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**NATIONAL STANDARD OF THE
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GB/T 40681.7-2026

**Statistical methods in monitoring process capability and
performance - Part 7: Capability of measurement processes**

生产过程能力和性能监测统计方法 第7部分：测量过程能力

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 7 of GB/T 40681, "Statistical Methods for Monitoring Production Process Capacity and Performance". GB/T 40681 has been published.

The following section.

---Part 2: Process Capability and Performance of Time-Dependent Process Models;

---Part 4: Process Capability Estimation and Performance Measurement;

---Part 5: Process Capability and Performance Estimation Based on Counting Characteristics;

---Part 6: Capacity Analysis of Multivariate Normal Processes;

---Part 7: Measurement Process Capability.

This document is a modified version of ISO 22514-7:2021 "Statistical methods in process management - Capability and performance - Part 7: Measurement processes".

ability".

The technical differences between this document and ISO 22514-7:2021, and the reasons therefor, are as follows.

---Replace ISO 3534-1 and ISO 3534-2 with the normatively referenced GB/T 3358.1 and GB/T 3358.2 respectively.

The referenced GB/T 6379 (all parts) replaces ISO 5725 (all parts), and the normative reference GB/T 27418-2017 is used.

Replace ISO/IEC Guide 98-3:2008 to adapt to my country's technical conditions and increase operability;

--- Symbols that did not appear in the main text of section 4.1 have been removed;

---Change $t_{1-\alpha/2}$ in 4.1 to $t_{1-\alpha/2, n}$;

---Use the formula $u_{MPE} = \frac{1}{M} \sqrt{\frac{M^2 PE_1^2 + M^2 PE_2^2}{3}}$ in Tables 1 and 10 Change to $M PE_1$
 $M^2 PE_2$

---The formula $C_{preal} = \frac{1}{C_2 p_{obs} - 2.25 \cdot Q_2 MP}$ in 10.1 changed to
 $C_{preal} = 1 / (C_2 p_{obs} - 2.25 \cdot Q_2 MP)$;

---Change the null hypothesis under Table 13 in section 12.2 to an assumption about the population;

---The summation subscript for the test statistic in section 12.2 has been changed;

---Change "X" in step 5 of 12.3.3 to " ".

The following editorial changes have been made to this document.

---A note has been added in 9.3 to explain the meaning of C_p here;

---Incorporates the revisions from ISO 22514-7:2021/Amd1:2024;

---ISO 17450-2 has been replaced by GB/T 24637.2 (see Introduction and 5.1) for informational purposes;

---ISO 10360-2 has been replaced with GB/T 16857.2 (see 5.3.2) for informational reference;

---ISO 10360-5 has been replaced with GB/T 16857.5 (see 5.3.2) for informational reference;

---ISO 11095-2010 has been replaced by GB/T 22554-2010 (see 7.1.3.4, A.1.1, References);

---ISO 22514-2 has been replaced by GB/T 40681.2 (see 9.3), which is cited in the informational reference.

---ISO 2854 has been replaced by GB/T 4889-2008 (see B.1), which is cited as informative.

---Figure A.1 in Appendix A has been modified;

---The residuals in Appendix A.1.2 were changed to bias, and the data in Table A.2 were changed accordingly;

---The subscripts of some data in Table B.2 were changed, and "x" was changed to "y";

---The subscripts of certain symbols in Table B.3 have been changed.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Statistical Methods Application (SAC/TC21).

Introduction

Process capability analysis is a commonly used statistical tool in statistical process control, used to describe whether a production or processing process meets product quality requirements.

Capacity. The GB/T 40681 series of standards, "Statistical Methods for Monitoring Production Process Capacity and Performance," is proposed to consist of eight parts.

---Part 1: General Principles and Concepts. This section aims to describe the fundamental principles governing the capability and performance of manufacturing processes.

---Part 2: Process Capability and Performance of Time-Dependent Process Models. The aim is to provide parameters for product or process characteristics when they are related to...

When time is relevant, this is a method for estimating the process capability or performance statistics of this characteristic.

---Part 3: Equipment Performance Study Based on Component Measurement Data. The aim is to provide data for continuous production of components under repetitive conditions.

A statistical method for the short-term process capability of equipment.

---Part 4: Process Capability Estimation and Performance Measurement. The purpose is to provide commonly used methods for measuring process capability and performance.

---Part 5: Process Capability and Performance Estimation of Counting Characteristics. The aim is to provide a method for calculating the process capability and performance of counting characteristics.