



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 40681.5-2021

**Statistical methods in monitoring process capability and
performance - Part 5: Process capability estimates and
performance for attributive characteristics**

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Foreword

The plan of GB/T 40681 "Statistical Methods for Monitoring Production Process Capability and Performance" is divided into the following 8 parts.

---Part 1.General principles and concepts;

---Part 2.Process capability and performance of time-dependent process models;

---Part 3.Research on machine performance of discrete product measurement data;

---Part 4.Process capability estimation and performance measurement;

---Part 5.Process capability and performance estimation of counting characteristics;

---Part 6.Multivariate normal process capability analysis;

---Part 7.Measurement process capability;

---Part 8.Equipment performance analysis of multi-state production process.

This part is Part 5 of GB/T 40681.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the redrafting method to modify and adopt ISO 22514-5:2019 "Statistical Method Capability and Performance in Process Management No. 5

Part. Process Capability and Performance Estimation of Counting Characteristics.

Compared with ISO 22514-5:2019, this part has the following structural adjustments.

--- Divide Chapter 4 into 4.1 symbols and 4.2 abbreviations.

The technical differences between this part and ISO 22514-5:2019 and the reasons are as follows.

---Regarding normative reference documents, this section has made adjustments with technical differences. The adjustments are specifically reflected in Chapter 2 "Regulations"

The specific adjustments are as follows.

* Replace ISO 3534-2 with GB/T 3358.2, which is equivalent to the international standard (see Chapter 3);

---In Chapter 4, the symbol "np" is added and defined as "the average number of unqualified products in the subgroup", which is more accurate;

---The definition of the symbol "p" in Chapter 4 is revised to "overall nonconforming product rate", which is more accurate;

--- In Chapter 4, the symbol "u" is modified to be defined as "the number of unqualified products per unit", which is more accurate;

--- The definition of count data in 5.1 is revised to "indicating whether each individual in the subgroup examined by the record has a certain characteristic (or characteristic)

Levy), calculate the number of individuals with this characteristic, or record the occurrence of such an event in a unit product, a group of products, or a certain area.

The observed value obtained by the number of births, that is, the number of units with a certain attribute or the frequency of occurrence of the characteristic", is more accurate;

---Change "based on one of the four different control charts" in 5.1 to "the number of unqualified items can be monitored using chart c, and the unit product is not compatible

The number of grids can be monitored by u chart, the number of nonconforming products can be monitored by np chart, and the rate of nonconforming products can be monitored by p chart", change

For clearer description;

--- Modify the "use c and u diagrams for the number of nonconforming products, use np and p diagrams for the number of nonconforming products" in 5.3 to "use the number of nonconformances

In figure c, use u figure for the number of unqualified products per unit, use np figure for the number of unqualified products, and use p figure for the rate of unqualified products", change to clear

Clear description;

--- Modify the vertical axis data of Figure 2 and modify the original text error;

--- Change the "p*p, p" in 7.1

pkL

And p*pkU" changed to "p

p, p

pk, p

pkL

And p*pkU", increase p

pk is more accurate;

---The formula (8) "QP-1.96

QP(1-p)

$n \leq QP < QP \ 1.96$

QP(1-p)

"To

"QP-1.96

QP(1-QP)

$m \leq QP \leq QP \ 1.96$

QP(1-QP)

", modify the original symbol error;

--- Change "z1-p=2.438" in 7.2 to "2.176<=z1-QP< infinity", modify the original calculation and symbol errors;

---In 7.2 "

2.438

3 $\leq$ P

pk $\leq$

3 $\rightarrow$ 0.81 $\leq$ P

pk $<$ infinity" is changed to "

2.176

3 $\leq$ P

pk $\leq$

3 $\rightarrow$ 0.725 $\leq$ P

pk $<$ infinity ", modify

The calculation and notation of the original text are wrong;

---In Chapter 8, "C*pk, C

pkU

And C*pkL" to "C

p, C

pk, C

pkL

, C*pkU", increase C

pk is more accurate;

---The formula (15) in Chapter 8 "C*pk=

z1-pM

"Amended to "C*pk=

z1-pM

","

--- Change "where z1-p is the quantile of the standard normal distribution of pM" in Chapter 8 to "where z1-pM is the standard normal distribution

pM quantile", modify the original text symbol error.

This section has made the following editorial changes.

---Revised the standard name to "Statistical Methods for Production Process Capability and