

Austempering: The metal is heated until it reaches an austenitic state ~1800°F and then quenched in molten salt bath, but kept at a temperature high enough to prevent the formation of martensite ~600°F for an extended period. Austempered metals have improved strength, toughness, and resistance to distortion, wear. Austempered Iron can be used a lower cost steel substitute.

Austenite: A solution of iron with a small amount of carbon in it, a high temperature ~1800°F iron phase. Bainite is formed when austenite is cooled rapidly.

Bainite: is a phase between pearlite and martensite. Two unique temperature conditions have to exist for the bainite microstructure to form. Austenite must be cooled rapidly enough so that pearlite does not form.

Cementite: Or iron carbide is an intermediate compound of Fe_3C . It is formed by heating Martensite and cooling it slowly.

Ceramic filter block: Placed in the gating system, catches slag and dirt before it can enter the mold cavity.

Chill: An object used to promote solidification in a specific portion of a metal casting mold. A chill can be strategically placed to help promote directional solidification where needed.

Compacted graphite iron: Combines the properties of Grey Iron and Ductile. Compacted graphite iron provides strength, is good for complicated castings, conducts heat well and has a high damping capacity. Ductile Iron with Graphite flakes.

Core: An insert in a mold made of sand, formed with a cold "Isocure" process or warm "Shell core" process. It used to create the interior surfaces of a casting.

Corebox: Hollow boxes shaped to form cores, when filled with sand in the Isocure or Shell process.

Cross runner: Carries iron from the down runner to the ingates and risers of the casting.

Cupola: the "smokestack" is actually a furnace that pushes air at supersonic speeds into a base fuel of coke to drive temperatures up to 2900 degrees F. The custom mix of materials in the cupola includes pig iron, recycled iron, scrap iron and metals specified by customers.

Down runner: Laps the bottom of the pour cup and carries the iron down through the ceramic filter to the cross runner.

Ductile Iron: Also called nodular iron, the key in the strength comes from the addition of spherical graphite into the cast-iron mixture. The graphite nodules resists breaking and cracking allowing for a more flexible and elastic iron. Excellent strength, increased ductility, excellent impact properties, good machinability and it has a high modulus of elasticity. Stronger than Aluminum lower cost than Steel.

Exothermic riser sleeves: Vacuum formed risers that ignite in an exothermic reaction keeping the metal liquid longer allowing it to feed the underlying casting.

Ferrite: Ferrite is pure iron, with a body-centered cubic B.C.C crystal structure. It is this crystalline structure which gives steel and cast iron their magnetic properties, and is the classic example of a ferromagnetic material

Gray Iron: When it is fractured, it's surface appears a dull gray color and graphite appears "flaked." Gray Iron provides excellent castability, good machinability, wear resistance, has a high damping capacity, conducts heat well, and has superior compressive and tensile strength. Used for engine blocks (dampening) and brake rotors (heat conduction)

Greensand: Green sand is a mixture of sand with bentonite clay, pulverized coal, and water used in metal casting. It is called green because it is used while wet. Green sand is used for sand casting because it holds its shape well when wet, creating a solid mold.

Horizontal Molding is the process used when molten metal is poured into the mold in a horizontal position.

Ingates: Used to meter the iron into the mold cavity

Iso-cure coremaking: No heat is applied to the corebox and a phenolic urethane resin is added to the sand. A catalyst, in this case amine gas, is introduced into the corebox and purged through the core with superheated air. This process is very fast and cost effective for large cores.

Martensite: Martensitic transformation occurs when the austenite is rapidly cooled in a process known as quenching. Martensite is very hard, meaning that it won't dent or scratch easily; this makes it a popular choice for tools, such as hammers and chisels, as well as swords. It is brittle, however, so it will break rather than bend when put under too much pressure.

Pattern: The wood, metal, foam or plastic shape used to form the cavity in the sand. A pattern may consist of one or many impressions and would normally be mounted on a board or plate complete with a runner system.

Pearlite: Pearlite is a common lamellar microstructure occurring in many grades iron and of steels. The layers consist of alternate plates of pure iron and iron carbide. Pearlite is around the middle of the chart in terms of strength when compared to other iron alloys.

Pour cup: The pattern piece where the molten iron enters the mold

Risers: Molten Iron reservoirs usually in the top of the mold for replacing iron as it contracts during solidification

Shell Core coremaking: sand is pre-coated with a resin and poured into a pre-heated corebox. In this case, there is no catalyst and the surface is heated until it forms a thin, hard shell. The sand on the inside of the core is uncured and can actually be poured out and reused. This process is ideal for light weight castings.

Slag is the by-product of smelting ore and are generally used as a waste removal mechanism in metal smelting

Vents: allow gases that form in the pattern to escape from the mold so they are not trapped in the casting

Vertical molding is the process used when molten metal is poured into the mold in a vertical position.