



Designation: ~~B899-06~~ Designation: B899 – 09

Standard Terminology Relating to Non-ferrous Metals and Alloys¹

This standard is issued under the fixed designation B899; 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 To promote precise understanding and interpretation of standards, reports, and other technical writings promulgated by Committee B02.

1.2 To standardize the terminology used in these documents.

1.3 To explain the meanings of technical terms used within these documents for those not conversant with them.

2. Referenced Documents

2.1 *ASTM Standards*:²

B6 Specification for Zinc

B29 Specification for Refined Lead

B32 Specification for Solder Metal

B39 Specification for Nickel

B69 Specification for Rolled Zinc

B86 Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings

B160 Specification for Nickel Rod and Bar

B161 Specification for Nickel Seamless Pipe and Tube

B163 Specification for Seamless Nickel and Nickel Alloy Condenser and Heat-Exchanger Tubes

B164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire

B165 Specification for Nickel-Copper Alloy (UNS N04400) Seamless Pipe and Tube

B166 Specification for Nickel-Chromium-Iron Alloys (UNS N06600, N06601, N06603, N06690, N06693, N06025, N06045, and N06696) and Nickel-Chromium-Cobalt-Molybdenum Alloy (UNS N06617) Rod, Bar, and Wire

B167 Specification for Nickel-Chromium-Iron Alloys (UNS N06600, N06601, N06603, N06690, N06693, N06025, N06045, and N06696) and Nickel-Chromium-Cobalt-Molybdenum Alloy (UNS N06617) Seamless Pipe and Tube

B240 Specification for Zinc and Zinc-Aluminum (ZA) Alloys in Ingot Form for Foundry and Die Castings

B327 Specification for Master Alloys Used in Making Zinc Die Casting Alloys

B333 Specification for Nickel-Molybdenum Alloy Plate, Sheet, and Strip

B339 Specification for Pig Tin

B407 Specification for Nickel-Iron-Chromium Alloy Seamless Pipe and Tube

B408 Specification for Nickel-Iron-Chromium Alloy Rod and Bar

B418 Specification for Cast and Wrought Galvanic Zinc Anodes

B423 Specification for Nickel-Iron-Chromium-Molybdenum-Copper Alloy (UNS N08825 and N08221) Seamless Pipe and Tube

B425 Specification for Ni-Fe-Cr-Mo-Cu Alloy (UNS N08825 and UNS N08221) Rod and Bar

B434 Specification for Nickel-Molybdenum-Chromium-Iron Alloys (UNS N10003, UNS N10242) Plate, Sheet, and Strip

B435 Specification for UNS N06002, UNS N06230, UNS N12160, and UNS R30556 Plate, Sheet, and Strip

B444 Specification for Nickel-Chromium-Molybdenum-Columbium Alloys (UNS N06625 and UNS N06852) and Nickel-Chromium-Molybdenum-Silicon Alloy (UNS N06219) Pipe and Tube

B445 Specification for Nickel-Chromium-Iron-Columbium-Molybdenum-Tungsten Alloy (UNS N06102)* Seamless Pipe and Tube

¹ This terminology is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.91 on Editorial and Terminology.

Current edition approved Dec-Oct. 1, 2006-2009. Published December 2006-October 2009. Originally approved in 1999. Last previous edition approved in 2005-2006 as B899 – 05 ϵ . DOI: 10.1520/B0899-06 ϵ .

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard.

