



Designation: ~~B830-97 (Reapproved 2003)~~ Designation: B830 – 11

## Standard Specification for Uniform Test Methods and Frequency<sup>1</sup>

This standard is issued under the fixed designation B830; 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 ( $\epsilon$ ) 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.~~

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.2.1 Exception—Resistivity is measured in SI units.

### 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:*<sup>2</sup>

~~E29-29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications~~

2.3 *Other Documents:*

~~National Bureau of Standards Handbook 100, Copper Wire Tables~~

~~Canadian Standards Association CAN/CSA-ISO 9000-1-94 Quality Management Quality Assurance Standards Part 1: Guidelines for Selection and Use National Bureau of Standards:~~<sup>3</sup>

~~Handbook 100, Copper Wire Tables~~

2.4 *Canadian Standards Association:*<sup>4</sup>

CAN/CSA-ISO 9001-08 Quality Management Systems – Requirements

CAN/CSA Z299.3-85 (R2006) Quality Assurance Program - Category 3

ASTM B830-11

<https://standards.iteh.ai/catalog/standards/sist/6a73a193-2f37-4428-b54b-ba5823e978bd/astm-b830-11>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.02 on Methods of Test and Sampling Procedure.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161.

<sup>3</sup> Available from National Technical Information Service (NTIS), 5301 Shawnee Road, Alexandria, VA 22312.

<sup>4</sup> Available from Canadian Standards Association (CSA), 178 Rexdale Blvd., Toronto, ON Canada M9W1R3.

<sup>4</sup> Available from Canadian Standards Association (CSA), 5060 Spectrum Way, Suite 100 Mississauga, Ontario L4W5N6 CANADA.

2.5 ANSI Standards:<sup>5</sup>

- ~~ANSI/ISO/ASQCA3534-1-1993 Statistics-Vocabulary and Symbols-Probability and General Statistical Terms~~
- ~~ANSI/ISO/ASQC A3534-2-1993 Statistics-Vocabulary and Symbols-Statistical Quality Control~~
- ~~ANSI/ISO/ASQ 3534-1-2006 Statistics-Vocabulary and Symbols Part 1-General Statistical Terms and Terms Used In Probability~~
- ~~ANSI/ISO/ASQ 3534-2-2006 Statistics-Vocabulary and Symbols Part 2-Applied Statistics~~
- ~~ANSI/ISO/ASQ Q9001-2008 Quality Management Systems - Requirements~~
- ~~ANSI/ISO/ASQC Q9004-1-1994 Quality Management and Quality System Elements-Guidelines-ANSI/ISO/ASQ Q9004-1-2009 Managing for the Sustained Success of an Organization – A Quality Management Approach~~
- ~~ANSI/ASQC C1-1996 Specification of General Requirements for a Quality Program~~
- ~~ANSI/ASQC S1-1996 An Attribute Skip-Lot Sampling Program~~
- ~~ANSI/ASQC-ANSI/ASQZ1.4-1993 Z1.4-2008 Sampling Procedures and Tables for Inspection by Attributes~~

**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.
- 3.1.3 *CPK*—Process Performance Index.

*Discussion:*

*Capability in Relation to Spec Mean:*

USL	=	5.0
LSL	=	1.0
MEAN	=	2.0
Standard deviation ( $\sigma$ )	=	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:

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

(1)

For example:

<https://standards.iteh.ai/catalog/standards/sist/93428-b54b-ba5823e978bd/astm-b830-11>  
 $CPK = \frac{(5.0-2.0)}{1.5} \text{ or } \frac{(2.0-1.0)}{1.5}$

(2)

= 2.0 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. See Explanatory Note 1 for an example interpretation of CPK values and actions to follow.

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 ASTM document for the specific product to be tested.

3.1.5 *process average*—the average percent nonconforming or average number of nonconformities per hundred units (whichever is applicable) of product submitted by the supplier for original inspection. Original inspection is the first inspection of a particular quantity of product as distinguished from the inspection of product that has been resubmitted after prior rejection. When double or multiple sampling is used, only the first sample results shall be included in the process average calculation.

3.1.6 *production unit*—a coil, reel, spool, or other package of drawing stock/wire that represents a single usable length.

<sup>5</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.