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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Specification for Uniform Test Methods and Frequency[1]

This standard is issued under the fixed designation B 830; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers a standard basis for uniform testing and frequency to determine physical and electrical compliance for aluminum and copper drawing stock, and aluminum and copper conductors.

1.2 The values stated in inch-pound units are standard, with the exception of resistivity. The SI equivalents of inch-pound units may be approximate.

2. Referenced Documents

2.1 The following documents of the issue in effect on date of material purchase form a part of this specification to the extent referenced herein.

2.2 *ASTM Standards:*

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[2]

2.3 *Other Documents:*

National Bureau of Standards *Handbook 100,Copper Wire Tables*[3]

Canadian Standards Association CAN/CSA-ISO 9000-1-94 Quality Management Quality Assurance Standards Part 1: Guidelines for Selection and Use[4]

2.4 *ANSI Standards:*

ANSI/ISO/ASQC A3534-1-1993 Statistics-Vocabulary and Symbols-Probability and General Statistical Terms[5]

ANSI/ISO/ASQC A3534-2-1993 Statistics-Vocabulary and Symbols-Statistical Quality Control[5]

ANSI/ISO/ASQC Q9004-1-1994 Quality Management and Quality System Elements-Guidelines[5]

ANSI/ASQC C1-1996 Specification of General Requirements for a Quality Program[5]

ANSI/ASQC Z1.4-1993 Sampling Procedures and Tables for Inspection by Attributes[5]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *acceptable quality level (AQL)*—the maximum percent nonconforming (or the maximum number of nonconformities per hundred units) that, for purposes of sampling inspection, can be considered as a process average.

3.1.2 *average outgoing quality (AOQ)*—the average quality of outgoing product, including all accepted lots or batches, plus all lots or batches not accepted after such lots or batches have been effectively 100 % inspected and all nonconforming units replaced by conforming units.

CPK —Process Performance Index.

3.1.3.1 *Discussion*—

Capability in Relation to Spec Mean:

USL	=	5.0
LSL	=	1.0
MEAN	=	2.0
Standard deviation (σ)	=	0.5

CPK tells the capability of a process based upon the worst case view of the data.

The equation is:

CPK = the lesser of:

$$\frac{(USL - MEAN)}{3\sigma} \text{ or } \frac{(MEAN - LSL)}{3\sigma} \quad (1)$$

For example:

$$CPK = \frac{(5.0–2.0)}{1.5} \text{ or } \frac{(2.0–1.0)}{1.5} \quad (2)$$

$$= 2.0 \text{ or } 0.67$$

$$= 0.67$$

A negative value for CPK indicates that the mean is outside the specification limits. A CPK of zero indicates that the mean is equal to one of the specification limits. A CPK between 0 and 1.0 means that part of the 6 sigma limits falls outside the specification limits. A CPK of 1.0 means that one end of the 6 sigma limits falls on a specification limit. A CPK larger than 1.0 means that the 6 sigma limits fall completely within the specification limits.

Capability indices are useful tools in the analysis of capability data. The most useful index is CPK, since it formulates capability in a manner that relates to shifts in the mean of the distribution away from the midpoint.

3.1.4 *lot*—a group of production units of one type and size of wire, which were produced during the same time period under similar production conditions, and are presented for acceptance at the same time. The mass will be defined in the

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[2] *Annual Book of ASTM Standards*, Vol 14.02.

[3] Available from National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

[4] Available from Canadian Standards Association, Standards Division, 178 Rexdale Blvd., Rexdale (Toronto), Ontario M9W 1R3.

[5] Available from American National Standard Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.