# FOUNDRY – Glossary of Terms

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| **ALLOY** | A substance having metallic properties and composed of two or more chemical elements of which at least one is metal. A metallic material formed by mixing two or more chemical elements. |
| **ANODIZING** | The process of forming a conversion coating on the surface of the metal by electrolytic oxidation with the work forming the anode. Anodizing increases corrosion resistance and wear resistance, and provides better adhesion for paint primers and glues than bare metal. |
| **ARTIFICIAL AGING** | An aging treatment above room temperature. |
| **AS CAST** | Casting without any subsequent heat treatment. |
| **BACK DRAFT** | A reverse taper that prevents removal of a pattern from a mold without damage to the mold or a core from a corebox. |
| **BINDER** | A material used as an additive to sand to bind particles together to impart strength. |
| **BLAST CLEANING** | The removal of sand from castings by using sand, metal shot or grit projected under air, water or centrifugal pressure. |
| **BLOW** | A defect in a casting due to the entrapment of gas in molten or partially molten metal causing voids in the metal. |
| **BOSS** | A projection on a casting usually intended for drilling and tapping or to attach parts. |
| **BOTTOM BOARD** | The board in which the mold rests for support. |
| **BRINELL HARDNESS** | The value of hardness of a metal on an arbitrary scale representing $kg/mm^2$ determined by measuring the diameter of the impression made by a ball of given diameter applied under a known load. |
| **BURNISH** | The process of creating a shiny or lustrous surface finish on a casting by using stainless steel media. |
| **CASTING** | The process whereby molten metal is poured into a mold and solidifies. Also refers to the metal shape, without gates and risers, obtained as a result of pouring metal into a mold. |
| **CASTING LAYOUT** | A check of the dimensions against the applicable drawings and specifications of a casting. |
| **CAVITY** | Impression or impressions on a mold that give the casting its shape. |
| **CHAMFER** | Breaking or beveling of a sharp edge or angle formed by two faces of a piece of wood or other material. |
| **CHAPLETS** | Supports or spacers used in molds to maintain cores, or parts of the mold which are not self-supporting in the proper positions during casting. |
| **CHILL** | A device that is incorporated into the mold used to cool an isolated area to increase the rate of heat removal and reduce shrinkage. |
| **COLD BOX PROCESS** | A core process that does not require the application of heat to cure the core. Core hardening is accomplished by chemical reaction rather than conventional baking. A phenolic resin is added to the sand used to make the core, which reacts chemically when exposed to an accelerator and hardens very quickly. $CO_2$ cores are made using the cold box (cold set) process. |
| **COPE** | The top half or upper section of a horizontally parted mold, flask or pattern. |



