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Standard Terminology Relating to Non-ferrous Metals and Alloys¹

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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), Nickel-Chromium-Cobalt-Molybdenum Alloy (UNS N06617), and Nickel-Iron-Chromium-Tungsten Alloy (UNS N06674) Rod, Bar, and Wire

B167 Specification for Nickel-Chromium-Iron Alloys (UNS N06600, N06601, N06603, N06690, N06693, N06025,

N06045, and N06696), Nickel-Chromium-Cobalt-Molybdenum Alloy (UNS N06617), and Nickel-Iron-Chromium-Tungsten Alloy (UNS N06674) 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, N08221, and N06845) Seamless Pipe and Tube

B425 Specification for Ni-Fe-Cr-Mo-Cu Alloy (UNS N08825, UNS N08221, and UNS N06845) 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 (Withdrawn 1995)³

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 Alloy Plate, Sheet, and Strip

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.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

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

- B471** Specification for UNS N08020, UNS N08026, and UNS N08024 Nickel Alloy Spring Wire (Withdrawn 1999)³
- 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 and Cold Worked Nickel Alloy Bars, Forgings, and Forging Stock for Moderate or 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 Castings (Withdrawn 1999)³
- 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
- 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

B860 Specification for Zinc Master Alloys for Use in Hot Dip Galvanizing

B892 Specification for ACuZinc5

B894 Specification for ACuZinc5 (Zinc-Copper-Aluminum) Alloy Die Castings

B897 Specification for Configuration of Zinc and Zinc Alloy Jumbo, Block, Half Block, and Slab Ingot

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

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
cobalt alloy
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
nonferrous material
part
permanent mold casting
pig

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.

brightener bar, *n*—brightener bar is a zinc alloy containing aluminum which is added to the galvanizing bath to adjust the aluminum content of the bath to: suppress the formation of iron-zinc alloy layers, increase the brightness and ductility of the galvanized coating, and improve the drainage of zinc from the work as it exits the bath; also called brightener. **B860**

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

cobalt alloy, *n*—a material that conforms to a specification that contains cobalt as the principal component.

DISCUSSION—The cobalt content requirement is not always stated in the specification and is not always determined by chemical analysis. If not specified, it may be taken to be 100 % minus the sum of the mean values permitted by the specification for all other elements having a specified range or a specified maximum. For conformance purposes, the mean value for cobalt, whether if specified, or the calculated value for cobalt, is compared on an individual basis to the mean values permitted by the specification for each of the other elements having a specified range or a specified maximum. If an element other than cobalt is not specified, but is listed as remainder or balance, then, for conformance purposes the mean value for cobalt is compared to the calculated value for that other element.

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

hardener, *n*—an aluminum-base master alloy added to Special High Grade Zinc (SHG) to produce a zinc alloy for die casting.

B327

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 contains nickel as the principal component.

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. The nickel content requirement is not always stated in the specification and is not always determined by chemical analysis. If not specified, it may be taken to be 100 % minus the sum of the mean values permitted by the specification for all other elements having a specified range or a specified maximum. For conformance purposes, the mean value for nickel, whether specified or calculated, is compared on an individual basis to the mean values permitted by the specification for each of the other elements having a specified range or a specified maximum. If an element other than nickel is not specified, but is listed as remainder or balance, then, for conformance purposes the mean value for nickel is compared to the calculated value for that other element.

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

nonferrous material, *n*—metals and alloys that do not contain iron as the principal component.

DISCUSSION—The iron content is not always stated in the specification and is not always determined by chemical analysis. The iron content may be taken to be 100 % minus the sum of the mean values permitted by the specification for all other elements having a specified range or a specified maximum. For conformance purposes, the mean value for iron, whether specified or calculated, is compared on an individual basis to the mean values permitted by the specification for each of the other elements having a specified range or a specified maximum. If an element other than iron is not specified, but is listed as remainder or balance, then, for conformance purposes the mean value for iron is compared to the calculated value for that other element.

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

B834