



JAPANESE  
INDUSTRIAL  
STANDARD

Translated and Published by  
Japanese Standards Association

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JIS Z 8101-2 : 1999

**Statistics—  
Vocabulary and symbols  
Part 2 : Statistical quality control  
terms**

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**ICS** 01.040.03; 03.120.10; 03.120.30

**Descriptors** : vocabulary, marks, symbols, statistical quality control

**Reference number** : JIS Z 8101-2 : 1999 (E)

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## Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. By this establishment JIS Z 8101 : 1981 was withdrawn and replaced with this Standard.

This Standard has been prepared based on the first edition issued in 1993 of ISO 3534-2.

**JIS Z 8101 : 1999** consists of the following parts, under the general title *Statistics—Vocabulary and symbols*:

- Part 1 : *Probability and general statistical terms*
- Part 2 : *Statistical quality control terms*
- Part 3 : *Design of experiments*

Date of Establishment: 1999-05-20

Date of Public Notice in Official Gazette: 1999-05-20

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Basic Items

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JIS Z 8101-2:1999, First English edition published in 2000-07

Translated and published by: Japanese Standards Association  
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

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Printed in Japan

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## Statistics—Vocabulary and symbols Part 2 : Statistical quality control terms

**Introduction** This Japanese Industrial Standard has been prepared based on **ISO 3534-2, Statistics—Vocabulary and symbols—Part 2 : Statistical quality control terms** published in 1993 as the first edition. The policy of revision work of **ISO 3534-1** and **2** ongoing in **ISO/TC 69/SC 1/WG2** decides to transfer the technical contents of the Sections 3 and 4 in **ISO 3534-1 : 1993** to the **Part 2**, so that this Standard includes the technical contents of Section 3 and Section 4 in **ISO 3534-1 : 1993**.

**Scope** This Standard specifies statistical quality control terms which may be used in the drafting of other Japanese Industrial Standards and also specifies the symbols for some terms.

The terms are classified under the following main headings:

- General statistical and quality control terms,
- Terms related to observed values and test results,
- Sampling terms,
- Sampling inspection terms,
- Statistical process control terms.

### 1 General statistical and quality control terms

#### 1.1 process

Source of bringing about products or service.

#### 1.2 process quality control ; process control

Activities to reduce the dispersion of the characteristics of products or service which are the output of the process and to keep these characteristics. In the process of these activities, improvement of process, standardization and accumulation of technology are promoted.

#### 1.3 inspection

Activities to carry out measurement, test, verification, calibration, etc. for one or more characteristic(s) of product or service to judge whether being in conformance with the specified requirements.

#### 1.4 100 % inspection

Inspection of every item of product or service.

#### 1.5 indirect inspection

A receiving inspection where a test to be made by purchaser is omitted, where appropriate, after examining the test results provided by the supplier.

**1.6 item, entity**

That which can be individually described and separated clearly one by one.

Remarks: In sampling bulk material, an item is usually a defined quantity of material, e.g. a scoopful of powder, a specified mass or a specified volume. Then the lot size is the number of these units in the lot.

**1.7 lot, batch**

A definite quantity of some product or material manufactured or considered to be manufactured under the same conditions.

Remarks: In the case of service, a definite quantity under the same conditions can be considered as a lot.

**1.8 lot size**

The number of items in a lot.

**1.9 consignment**

A quantity of commodity delivered at one time.

Remarks: A consignment may consist of several lots or parts of a lot.

**1.10 rational subgroup**

A block of the manufacturing processes within which variations may be considered to be due to non-assignable chance causes only, but between which there may be variations due to assignable causes the presence of which is considered both possible and important to detect. Where a block is a duration of divided time of manufacturing process so as to make a relatively uniform condition in it.

**1.11 size of subgroup**

The number of observed values in a subgroup. Where the subgroup is rational subgroup.

**1.12 tolerance limits, limiting values, specification limits**

Specified values of the characteristic giving upper and/or lower bounds of the permissible value.

**1.13 tolerance**

Difference between the upper and the lower tolerance limits.

**1.14 nonconformity**

The non-fulfillment of a specified requirement.

**1.15 nonconforming item, nonconforming unit**

An item with one or more nonconformities.

**1.16 lot quality**

Degree of good quality of lot as a group. The lot quality is denoted with average value, rate of nonconforming item, number of nonconformities per unit, etc.

### 1.17 process average

An assessed value of the average of process assumed from the inspection results of the products.

### 1.18 cause and effect diagram

A diagram which systematically shows the relation between the effects and the causes of the product (see Fig. 1).

