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First edition
2010-03-15

Plastics — Production quality control — Statistical method for using single measurements

*Plastiques — Contrôle de qualité en production — Méthode statistique
pour l'utilisation de mesurages uniques*



Reference number
ISO 25337:2010(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 25337 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

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Introduction

Many ISO standard test methods specify that measurements be made in duplicate or even in more than duplicate. In some cases, repeated operations are also specified. However, for production quality control it is common practice to carry out single measurements. For many production environments, replicates and/or repeated operations, as specified in many ISO standards, are time-consuming and expensive and could result in an undesirable increase in production costs. Furthermore, the laboratory response time could also increase unacceptably.

This International Standard presents a statistical method for using only single measurements in a production environment, in accordance with ISO test method standards which specify at least duplicate measurements and/or repeated operations. This International Standard is likely to be of interest to companies using ISO test methods in production quality control and recorded in their quality management system. This International Standard is not intended to be used for publishing data, for marketing purposes or for the development of customer specifications/designations.

Provided the statistical computations support the reduction in the number of replicates for a particular test, reduction from duplicate replicates to a single measurement is possible, as is reduction in the number of replicates for a test result to half, or even less than half, the specified number of replicates. A reduction in the variability of a test method might be necessary before a reduction in the number of test replicates can be considered¹⁾.

Technical Committee ISO/TC 61, *Plastics*, considers that such a model might not only be of importance in the field of plastics but also of interest in other fields in which ISO test methods are used in production quality control.

Single measurements are often used for quality control tests. The "single-measurement model" presented in this International Standard forms a basis for

- carrying out single measurements for production quality control;
- reducing the number of replicate tests carried out and/or modifying test methods using multiple test samples in order to reduce laboratory costs and decrease the laboratory response time;
- modifying test methods which specify repeated operations (as is usually the case with, e.g., drying to constant mass) to give a test method which involves only one operation, leading to shorter response times and lower laboratory costs;
- handling results that lie outside the production and/or acceptance limits;
- achieving cost savings by harmonizing material production limits with the test methods used, taking into account the precision of the test method and the production capacity.

Furthermore, when specified by the responsible authority, the single-measurement model described in this International Standard can be used as a reference in, for example, product specifications, in sales agreements and in communicating with customers.

1) An Excel-based tool for the calculation of repeatability and reproducibility parameters has been developed by ISO/TC 61/SC 5 and is expected to become available on the ISO web site for on-line calculations at some future point in time, initially at a password-protected location reserved for those participating in the development of ISO standards. The calculation model is based on that of ISO 5725 and is applicable to balanced and unbalanced data sets.