- B446 Specification for Nickel-Chromium-Molybdenum-Columbium Alloy (UNS N06625), Nickel-Chromium-Molybdenum-Silicon Alloy (UNS N06219), and Nickel-Chromium-Molybdenum-Tungsten Alloy (UNS N06650) Rod and Bar
- B463 Specification for UNS N08020, UNS N08026, and UNS N08024 Alloy Plate, Sheet, and Strip
- B471 Specification for ~~UNS N08020, N08020,~~ UNS N08026, and UNS ~~N08024, N08024~~ Nickel Alloy Spring Wire³
- B473 Specification for UNS N08020, UNS N08024, and UNS N08026 Nickel Alloy Bar and Wire
- B475 Specification for UNS N08020, UNS N08024, and UNS N08026 Nickel Alloy Round Weaving Wire
- B511 Specification for Nickel-Iron-Chromium-Silicon Alloy Bars and Shapes
- B512 Specification for Nickel-Chromium-Silicon Alloy (UNS N08330) Billets and Bars
- B518 Specification for Nickel-Chromium-Iron-Columbium-Molybdenum-Tungsten Alloy (UNS N06102) Rod and Bar
- B522 Specification for Gold-Silver-Platinum Electrical Contact Alloy
- B535 Specification for Nickel-Iron-Chromium-Silicon Alloys (UNS N08330 and N08332) Seamless Pipe and Tube
- B536 Specification for Nickel-Iron-Chromium-Silicon Alloys (UNS N08330 and N08332) Plate, Sheet, and Strip
- B540 Specification for Palladium Electrical Contact Alloy
- B541 Specification for Gold Electrical Contact Alloy
- B575 Specification for Low-Carbon Nickel-Chromium-Molybdenum, Low-Carbon Nickel-Chromium-Molybdenum-Copper, Low-Carbon Nickel-Chromium-Molybdenum-Tantalum, and Low-Carbon Nickel-Chromium-Molybdenum-Tungsten Alloy Plate, Sheet, and Strip
- B582 Specification for Nickel-Chromium-Iron-Molybdenum-Copper Alloy Plate, Sheet, and Strip
- B599 Specification for Nickel-Iron-Chromium-Molybdenum-Columbium Stabilized Alloy (UNS N08700) Plate, Sheet, and Strip
- B620 Specification for Nickel-Iron-Chromium-Molybdenum Alloy (UNS N08320) Plate, Sheet, and Strip
- B622 Specification for Seamless Nickel and Nickel-Cobalt Alloy Pipe and Tube
- B625 Specification for UNS N08925, UNS N08031, UNS N08932, UNS N08926, UNS N08354, and UNS R20033 Plate, Sheet, and Strip
- B637 Specification for Precipitation-Hardening Nickel Alloy Bars, Forgings, and Forging Stock for High-Temperature Service
- B639 Specification for Precipitation Hardening Cobalt-Containing Alloys (UNS R30155 and UNS R30816) Rod, Bar, Forgings, and Forging Stock for High-Temperature Service
- B649 Specification for Ni-Fe-Cr-Mo-Cu-N Low-Carbon Alloys (UNS N08925, UNS N08031, UNS N08354, and UNS N08926), and Cr-Ni-Fe-N Low-Carbon Alloy (UNS R20033) Bar and Wire, and Ni-Cr-Fe-Mo-N Alloy (UNS N08936) Wire
- B667 Practice for Construction and Use of a Probe for Measuring Electrical Contact Resistance
- B672 Specification for Nickel-Iron-Chromium-Molybdenum-Columbium Stabilized Alloy (UNS N08700) Bar and Wire
- B677 Specification for UNS N08925, UNS N08354, and UNS N08926 Seamless Pipe and Tube
- B688 Specification for Chromium-Nickel-Molybdenum-Iron (UNS N08366 and UNS N08367) Plate, Sheet, and Strip
- B690 Specification for Iron-Nickel-Chromium-Molybdenum Alloys (UNS N08366 and UNS N08367) Seamless Pipe and Tube
- B691 Specification for Iron-Nickel-Chromium-Molybdenum Alloys (UNS N08366 and UNS N08367) Rod, Bar, and Wire
- B709 Specification for Iron-Nickel-Chromium-Molybdenum Alloy (UNS N08028) Plate, Sheet, and Strip
- B710 Specification for Nickel-Iron-Chromium-Silicon Alloy Welded Pipe
- B718 Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Plate, Sheet, and Strip
- B719 Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Bar
- B722 Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Seamless Pipe and Tube
- B723 Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Welded Pipe
- B726 Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Welded Tube
- B729 Specification for Seamless UNS N08020, UNS N08026, and UNS N08024 Nickel-Alloy Pipe and Tube
- B739 Specification for Nickel-Iron-Chromium-Silicon Alloy Welded Tube
- B749 Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products
- B750 Specification for GALFAN (Zinc-5 % Aluminum-Mischmetal) Alloy in Ingot Form for Hot-Dip Coatings
- B751 Specification for General Requirements for Nickel and Nickel Alloy Welded Tube
- B756 Specification for Nickel-Chromium-Molybdenum-Tungsten Alloy (UNS N06110) Rod and Bar
- B759 Specification for Nickel-Chromium-Molybdenum-Tungsten Alloys (UNS N06110) Pipe and Tube
- B775 Specification for General Requirements for Nickel and Nickel Alloy Welded Pipe
- B791 Specification for Zinc-Aluminum (ZA) Alloy Foundry and Die Castings⁰
- B792 Specification for Zinc Alloys in Ingot Form for Slush Casting
- B805 Specification for Precipitation Hardening Nickel Alloys Bar and Wire
- B814 Specification for Nickel-Chromium-Iron-Molybdenum-Tungsten Alloy (UNS N06920) Plate, Sheet, and Strip

³ Withdrawn.

