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GLOSSARY OF DIE CASTING TERMS

ADCI. The “American Die Casting Institute,” a trade association serving the die casting industry by providing statistical, marketing, technical, and management programs.

Alignment System. A set of pins, bushings, blocks, and wear plates that work together and cause the two die halves to align properly.

Alloy. A substance composed of two or more metals, or of a metal and a non-metal. The alloy elements are dissolved in each other when molten and fused together when a solid. Most die castings are made from alloys.

Alloy, Certified Zinc. A program implemented by the ADCI in which participating die casting companies regularly have their zinc die castings tested to certify they are maintaining the correct alloy content.

Aluminum. A light silvery metal that is used as the major constituent in many die casting alloys.

Anodize. A chemical process using an electric current in a solution to produce a hard and dense oxide protective surface on a part.

As-Cast. The condition of a die casting when the runners, flash, and overflows have been removed, but no surface finishing, machining, or coating operations have been performed.

Auto-Ladle. A mechanical metal feeding delivery device usually attached to a cold chamber die casting machine, or a part of a furnace system.

Automatic Operation. An expression used to describe a die casting machine that operates continuously without an operator initiating each cycle, lading the molten metal, or removing the casting.

Benching. The hand finishing of die casting die cavity surfaces.

Biscuit. The excess of ladled metal that remains in the shot sleeve on a cold chamber die casting machine. The biscuit is part of the cast shot and is removed from the die with the casting.

Blister. A casting defect characterized by a smooth bump on the surface of the casting and a hole inside the casting directly below the bump.

Blow. The physical opening of the die casting die when the internal force of the shot exceeds the locking force of the machine. The “blow” causes flash and excessive casting thickness.

Castability. The relative ease that a molten metal flows through a casting die. More generally, the relative ease that a casting can be made with a particular alloy.

Casting. The product that results from the solidification of molten metal in a mold or die.

Casting Cycle. The total number of events required to make each casting. For die casting, the cycle generally consists of solidification time, machine movement, and the operator’s manual movements.

Cavity. The space within the die casting die that is the size and shape of the part to be cast. The molten metal flows into this space and is held until it has solidified.

Cavity Insert. A separate die component inserted into the die block to form an external feature of the casting. Sometimes the entire cavity block is referred to as the cavity insert.

Clamping Force. The actual force applied by the die casting machine to keep the die halves closed. This may be less than the clamping capacity of the die casting machine.

Cold Chamber Machine. A die casting machine in which the molten metal pressure chamber is not submerged in the molten metal to be cast. The metal is ladled into the shot sleeve of the machine prior to each shot.

Cold Shut. A defect in a die casting that shows as a line on the casting surface. This is caused when two metal flows meet, but are too cold to fuse together properly.

Core. A part of a die casting die that forms an internal feature of the casting (usually a feature with considerable dimensional fidelity) and is a separate piece from the cavity block. A core may be fixed in a stationary position relative to the cavity or may be actuated through some movement each time the die is opened.

Core Actuating Mechanism. The various parts of a die casting die, and their mounting to the die that controls or retains the core’s movement. The mechanism may include cams, slides, detents, angled pins, and hydraulic cylinders.

Core Pins. A hot work tool steel pin, usually H-13, that is used to form a cored hole in a die casting.

Density. The unit mass of material, usually expressed in pounds per cubic inch or kilograms per cubic meter.

Die. A tool used to impart the shape to the casting. Specifically, two matching steel blocks with their cavities that shape the molten metal until it solidifies.

Die Block. The large block of steel that forms the base for one half of the die casting die. All other components of the die are attached to or mounted on the die block.

Die Blow. Describes the dimensional growth of a casting across the parting line or in the direction of slide movements. A growth or blow can occur in small amounts without substantial flash evident.

(continued other side)

Die, Cover. The half of a die casting die that is attached to the stationary platen of the die casting machine.

Die, Ejector. The half of a die casting die that contains the ejection system and that mounts to the moving platen of the die casting machine.

Die, Trim. A die, usually in a power press, that cuts the runners, overflows, and flash off the die casting.

Die, Unit. A type of die construction that allows quick changing of the cavity blocks in the holder or die block. This usually can be performed while the die is still in the machine.

Dimension, Critical. A dimension on a part that must be held within the specified tolerance for the part to function in its application.