PH: (937) 526-4551
FX: (937) 526-5508
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| **COPE & DRAG PATTERN** | Pattern equipment where the cope and drag pattern sections are mounted on separate pattern boards so that the cope and drag mold sections can be made at the same time. |
| **CORE** | A preformed, bonded sand insert placed into a mold to shape the interior of the casting or a part of the casting which cannot be shaped by the pattern. A core is frequently used to create hollow sections or cavities in a casting. |
| **CORE ASSEMBLY** | A complex core made from a number of cores or sections. |
| **CORE BOX** | A mold in which a core is formed, typically made from cast iron, aluminum, wood or other types of metal. |
| **CORE KNOCKOUT MACHINE** | A mechanical device used for removing cores from castings. |
| **CORE PRINT** | Projections on a pattern that form and locate cores in a mold. A core print is also a projection on the core or an area in the mold for the same purpose. |
| **CORE SHIFT** | A defect resulting from the movement of the core from its proper position in the mold cavity. A variation from specified dimensions of a cored section of a casting due to a change in position of the core or misalignment of cores in assembling. |
| **CORE (RAM UP)** | Core set into the pattern and rammed up into the mold, where it remains when the pattern is withdrawn. |
| **COVER CORE** | A core set in place during the ramming of a mold to cover and complete a cavity partly formed by the withdrawal of a loose part of the pattern. It can also be used to form part or all of the cope surface of the mold cavity. A core that is placed over another core to create a flat parting line. |
| **CURE TIME** | The period of time needed before sand mass reaches maximum hardness. |
| **DEGASSING** | Typically a chemical reaction resulting from a compound added to molten metal to remove gases from the metal. The act of removing absorbed gasses from the melt. |
| **DIMENSIONAL TOLERANCE** | The measurement of the tightness of tolerances for purposes of accurately measuring and defining what is required by the customer. |
| **DRAFT** | The angle in which a mold or pattern is designed to allow for the withdrawal of sand or aluminum without distorting or tearing. |
| **DRAG** | The bottom section of a mold, flask or pattern. |
| **ELASTICITY** | The property of recovering the original shape and dimensions upon removal of a deforming source. |
| **ELONGATION** | The percentage at which material can stretch before failure. A measure of a material's ductility. |
| **FATIGUE** | The loss of load-bearing ability under repeated load application, as opposed to a single load. |
| **FATIGUE STRENGTH** | The maximum stress a material will endure without failure for a specified number of load cycles. |
| **FILLET** | A strip that gives a rounded appearance where two surfaces meet. A concave corner piece used at the intersection of two surfaces to round out a sharp corner. |
| **FIN** | A thin projection of metal from the casting formed as a result from an imperfect mold or core joint. |
| **FINISH (MACHINE)** | The amount of material allowed for machining purposes. |
| **FINISH (ALLOWANCE)** | The amount of stock left on surface of the casting for machining. |



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| **FLASH** | A thin fin or small piece of material extending from the casting along the joint line due to the cope and drag not matching completely or where the core and coreprint do not match. |
| **FLASK** | The frame used to hold sand around the pattern without a fixed top or bottom usually consisting of two parts, cope and drag. |
| **FLUIDITY** | The ability of molten metal to flow freely. |
| **FOLLOW BOARD** | A board shaped to the parting line of a mold. |
| **GAS POROSITY** | A condition caused by the entrapment of gas in the molten metal, or by mold gases evolved during the pouring of the metal into the mold. |
| **GATE** | The controlled entry points where molten metal enters into the casting cavity. Also used to indicate a network of connected channels that deliver the molten metal into the casting cavity. Gates connect the sprue to the mold cavity. |
| **GREEN SAND** | Natural sands moistened with water or organic additives such as clay, that is bonded together to create a mold. |
| **HARDNESS** | The resistance of material to indentation as measured by a particular method, such as Brinell hardness. The term also refers to the stiffness of a material or its resistance to scratching, abrasion or cutting. |
| **HEAT TREATMENT** | A combination of heating and cooling operations timed and applied to a metal in solid state to produce desired properties. |
| **HOT BOX PROCESS** | A method of making and curing cores within a heated corebox. Shell cores are an example of cores made with the hot box process. |
| **HOT SPOT** | An area of extra mass typically found at the junction of sections. |
| **HOT TEAR (CRACK)** | A crack in a metal casting formed at elevated temperatures by contraction stress. |
| **IMPREGNATION** | A treatment applied to a casting using a sealing medium to keep castings from leaking. The process involves injecting liquid under pressure into the porous area, which is then solidified in place by heating or baking. |
| **IMPRESSION** | A cavity in a mold. |
| **INSERT** | A part formed typically from metal, which is placed into a mold that may become an integral part of the casting. |
| **INSULATING PADS/SLEEVES** | Insulating material used to lower the rate of solidification. The application of pads and sleeves keep the metal from cooling too quickly thereby increasing the feed efficiency. |
| **INTERNAL SHRINKAGE** | A void or network of voids within a casting that is caused by inadequate feeding of a section during solidification. |
| **JACKET** | A wood or metal form slipped over a mold to support the four sides of the mold during pouring. |
| **JOLT SQUEEZER MACHINE** | A combination machine that uses a jolt action followed by a squeezing action to compact sand around a pattern. |
| **KNOCK OUT MACHINE** | A machine that removes sand and cores from a casting. |
| **LOCATING SURFACE** | A casting surface used as a basis for measurement in making secondary machining operations. |
| **LOOSE PATTERN** | A pattern that has the shape of the casting without forms for sprues, risers, etc. attached. |
| **MACHINABILITY** | The capability of being cut, turned, broached, etc. by machine tools. |



