ANSI H35.2-2003
Revision of H35.2-2001

American National Standard Dimensional Tolerances for Aluminum Mill Products

Secretariat
The Aluminum Association
Incorporated

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The Aluminum Association, Inc.
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American National Standards Institute

American National Standard

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Foreword

This Standard is a revision of "American National Standard Dimensional Tolerances for Aluminum Mill Products" issued in 2001 (ANSI H35.2-2001).

The tolerances included in this Standard were developed by the Technical Committee of The Aluminum Association. They are broadly accepted both within the aluminum industry itself and by users of the metal. They are the basis of the dimensional tolerances specified in U.S. government, technical society, and other specifications for aluminum products. They represent the maximum deviation from specified dimensions that may be expected in any individual piece. For most pieces the deviation from specified dimensions will be less than the tolerance shown.

Work on the tolerances began in The Aluminum Association in 1949, five years before its Technical Committee was established. In that year a special committee was appointed by the Association's Extruded Products Division to develop drafting standards for these products. One of the committee's assignments was to develop standard tolerances for aluminum extrusions. The committee completed its work later in 1949, and the Association issued the first edition of its Drafting Standards for Extruded and Tubular Products, including the tolerances, in October of that year.

By 1954, the Association's technical activities had grown to the point that a standing Technical Committee was needed. One of the first jobs undertaken by this committee was the compilation of mechanical property data for commonly used aluminum alloys and dimensional tolerances for other aluminum mill products. This work was completed later in 1954, and the resulting data were published in the first edition of the Association's "Standards for Aluminum Mill Products" in June 1955. Successive editions of the "Standards for Aluminum Mill Products" have been revised to include new data and to keep the manual abreast of industry advances. In 1968 the title was changed to "Aluminum Standards and Data" to reflect the adoption of a revised format.

Many refinements have been made in the tolerances as experience was gained in their use. In addition, tolerances have been developed for products not covered initially, and the data have been extended to embrace the larger sizes now being produced. All of these additions and refinements have been incorporated into this Standard. Included also are definitions of the various products as given in "Aluminum Standards and Data" published by The Aluminum Association, and standard limits for expressing the tolerances.

This Standard was originally developed and subsequently revised using the "canvass" method and published under the proprietary sponsorship of The Aluminum Association. At the request of The Aluminum Association, the establishment of Standards Committee H35 on Aluminum and Aluminum Alloys was authorized by the American National Standards Institute on 17 February 1970, with the Association serving as Secretariat.

The 1971 revision of ANSI H35.2 was the first revision developed by Standards Committee H35, under the "Standards Committee" procedures, and the 1972, 1975, 1978, and 1982 revisions were developed under the auspices of that Committee.

Standards Committee H35 was transferred to an Accredited Standards Committee on December 28, 1983, and this revision was developed under the Accredited Standards Committee method.

This latest (2003) revision consists of an expanded range of specified diameters for round wire, rod and drawing stock, clarification of the 5xxx alloys with special extrusion tolerances and editorial corrections.

American National Standard Dimensional Tolerances for Aluminum Mill Products

1. Definitions

Bar—A solid wrought product that is long in relation to its cross section which is square or rectangular (excluding plate and flattened wire) with sharp or rounded corners or edges, or is a regular hexagon or octagon, and in which at least one perpendicular distance between parallel faces is 0.375 inch or greater.

Fin Stock—Coiled sheet or foil in specific alloys, tempers, and thickness ranges suitable for manufacture of fins for heat-exchanger applications.

Foil—A rolled product rectangular in cross section of thickness less than 0.006 inch. In Europe, foil is equal to and less than 0.20 mm.

Forging Stock—A wrought or cast rod, bar or other section suitable for forging.

Pipe—Tube in standardized combinations of outside diameter and wall thickness, commonly designated by "Nominal Pipe Sizes" and "ANSI Schedule Numbers."

Plate—A rolled product that is rectangular in cross section and with thickness not less than 0.250 inch with sheared or sawed edges.

Tread Plate—Sheet or plate having a raised figured pattern on one surface to provide improved traction.

Profile—A wrought product that is long in relation to its cross-sectional dimensions which is of a form other than that of sheet, plate, rod, bar, tube, wire or foil.

Structural Profile—A profile rolled or extruded, in certain standard alloys, tempers, sizes, and sections, such as angles, channels, tees, zees, I-beams, and H-sections, commonly used for structural purposes.

Rod—A solid wrought product that is long in relation to its circular cross section, which is not less than 0.375 inch diameter.

Shape—This term is no longer recommended. The term "Profile" is preferred. See "Profile."

Sheet—A rolled product that is rectangular in cross section with thickness less than 0.250 inch but not less than 0.006 inch and with slit, sheared or sawed edges.

Alclad Sheet—Composite sheet comprised of an aluminum alloy core having on both surfaces (if on one side only, Alclad One Side Sheet) a metallurgically bonded aluminum or aluminum alloy coating that is anodic to the core, thus electrolytically protecting the core against corrosion.

Brazing Sheet—Sheet of a brazing alloy, or sheet clad with a brazing alloy on one or both sides.

Duct Sheet—Coiled or flat sheet in specific tempers, widths and thicknesses, suitable for duct applications.

Tube—A hollow wrought product that is long in relation to its cross section, which is symmetrical and is round, a regular hexagon or octagon, elliptical, or square or rectangular with sharp or rounded corners, and that has uniform wall thickness except as affected by corner radii.

Heat-Exchanger Tube—A tube for use in apparatus in which fluid inside the tube will be heated or cooled by fluid outside the tube. The form usually is not applied to coil tube or tubes for use in refrigerators or radiators.

Welded Tube—A tube produced by forming and seam-welding sheet longitudinally.

Wire—A solid wrought product that is long in relation to its cross section, which is square or rectangular with sharp or rounded corners or edges, or is round, hexagonal, or octagonal, and whose diameter or greatest perpendicular distance between parallel faces is less than 0.375 inch.

2. Standard Limits for Expressing Tolerances

2.1 Standard limits for expressing the tolerances depend on the type of instrument ordinarily used in measuring the particular dimension. Where instruments permitting the required degree of accuracy generally are used, the tolerances are expressed in decimals as follows (except for foil):

Tolerance less than 0.005 in. . . . . Multiple of 0.0005
Tolerance of 0.005 in. and greater 0.XXX

For measurements commonly made with instruments not permitting such accuracy, the tolerances are expressed in fractions.

2.2 Rounding For purposes of determining conformance to the dimensional tolerances, a measured value is not rounded off. To determine applicable limits when a dimension is specified to more decimal places than are used in these standards, it shall be rounded off to the same number of places in conformance with ASTM E29, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications.