BS ISO 7870-1:2019

BSI Standards Publication

Control charts

Part 1: General guidelines

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National foreword

This British Standard is the UK implementation of ISO 7870-1:2019. It supersedes BS ISO 7870-1:2014, which is withdrawn.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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Part 1: General guidelines

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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 third edition of ISO 7870-1 cancels and replaces the second edition (ISO 7870-1:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Added Annex A, specifying the conventions for drafting control charts.

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

Every production, service, or administrative process contains a certain amount of variability due to the presence of a large number of causes. The observed results from a process are, as a result, not constant. Studying this variability to gain an understanding of its characteristics provides a basis for taking action on a process.

Control charts are a fundamental tool of statistical process control (SPC). They provide a simple graphical method that can be used to

a) indicate if the process is stable, i.e. operating within a stable system of random causes, also known as inherent variability and referred to as being in a "state of statistical control",

b) estimate the magnitude of the inherent variability of the process,

c) compare information from samples representing the current state of a process against control limits reflecting this variability, with the objective of determining whether the process variability has remained stable or is reduced or increased,

d) identify, investigate, and possibly reduce/eliminate the effect of special causes of variability, which can drive the process to an unacceptable level of performance,

e) aid in the regulation of a process through the identification of patterns of variability such as trends, runs, cycles, etc.,

f) determine if the process is behaving in a predictable and stable manner so that it will be possible to assess if the process is able to meet specifications,

g) determine whether or not the process can be expected to satisfy product or service requirements and process capability for the characteristic(s) being measured,

h) provide a basis for process adjustment through prediction using statistical models, and

i) assist in the assessment of the performance of a measurement system.

A major virtue of the control chart is its ease of construction and use. It provides the production or service operator, engineer, administrator, and manager with an online indicator about the behaviour of the process. However, in order for the control chart to be a reliable and efficient indicator of the state of the process, careful attention has to be paid at the planning stage to such matters as selecting the appropriate type of chart for the process under study and determining a proper sampling scheme.

General concepts useful to a successful design of a control chart are presented in Annex A.

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Control charts —

Part 1: General guidelines

1 Scope

This document presents key elements and the philosophy of the control chart approach, and identifies a wide variety of control charts (including those related to the Shewhart control chart, those stressing process acceptance or online process adjustment, and specialized control charts).

It presents an overview of the basic principles and concepts of control charts and illustrates the relationship among various control chart approaches to aid in the selection of the most appropriate part of ISO 7870 for given circumstances. It does not specify statistical control methods using control charts. These methods are specified in the relevant parts of ISO 7870.

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
control chart
chart with *control limits* (3.2) on which some statistical measure of a series of samples is plotted in a particular order to steer the process with respect to that measure

Note 1 to entry: The particular order is usually based on time or sample number order.

Note 2 to entry: The control chart operates most effectively when the measure is a process variable which is correlated with an ultimate product or service characteristic.

[SOURCE: ISO 3534-2:2006, 2.3.1, modified — added "with control limits" after "chart" in definition, deleted "and to control and reduce variation" after "to that measure".]

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