- B818 [Specification for Cobalt-Chromium-Nickel-Molybdenum-Tungsten Alloy \(UNS R31233\) Plate, Sheet and Strip](#)
- B834 [Specification for Pressure Consolidated Powder Metallurgy Iron-Nickel-Chromium-Molybdenum \(UNS N08367\) and Nickel-Chromium-Molybdenum-Columbium \(Nb\) \(UNS N06625\) Alloy Pipe Flanges, Fittings, Valves, and Parts](#)
- B892 [Specification for ACuZinc5 \(Zinc-Copper-Aluminum\) Alloy in Ingot Form for Die Castings](#)
- B894 [Specification for ACuZinc5 \(Zinc-Copper-Aluminum\) Alloy Die Castings](#)
- B897 [Specification for the Configuration of Zinc and Zinc Alloy Jumbo and Block Ingot](#)

3. Significance and Use

3.1 The terms defined in this document are generic in respect to the standards under the jurisdiction of Committee B02 on Nonferrous Metals and Alloys. The same terms may have different definitions in other ASTM technical committees.

3.2 Some definitions may differ within the committee because of limitations on items such as weights or dimensions. In such cases the terms will be more precisely defined in the *Terminology* section of the standards in which these terms are used.

4. Index of Terms

4.1 *Alphabetical Listing of Terms*

average diameter
bar
billet
can
cathodic protection
coiled sheet
compact
contact resistance
contact resistance probe
die casting
fill pin
fineness
flat sheet
foundry casting
galvanic anode
graphite permanent mold casting
heat
ingot
liquidus
lot
lot number
melt
nickel
nickel alloy
nickel-base alloy
nickel-based alloy
nominal wall
part
permanent mold casting
pig
pipe
plate
platinum group metal
powder
powder blend
precious metals
precipitation hardening
pressure die-casting
producer
rod
rough part
saline electrolyte
sand casting
seamless pipe

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[ASTM B899-09](#)

<https://standards.itih.ai/catalog/standards/sist/e374b1eb-3c96-4c34-8734-cc0865447638/astm-b899-09>

semi-permanent mold casting
 shapes
 sheet
 shot
 solidus
 sponge
 spring wire
 strip
 test report
 thin-wall tube
 tube
 weaving wire
 welded pipe
 wire

5. Terminology

5.1 Terms and Their Definitions

average diameter, *n*—the average of the maximum and minimum outside the diameters, as determined at any one section of the pipe or tube. **B160, B161, B163, B165, B167, B407, B423, B444, B445, B535, B622, B677, B690, B710, B722, B723, B726, B729, B739, B751, B759, B775**

bar, *n*—an elongated, forged or rolled metal product with uniform strength, length and section (such as rectangular, square, round, oval or hexagonal). **B327, B518**

NOTE 1—In the following standards the term “bar” has a similar definition, but with greater and more specific detail. **B160, B164, B166, B408, B425, B446, B473, B511, B512, B637, B639, B649, B672, B691, B719, B756, B805**

billet, *n*—a formed shape that may be further worked, or a solid, semifinished, round, or rectangular product that has been hot-worked by forging, rolling, or extrusion.

can, *n*—the container used to encapsulate the powder during the pressure consolidation process; it is removed from the final part. **B834**

cathodic protection, *n*—protection of a metal from corrosion by making it a cathode through the galvanic sacrifice of a less noble metal or through an impressed electric current. **B418**

coiled sheet, *n*—sheet in coils with slit edges. **B69**

compact, *n*—the consolidated powder from one can; it may be used to make one or more parts. **B834**

contact resistance, *n*—the resistance to current flow between two touching bodies, consisting of constriction resistance and film resistance. **B667**

contact resistance probe, *n*—an apparatus for determining electrical contact resistance characteristics of a metal surface.

