



Designation: E 29 – 67 (Reapproved 1980)¹

Standard Recommended Practice for INDICATING WHICH PLACES OF FIGURES ARE TO BE CONSIDERED SIGNIFICANT IN SPECIFIED LIMITING VALUES¹

This standard is issued under the fixed designation E 29; 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.

This recommended practice has been approved for use by agencies of the Department of Defense and for listing in the DoD Index of Specifications and Standards.

¹ NOTE—Table 1 was changed editorially in April 1980.

1. Scope

1.1 This recommended practice is intended to assist the various technical committees in the use of uniform methods of indicating the number of places of figures which are to be considered significant in specified limiting values, for example, specified maximum values and specified minimum values. Its aim is to outline methods which should aid in clarifying the intended meaning of specified limiting values with which observed values or calculated values obtained from tests are compared in determining conformance with specifications. Reference to this practice is valid only when a choice of method has been indicated, that is, either *absolute method* or *rounding-off method*.

1.2 This recommended practice is intended to be used in determining conformance with specifications when the applicable ASTM specifications or standards make direct reference to this practice.

1.3 This recommended practice describes two commonly accepted methods of rounding data, identified as the Absolute Method and the Rounding-Off Method. In the application of this practice to a specific material or materials it is essential to specify which method is intended to apply. In the absence of such specification, reference to this recommended practice, which expresses no preference as to which method should apply, would be meaningless. The choice of method is arbitrary, depending

upon the current practice of the particular branch of industry or technology concerned, and should therefore be specified in the prime publication.

2. Expression of Numerical Requirements

2.1 The unqualified statement of a numerical limit, such as “2.50 in. max,” cannot, in view of different established practices and customs, be regarded as carrying a definite operational meaning concerning the number of places of figures to be retained in an observed or a calculated value for purposes of determining conformance with specifications.

2.2 *Rounding-Off Method*—In some fields, specified limiting values of 2.5 in. max, 2.50 in. max, 2.500 in. max are taken to imply that, for the purposes of determining conformance with specifications, an observed value or a calculated value should be rounded off to the nearest 0.1 in., 0.01 in., 0.001 in., respectively, and then compared with the specified limiting value. This will be referred to as the *rounding-off method*.

2.3 *Absolute Method*—In other fields, specified limiting values of 2.5 in. max, 2.50 in. max, and 2.500 in. max are all taken to imply the same absolute limit of exactly two and a half

¹ This recommended practice is under the jurisdiction of ASTM Committee E-11 on Statistical Methods.

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inches and for purposes of determining conformance with specifications, an observed value or a calculated value is to be compared directly with the specified value. Thus, any deviation, however small, outside the specified limiting value signifies nonconformance with the specifications. This will be referred to as the *absolute method*.

3. Rounding-Off Method

3.1 Where Applicable—The rounding-off method applies where it is the intent that a limited number of places of figures in an observed value or a calculated value are to be considered significant for purposes of determining conformance with specifications.

3.2 How Applied—With the rounding-off method, an observed value or a calculated value should be rounded off by the procedure prescribed in 2.2 to the nearest unit in the designated place of figures stated in the standard, as, for example, “to the nearest 100 psi,” “to the nearest 10 ohms,” “to the nearest 0.1 percent,” etc. The rounded-off value should then be compared with the specified value, and conformance or nonconformance with the specification based on this comparison.

3.3 How Expressed—This intent may be expressed in the standard in one of the following forms:

3.3.1 If the founding-off method is to apply to all specified limits in the standard, and if all figures expressed in the limiting value are to be considered significant, this may be indicated by including the following statement in the standard:

The following applies to all specified limits in this standard: For purposes of determining conformance with these specifications, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of ASTM Recommended Practice E 29, for Indicating Which Places of Figures Are to Be Considered Significant in Specified Limiting Values.

3.3.2 If the rounding-off method is to apply only to the specified limits for certain selected requirements, this may be indicated by including the following statement in the standard:

The following applies to specified limits for requirements on (tensile strength), (elongation), and (.....) given in (applicable

section number and title) and (.....) of this standard: For purposes of determining conformance with these specifications, an observed value or a calculated value shall be rounded off to the nearest (1000 psi) for (tensile strength), to the nearest (1 percent) for (elongation), and to the nearest (.....) for (.....), in accordance with the rounding-off method of ASTM Recommended Practice E 29, for Indicating Which Places of Figures Are to Be Considered Significant in Specified Limiting Values.

3.3.3 If the rounding-off method is to apply to all specified limits in a table, this may be indicated by a note in the manner shown in the following examples:

3.3.3.1 Example 1—Same significant places for all items:

	Chemical Composition, percent
Copper	4.5 ± 0.5
Iron	1.0 max
Silicon	2.5 ± 0.5
Other constituents (magnesium + zinc + manganese)	0.5 max
Aluminum	remainder

NOTE—For purposes of determining conformance with these specifications, an observed value or a calculated value shall be rounded off to the nearest 0.1 percent, in accordance with the rounding-off method of ASTM Recommended Practice E 29, for Indicating Which Places of Figures Are to Be Considered Significant in Specified Limiting Values.

3.3.3.2 Example 2—Significant places not the same for all items; similar requirements:

	Chemical Composition, percent	
	min	max
Nickel	57	...
Chromium	14	18
Manganese	...	3
Silicon	...	0.40
Carbon	...	0.25
Sulfur	...	0.03
Iron	remainder	

NOTE—For purposes of determining conformance with these specifications, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of ASTM Recommended Practice E 29, for Indicating Which Places of Figures Are to Be Considered Significant in Specified Limiting Values.

3.3.3.3 Example 3—Significant places not the same for all items; dissimilar requirements:

	Tensile Requirements
Tensile strength, psi	60 000 to 72 000
Yield point, min, psi	33 000
Elongation in 2 in., min, percent	22