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First edition  
2007-10-01

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## Control charts —

### Part 1: General guidelines

*Cartes de contrôle —*

*Partie 1: Lignes directrices générales*



Reference number  
ISO 7870-1:2007(E)

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Published in Switzerland

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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 7870-1 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 7870-1 cancels and replaces ISO 7870:1993.

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

— *Part 1: General guidelines*

The following parts are planned:

— *Part 2: Shewhart control charts*

— *Part 3: Process acceptance control charts*

— *Part 4: Process adjustment control charts*

— *Part 5: Specialized control charts*

— *Part 6: Guide to the application of statistical control charts*

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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, or is not, 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 limits reflecting this variability, with the objective of determining whether the process has remained stable or not and variability has been reduced or not;
- d) identify, investigate and possibly reduce/eliminate the effect of special causes of variability, which may 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 and the like;
- 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;
- 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 on-line 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 must 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 this part of ISO 7870.