



Standard Terminology Relating to Iron Castings¹

This standard is issued under the fixed designation A 644; 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.

This standard has been approved for use by agencies of the Department of Defense.

austerrite, *n*—a cast iron matrix microstructure, produced by a controlled thermal process, which consists of predominantly acicular ferrite and high carbon austenite. (See **austempered ductile iron**.)

austempered ductile iron, *n*—a ductile cast iron that has been produced by a controlled thermal process which results in a matrix microstructure consisting of predominately acicular ferrite and high carbon austenite.

austenitize, *vt*—to convert the matrix of a ferrous alloy to austenite by heating above the transformation temperature.

batch, *n*—the component raw materials properly weighed, proportioned, and mixed for delivery to a processing unit. Also, the product output from a processing unit in which there is essentially no product output until all component materials are charged and processed.

brittle fracture, *n*—fracture that occurs without appreciable plastic deformation of the material.

brittle fracture area, *n*—The fraction or percent of the fracture surface that formed by brittle fracture. (When observed with no or low magnification, brittle fracture appears whiter and shinier than ductile fracture.)

capability index (C_p), *n*—for a stable process, the specification range divided by six times the standard deviation.

$$C_p = \frac{(USL - LSL)}{6 \times s}$$

capability index (C_{pk}), *n*—for a stable process, the smaller of the upper capability index (CPU) or the lower capability index (CPL).

carbide, primary, *n*—carbide precipitated in cast iron during solidification.

cast iron, *n*—a generic term for a series of alloys primarily of iron, carbon, and silicon in which the carbon is in excess of the amount which can be retained in solid solution in austenite at the eutectic temperature.

cementite, *n*—a very hard and brittle compound of iron and carbon corresponding to the empirical formula Fe_3C , com-

monly known as iron carbide.

cementite, primary, *n*—cementite precipitated in cast iron during solidification. Also known as primary carbide. (See **cementite**.)

chill, *n*—an object, usually metal, imbedded in a portion of the mold to accelerate the local rate of heat removal from the metal being cast.

chill, *v*—to accelerate the freezing rate of cast iron, usually in a localized region, to refine the graphite structure or cause formation of primary carbides.

chill, microstructural, *n*—a localized region of primary carbides in a casting made from a cast iron that would normally solidify free of primary carbides.

chilled iron, *n*—a cast iron that would normally solidify free of primary carbide which is purposely caused to solidify as white cast iron, locally or entirely, by accelerated cooling.

compacted graphite iron, *n*—a cast iron that has been treated in the liquid state so as to cause its graphitic carbon to occur in the compacted graphite shape in the as-cast condition. (See **graphite, compacted** and **graphite, spheroidal**.)

confidence level, *n*—the probability, or expected percent of the times, that the selected percent (P %) of the actual population lies within the tolerance interval calculated from the data sample.

direct reduced iron, *n*—iron ores that have been reduced to essentially metallic iron by heat and reducing agents, but without melting, and processed into suitable shapes (typically pellets) for use as a charge material in a melting operation.

dual metal, *n*—two metals of different composition that are fusion bonded at all interfacial surfaces by casting metal of one composition against metal of a second composition.

ductile fracture, *n*—fracture that occurs with appreciable plastic deformation of the material.

ductile fracture area, *n*—The fraction or percent of the fracture surface that formed by ductile fracture. (When observed with no or low magnification, ductile fracture appears grayer and duller than brittle fracture.)

ductile iron, *n*—a cast iron that has been treated in the liquid state so as to cause substantially all of its graphitic carbon to occur as spheroids or nodules in the as-cast condition.

¹ This terminology is under the jurisdiction of ASTM Committee A04 on Iron Castings and is the direct responsibility of Subcommittee A04.91 on Editorial Matters and Nomenclature.

Current edition approved Dec. 10, 1998. Published January 1999. Originally approved in 1971. Last previous edition approved in 1998 as A 644 – 98.