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**Control charts —**

Part 3:  
**Acceptance control charts**

*Cartes de contrôle —*

*Partie 3: Cartes de contrôle pour acceptation*



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ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

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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 preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7870-3 was prepared by Technical Committee ISO/TC 69, *Applications of statistical methods*, Subcommittee SC 4, *Applications of statistical methods in process management*.

This first edition of ISO 7870-3 cancels and replaces ISO 7966:1993.

ISO 7870 consists of the following parts, under the general title *Control charts*:

- *Part 1: General guidelines*
- *Part 2: Shewhart control charts*
- *Part 3: Acceptance control charts*
- *Part 4: Cumulative sum charts*

Additional parts on specialized control charts and on the application of statistical process control (SPC) charts are planned.

## Introduction

An acceptance control chart combines consideration of control implications with elements of acceptance sampling. It is an appropriate tool for helping to make decisions with respect to process acceptance. The bases for the decisions may be defined in terms of

- a) whether or not a designated percentage of units of a product or service derived from that process will satisfy specification requirements;
- b) whether or not a process has shifted beyond some allowable zone of process level locations.

A difference from most acceptance sampling approaches is the emphasis on process acceptability rather than on product disposition decisions.

A difference from usual control chart approaches is that the concept of process acceptance is introduced in the process control. The process usually does not need to be in control about a single standard process level; as long as the within-subgroup variability remains in control and is much smaller than the tolerance spread, it can (for the purpose of acceptance) run at any level or levels within a zone of process levels which would be acceptable in terms of tolerance requirements. Thus, it is assumed that some assignable causes will create shifts in the process levels which are small enough in relation to requirements that it would be uneconomical to attempt to control them too tightly for the purpose of mere acceptance.

The use of an acceptance control chart does not, however, rule out the possibility of identifying and removing assignable causes for the purpose of continuing process improvement.

A check on the inherent stability of the process is required. Therefore, variables are monitored using Shewhart-type range or sample standard deviation control charts to confirm that the variability inherent within rational subgroups remains in a steady state. Supplementary examinations of the distribution of the encountered process levels form an additional source of control information. A preliminary Shewhart control chart study should be conducted to verify the validity of using an acceptance control chart.



## Control charts —

### Part 3: Acceptance control charts

#### 1 Scope

This part of ISO 7870 gives guidance on the uses of acceptance control charts and establishes general procedures for determining sample sizes, action limits and decision criteria. An acceptance control chart should be used only when:

- a) the within subgroup variation is in-control and the variation is estimated efficiently;
- b) a high level of process capability has been achieved.

An acceptance control chart is typically used when the process variable under study is normally distributed; however, it can be applied to a non-normal distribution. The examples provided in this part of ISO 7870 illustrate a variety of circumstances in which this technique has advantages; these examples provide details of the determination of the sample size, the action limits and the decision criteria.

#### 2 Normative references

The following standards, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3534-1, *Statistics — Vocabulary and symbols — Part 1: General statistical terms and terms used in probability*

ISO 3534-2, *Statistics — Vocabulary and symbols — Part 2: Applied statistics*

#### 3 Terms and definitions

For the purposes of document, the terms and definitions given in ISO 3534-1 and ISO 3534-2 apply.

##### 3.1

##### **acceptable process**

process which is represented by a Shewhart control chart with a central line within the acceptable process zone

NOTE 1 Ideally, the average value  $\bar{X}$  of such a control chart would be at the target value.

NOTE 2 The acceptable process zone is shown in Figure 1. Information on the Shewhart control chart can be found in ISO 7870-2.