Draft. A slight angle placed on surfaces that would otherwise be parallel to the direction in which the die opens. The draft allows that surface to move away from the cavity wall as the casting is removed from the die.

Eject. To push the solidified casting out of the cavity of the die casting die.

Ejector. A pin or mechanism that pushes the solidified die casting out of the die.

Flash. A thin web or fin of metal on a casting which occurs at die parting, air vents, and around movable cores. This excess metal is due to the necessary working and operating clearances in a die.

Gate. A thin passage for molten metal which connects the runner to the die cavity. Also, the entire ejected content of a die, including the castings, gates, runners, biscuit (or spue), and flash.

H-13 Steel. An air hardening hot work tool steel of fine grain structure and high cleanliness that is exclusively used for making die casting dies for casting aluminum and zinc alloys.

Hole, Cored. In a die casting, any hole that is formed by a core in the die casting die. A cored hole is distinguished from a hole that is added after the casting has been made (as by drilling).

Hot Chamber Machine. A die casting machine that has the molten metal pressure chamber immersed in the molten metal in the holding furnace. The advantage of the hot chamber machine is that the pressure chamber refills naturally after each shot is made.

Injection. The process of forcing molten metal into die casting die.

Insert, Cast-In. A piece of material, usually metal, which is placed in a die and becomes an integral part of the die casting after molten metal is cast around it.

Metal Saver. A shape made on the cavity of a die casting for the sole purpose of displacing unnecessary die casting alloy from the casting. The shape placed on the casting by the metal saver is not required for the function of the casting.

Overflow. A small reservoir cavity added to the exterior of the die cavity (on a parting line) to receive impure or cold metal during cavity fill. Also used to generate added die heat in the local area.

Parting Line. A line-like mark around a die casting where the two halves of the die came together.

Platen. A large thick flat steel plate that is a major part of a diecasting machine frame.

Porosity. Any void within a die casting that was not intentionally created. This includes such voids that are open to the surface of the casting as well as those that are completely encased within the casting.

Pressure Tightness. A measure of the integrity of a die casting in terms of its ability to contain a fluid under pressure. The method of testing and the pressure used must be stated.

Runner. A channel cut into one or both parting faces of a die casting die to allow the injected molten metal to flow from the sprue or biscuit to the cavity.

SDCE. The Society of Die Casting Engineers. A society dedicated to increasing and disseminating the fund of knowledge of die casting, fostering educational programs, encouraging the investigation of new techniques, and advancing international development and growth in die casting and related industries.

Shot. (1) The injection of molten metal into a die casting die. The metal is injected so quickly that it can be compared to the shooting of a gun. (2) The solidified metal-consisting of the castings, runners, overflows, flash, and biscuit (or sprue) - as it is when removed from a die casting die.

Shot Sleeve. The molten metal chamber of a cold chamber die casting machine. This is a hardened steel tube through which the shot plunger moves to inject the molten metal into the die.

Shut-Off. In a die casting die, any place where two surfaces are fitted together with the intent of stopping the flow of any molten metal between them.

Slide. Any member of a tool, die, or machine that moves in a straight-line motion and is not parallel to the die pull.

Sprue. (1) The hole in a die casting die (for a hot chamber die casting machine) through which the molten metal first enters. (2) The portion of a cast shot formed by the sprue hole in the die casting die.

Statistical Quality Control. A technique for monitoring the quality of manufactured items, such as die castings, in which only a few individual items are actually inspected. Estimates as to the general quality level of the entire lot of items are made from the observed quality of those inspected.

Tie Bar. The bars (usually round), that connect the stationary platen to the adjustable platen on a die casting machine.

Trim. To remove the flash, overflows, and runners from a die casting.

Undercut. Any condition in a die casting die cavity that restricts the ejection of the casting.

Unit. A cavity block for a die casting die that can be installed into the die block without removing the entire die from the die casting machine.

Unit Die Holder. A particular type of die frame designed to accept quick interchange unit die sets. A unit holder may remain mounted in a machine for long service periods, and is complete with an ejection mechanism, sprue or shot entries, and runner system, but no cavities.

Vent. A shallow channel cut into the parting face of a die casting die to let air and other gasses escape from the cavity to the outside of the die.

Water Line. A passage through a die casting die in which water flows to cool the die. The correct placement of these channels is a highly developed science. The degree to which the water lines are correctly placed is key to productivity in the die casting process.

Zinc. The major constituent of the zinc-base die casting alloys.