BS ISO 7870-3:2020

BSI Standards Publication

Control charts

Part 3: Acceptance control charts

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National foreword

This British Standard is the UK implementation of ISO 7870-3:2020. It supersedes BS ISO 7870-3:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SS/4, Statistical Process Management.

A list of organizations represented on this committee can be obtained on request to its secretary.

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 7870-3:2012), of which it constitutes a minor revision with the following changes:

— typo corrections in 9.1, example 1;

— editorial updates.

A list of all parts in the ISO 7870 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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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.

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Control charts —

Part 3: Acceptance control charts

1 Scope

This document 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 document 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 this document, the terms and definitions given in ISO 3534-1, ISO 3534-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
acceptable process
process which is represented by a Shewhart control chart with a central line within the acceptable process zone

Note 1 to entry: Ideally, the average value $\overline{X}$ of such a control chart would be at the target value.

Note 2 to entry: The acceptable process zone is shown in Figure 1. Information on the Stewhart control chart can be found in ISO 7870-2.

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