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| **MASTER PATTERN** | An approximate duplicate of the final casting used to form the mold cavity. |
| **MATCHPLATE** | Typically a metal plate on which patterns split along the parting line are mounted back to back with the gating system to form an integral piece. |
| **MISRUN** | A casting that is not fully formed. |
| **MOLD** | Typically consists of a top and bottom form which contains the cavity into which molten metal is poured to produce a casting of a defined shape and design. |
| **MOLD CAVITY** | The impression in a mold produced by the removal of the pattern. It is filled with molten metal to form the casting. Gates and risers are not considered part of the mold cavity. |
| **MOLDING (FLOOR)** | Making sand molds from loose or large patterns that cannot be satisfactorily handled on a molding machine. |
| **MULLER (SAND)** | A machine that mixes foundry sand with water and binders to make ready-to-use molding sand. |
| **OLIVINE** | A silica-free sand that can be used as molding material. |
| **PARTING LINE** | The line on a mold, flask or pattern corresponding to the separation between the cope and the drag. The joint where a mold separates to permit the removal of the pattern. |
| **PULL DIRECTION** | The direction in which two halve of the mold separate to reveal the casting within. The two halves will move in exactly opposite directions along the vertical direction vector. Important part of determining the orientation of the part within the mold. |
| **RISER** | A reservoir of molten metal that the casting can draw from to offset the shrinkage that is taking place as the metal solidifies. It is a vertical hole in the sand that is a place for metal to go after the mold is full. Risers are commonly placed at the thickest parts of the casting. |
| **RUNOUT** | Metal that flows through a defect in the mold. |
| **SAND BLAST** | Sand driven by a blast of compressed air or steam used to clean castings or provide a satisfactory surface finish. |
| **SHAKEOUT** | The action required to separate the solidified casting from the mold material. |
| **SHEAR STRENGTH** | The maximum shear stress a material is capable of withstanding without failure. |
| **SHIFT** | A casting defect resulting from a mismatch between the cope and drag. |
| **SHOT** | A metallic abrasive used for cleaning casting surfaces. |
| **SHRINKAGE** | The difference in volume between the liquid metal and solidified metal in a given cavity. The contraction of the metal during solidification. The term is also used to describe a casting defect that can result from poor design or insufficient metal feed. |
| **SPRUE** | A vertical passageway that takes the molten metal from the pouring basin to the runner. |
| **SPRUE HOLE** | The opening in which the metal is poured into the cope to run into the casting cavity. |
| **SQUEEZE BOARD** | A board used on the cope half of the mold to permit squeezing of the mold. |
| **TENSILE STRENGTH** | The measure of the amount of mechanical stress a material can withstand before it fractures. Measured in pounds per square inch (PSI), or thousands of pounds per square inch (KSI). |

Manufacturer of Aluminum Castings
FRANCIS MANUFACTURING COMPANY

PH: (937) 526-4551
FX: (937) 526-5508
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| **THERMAL CONTRACTION** | A decrease in linear dimension and volume of a material accompanying a change in temperature. |
| **THERMAL EXPANSION** | An increase in linear dimension and volume of a material accompanying a change in temperature. |
| **THERMAL FATIGUE** | Failure that results from rapid cycles of alternate cooling and heating. |
| **TOLERANCE** | The permissible deviation of a dimension from the nominal or desired value. The minimum clearance between mating parts. |
| **VENTS** | Additional channels that provide an escape for gases generated during the pour. |
| **VOID** | A shrinkage cavity produced in casting during solidification. |
| **YIELD** | The comparison of finished casting weight vs the total weight of metal poured in a mold. A value expressed as a percentage indicating the relationship of the weight of a casting to the total composite of the casting and its gating system. |
| **YIELD STRENGTH** | The measure of the amount of mechanical stress a material can withstand before it permanently deforms. |



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