints between components, it recognises that a given joint design will have certain associated limits within which the required joint width must lie if it is to function satisfactorily. The joint width achieved in a given assembly of components will be determined by the dimensional variability (deviations, errors, inaccuracies) in that assembly. The calculation of "fit" is essentially a process of reconciling the required joint width range with the joint width that is predicted to result from dimensional variability. Thus, the dimensional flexibility of a jointing technique is expressed in terms of its maximum and minimum clearance capabilities, i.e. the limits of clearance within which performance can be maintained.

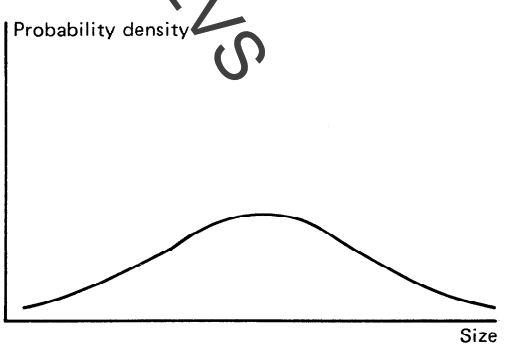
Exceeding either limit results in a "misfit". The design or selection of a jointing technique should therefore include the aim of matching its clearance capability with the clearance predicted to occur. The calculation of "fit" is relevant both to the derivation of a suitable work size for a component and to proposed uses of an existing component, of known work size, in a known situation.

5 PROBABILITY AND INDUCED DEVIATIONS

In many production and erection processes, the achieved sizes in a sufficient number of attempts follow the so-called normal distribution, the density function of which is depicted by the Gaussian curve (see figure 1).



Small standard deviation



Large standard deviation

FIGURE 1 — **Gaussian curves (Normal distribution for different standard deviations)**