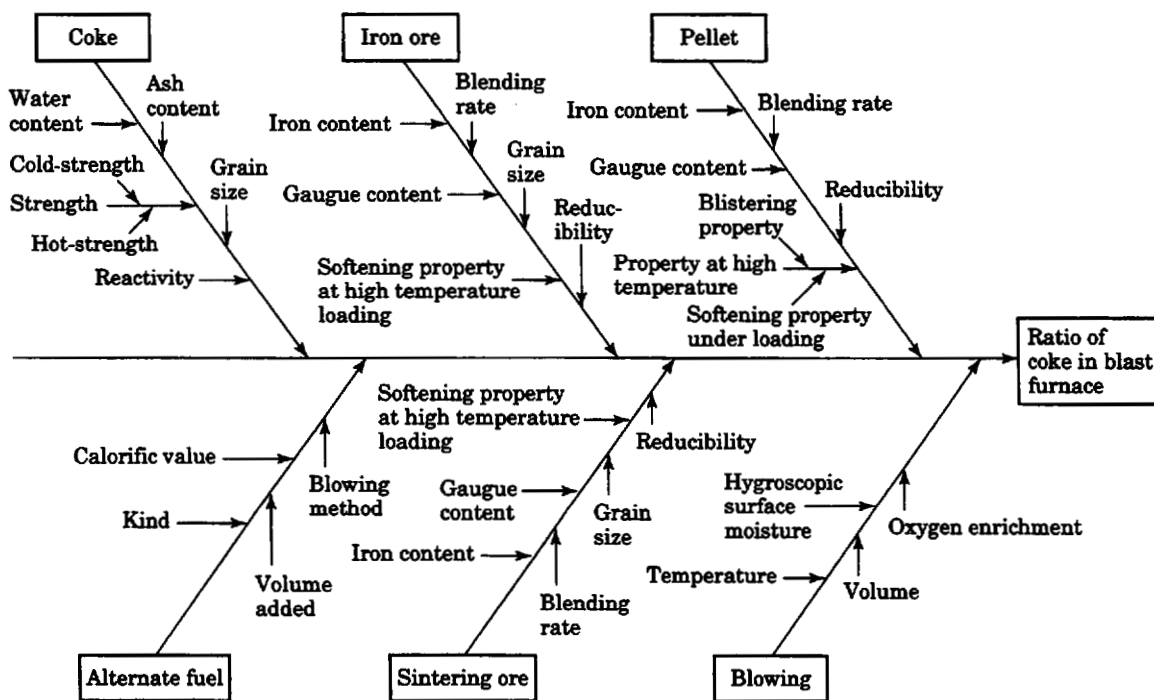


Fig. 1 Example of cause and effect diagram

### 1.19 Pareto diagram

A diagram which stratifies item by item and arranges in the order of magnitude of frequency of occurrence to show the cumulative sum. For example, the Pareto diagram made by classifying the nonconforming items according to the contents of nonconformities and arranging in the order of the number of nonconforming items shows the ranking of importance of nonconformities (see Fig. 2).

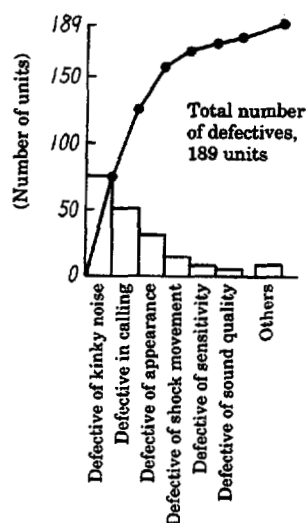


**Fig. 2 Example of Pareto diagram**

## **2 Terms related to observed values and test results**

### **2.1 true value**

A quantity which coincides with the definition of a given specific quantity.

Remarks : This is the value obtained only by the idealized complete measurement.

### **2.2 conventional true value**

A value fitting for a given purpose substituting for the true value.

Remarks : The conventional true value is usually considered to be sufficiently near the true value for its purpose.

Example : The value given to the reference material according to an agreement becomes the conventional true value of that reference material.

### **2.3 accepted reference value**

The value useful for comparison as a recognized standard and obtained as follows:

- a) Theoretical value or definite value based on scientific principles,
- b) Given value or certified value on the basis of the experiment and research carried out by the government or international organization,
- c) Conventional true value or certified value on the basis of the joint experiment and research carried out by the scientific or engineering groups,
- d) If not based on any of a), b) and c), the expected value of that quantity, namely, the arithmetic mean of the distribution of the observed values.

## 2.4 test result

The value of characteristic obtained by executing the specified measuring method.

**Remarks :** The measuring method should specify the test result to be selected from the single observed value, the average of plural observed values or a suitable function of plural observed values (e.g. median and standard deviation). Moreover, the correction such as conversion of gas volume to standard condition may also be specified. Therefore, the result calculated from the plural observed values can be taken as a single test result. In a simple case, a single observed value itself is taken as a test result.

## 2.5 error of result

The value obtained by subtracting the true value from the observed value or the test result.

- Remarks 1** Actually, the reference or the conventional true value is used in substitution for the true value.
- 2** The error of result consists of random error and systematic error. The **random error** which is a component of the error gives rise to an unpredictable variation between the plural observed values and test results of the same characteristic. It is impossible to correct the random error. The **systematic error** which is also a component of the error gives rise to a predictable variation or a given variation between the plural test results of the same characteristic. Both known and unknown cases apply to the systematic error and its cause.

## 2.6 bias

The value obtained by subtracting the true value from the expectation of the observed value or test result.

**Remarks :** Actually, the reference value or conventional true value is used in substitution for the true value.

## 2.7 trueness

Degree of bias from the true value. It is said that the smaller bias, the better or higher the trueness is.

**Remarks :** Actually, the reference value or the conventional true value is used in substitution for the true value.

## 2.8 dispersion, imprecision

A state in which the largeness of observed values and test results is not uniform. Or a degree of lack of uniformity. For denoting the largeness of dispersion, the standard deviation is used.

## 2.9 precision

A degree of the dispersion of independent observed value and test result obtained from the same sample under a specified condition. It is said that the smaller dispersion, the better or higher the precision is.

- Remarks 1** The precision depends only upon the distribution of the random errors without relation to the true value and/or specific value.