DISCUSSION—Probe, in this instance, should be distinguished from the classical tool whose function it is to touch or move an object. **B667**

die casting, *n*—a casting process in which molten metal is injected under high velocity and pressure into a metal die and solidified; also, a product produced by such a process. Alternately known as pressure die casting. **B6, B240, B892, B894**

fill pin, *n*—the part of the compact in the spout used to fill the can; it is usually integral to the part produced. **B834**

fineness, *n*—a measure of the purity of precious metals expressed in parts per thousand.

flat sheet, *n*—sheet with sheared, silt, or sawed edges that has been flattened or leveled. **B69**

foundry casting, *n*—a casting process wherein a molten metal is poured by gravity into the cavity of a mold and solidified; also, a product of such a process. **B86**

galvanic anode, *n*—a metal electrode that sacrificially corrodes when coupled to a more noble metal in a conducting medium, thereby supplying a protective electric current to the more noble electrode. **B418**

graphite permanent mold casting, *n*—a metal object produced by introducing molten metal by gravity or low pressure into a graphite mold and allowing it to solidify. **B86**

heat, *n*—refer to melt.

ingot, *n*—a casting of simple shape suitable for hot-working or remelting.

liquidus, *n*—the lowest temperature at which an alloy under equilibrium conditions begins to freeze on cooling or is completely melted on heating.

lot, *n*—a quantity of metal made under conditions that, for sampling purposes, are considered uniform. **B6, B32, B240, B418, B749**

lot number, *n*—a unique alphanumeric designation for a lot that is traceable to manufacturing records. **B32**

melt, *n*—all the metal that, while molten, was held at the same time in the same holding vessel.

nickel, *n*—a refined nickel primarily produced from ore or matte or similar raw material containing a minimum of 99.80 percent nickel by weight. **B39**

nickel alloy, *n*—a material that conforms to a specification that requires, by weight percent, more nickel than any other element.

DISCUSSION—Beginning in 1992, only alloys containing nickel as the principal constituent have been categorized as a nickel alloy for the purpose of new coverage in B02 specifications. Prior to 1992, nickel alloys were defined as alloys nominally containing less than 50 % iron with nickel as the highest nonferrous element present.

nickel-base alloy and **nickel-based alloy**—these terms are not used in ASTM standards under the jurisdiction of Committee B02 and are not preferred. See **nickel alloy**.

nominal wall, *n*—specified wall thickness with a published plus and minus tolerance from the specified thickness at any point. **B535, B710, B722, B723, B726, B739, B751, B775**

part, *n*—a single item coming from a compact, either prior to or after machining. **B834**

permanent mold casting, *n*—a metal object produced by introducing molten metal by gravity or low pressure into a mold constructed of durable material, usually iron or steel, and allowing it to solidify. See also graphite permanent mold casting. **B86, B792**

pig, *n*—an oblong or square mass of metal that has been cast while still molten into a mold that gives the metal its particular shape; most commonly used for lead and tin in weights that can be handled manually. **B29, B339**

pipe, *n*—a tubular metal product, cast or wrought, of dimensions that conform to those referred to commercially as standard pipe sizes. **B161, B165, B167, B407, B423, B444, B445, B535, B622, B677, B690, B710, B722, B723, B729, B759, B775**

plate, *n*—a flat-rolled metal product of same minimum thickness and width arbitrarily dependent on the type of metal. **B69, B333, B434, B435, B463, B536, B575, B582, B599, B620, B625, B709, B718, B814, B818**

platinum group metal, *n*—these metals are palladium, platinum, rhodium, iridium, osmium, and ruthenium. **B522, B540, B541**

powder, *n*—particles of a solid characterized by small size, nominally within the range of from 0.1 to 1000 u.m.

powder blend, *n*—a homogeneous mixture of powder from one or more heats; it is limited to the amount that can be mixed in the same blender at one time. **B834**

precious metals, *n*—the eight noble metals: gold, silver, palladium, platinum, rhodium, iridium, osmium, and ruthenium.

precipitation hardening, *n*—hardening caused by the precipitation of a constituent from a supersaturated solid solution.

pressure die-casting, *n*—Same as die casting. **B86, B791**

producer, *n*—the primary manufacturer of the material. **B32**

rod, *n*—wrought material of round, solid straight lengths. **B408, B518, B691**

NOTE 2—In the following standards the term “rod” has a similar definition, but is worded differently. **B160, B164, B166, B425, B446, B637, B639, B756**

rough part, *n*—the part prior to final machining. **B834**

saline electrolyte, *n*—a solution customarily consisting of the chlorides of the alkali metals. **B418**

sand casting, *n*—a casting process wherein molten metal is poured by gravity into the cavity of a sand mold and solidified; also, a product of such a process. **B791**

seamless pipe, *n*—a round, hollow product made with a continuous periphery in all stages of manufacture and produced to the particular dimensions commercially known as standard pipe sizes. **B423, B444, B775**

semi-permanent mold casting, *n*—mold casting that is made with an expendable core such as sand. **B791**

shapes, *n*—materials of solid section in such forms as angles, channels, tees, I-beams, and four-fluted bars. **B511**

sheet, *n*—a flat-rolled metal product of some maximum thickness and minimum width arbitrarily dependent on the type of metal; it is thinner than plate. **B69, B463, B599, B625, B688, B709, B718, B749**

shot, *n*—small spherically shaped particles of metal. **B327**

solidus, *n*—the highest temperature at which under equilibrium conditions an alloy begins to melt on heating or is completely solid on cooling.

sponge, *n*—a form of metal characterized by a porous condition that is the result of decomposition or reduction of a compound without fusion.

spring wire, *n*—round wire intended especially for the manufacture of springs. **B471**

strip, *n*—a flat-rolled metal product of some maximum thickness and width arbitrarily dependent on the type of metal, it is narrower than sheet. **B463, B536, B599, B625, B688, B709, B718, B749**

test report, *n*—a document that presents the applicable qualitative or quantitative results obtained by applying one or more given test methods.

DISCUSSION—A single document, containing test report information and certificate of compliance information, may be used.

thin-wall tube, *n*—tube with specified wall thickness 3 % or less of the specified outside diameter. **B751**

tube, *n*—a hollow product of round or any other cross section having a continuous periphery of uniform shape. **B423, B444, B445, B535, B677, B722, B729**

NOTE 3—The following standards use the same definition for “tube,” less the words “of uniform shape.” **B161, B163, B165, B167, B407, B622, B690, B759**

weaving wire, *n*—round wire intended especially for weaving. **B475**
welded pipe, *n*—a round hollow product made by forming flat stock and joining the single longitudinal seam by welding; it is produced to the particular dimensions commercially known as standard pipe sizes. **B775**
wire, *n*—a thin, flexible continuous length of metal, usually of uniform, round cross section. **B473, B649, B672, B691, B805**

6. Index of Terms Specific to a Standard

6.1 *Terms and Their Corresponding Standard(s)*

bars — B473, B649, B672
 billet — B512
 High Grade — B6
 jumbo ingot — B897
 mischmetal — B750
 Prime Western — B6
 Special High Grade — B6
 ribbon anode — B69, B418
 wire — B164, B166

7. Abbreviations

7.1

CGG—continuous galvanizing grade zinc
 HG—High Grade Zinc
 MM—mischmetal
 PW—Prime Western Zinc
 SHG—Special High Grade Zinc
 UNS—Unified Numbering System
 V-12—zinc-12 % aluminum master alloy used to produce die casting alloy #3
 ZA—zinc-aluminum
 ZA-8—zinc- 8 % aluminum- 1 % copper die casting alloy
 ZA-12—zinc- 11 % aluminum- 1 % copper die casting and foundry alloy
 ZA-27—zinc- 27 % aluminum- 2 % copper die casting and foundry alloy
 Zn-5Al-MM—zinc- 5 % aluminum-mischmetal galvanizing alloy
 85 Zn/15 aluminum—85 % zinc- 15 % aluminum alloy
 95/5 Zn/Al—95 % zinc- 5 % aluminum alloy
 90/10 Zn/Al—90 % zinc- 10 % aluminum alloy
 90/10 Al/Sb—90 % zinc- 10 % antimony alloy

8. Index of Keywords Used in B02 Standards

8.1

alloys
 aluminum-base master alloy
 aluminum alloy hardener
 analysis
 antimony
 babbitt metal
 bar
 bearing alloys
 billet
 bismuth
 blanking dies
 block
 brightener
 cake
 casting
 casting alloys
 cathodic protection