
DIE CUTTING GLOSSARY OF TERMS

ADHESIVE, PRESSURE SENSITIVE

A type of adhesive which in dry form is aggressively tacky at room temperature. It has the capability of promoting a bond to dissimilar surfaces on contact, with pressure.

ADHESIVE, REMOVABLE

An adhesive characterized by relatively high cohesive strength and low ultimate adhesion. It can be removed easily from most surfaces. Some adhesive transfer could take place depending on the affinity of the adhesive to the surface.

ADHESIVE STRIKE-THROUGH

When adhesive penetrates through the face material of a pressure sensitive lamination.

AIR EJECTION

Some cutting dies are equipped with air ejection jets to eject die cut parts or scrap parts out of a die.

AIR HOLES

Air escape holes are often required in a die blade or at the back of the die to allow the built up air in a die cavity to escape during the die cutting process. If air holes are not provided the captured air in a die cavity can impede the die cutting action and hinder the ejection of the die cut piece from the die after the die cutting cycle. In clicker and high dies, the die maker will often grind several grooves in the back of the die to allow air to escape from the die. Also used on auto platen stripping & blanking dies.

ALL-STEEL DIE

Made totally from steel. This usually refers to an all steel clicker dies or solid milled clicker dies vs. a steel rule dies.

ANNEALED DIE STEEL

Soft and untreated die steel that can be easily bent or formed into the desired shape before the die is heat treated. Clicker dies are generally hand bent or forged with annealed die steel which is then heat treated to a Rockwell 50C hardness.

ANSI

An acronym for American National Standards Institute. An organization that acts as a national clearing-house and coordinator for voluntary standards in the United States.

ANVIL

- (1) The press plate against which the die cuts.
- (2) In rotary die cutting, soft urethane surface the die knives penetrate while cutting the product.
- (3) A hardened steel roll upon which the bearers of a rotary die cutter ride which also provides the hardened surface to support the die cutting.

ANVIL DRUM

In rotary die cutting, steel or cast Iron cylinder on which the urethane blankets and the cutting die are mounted onto.

ARBOR PRESS

A small press with a long handle or lever-age bar used to apply leverage to the downward stroke of the head or the press to cause the adequate pressure to make a die cut.

ARC WELDING

Welding with a stick of welding electrode to join the open ends of a clicker or high die blade.

AUTOMATIC FEED SYSTEMS

Die cutting systems which have automatic feed systems are systems which automatically feed the material to be die cut up to the die cutting area of the press. An automatic feed system could be belt driven, pinch drives or using air transport tables.

BACKER PLATES

The metal back plate that is welded into or onto the back of a clicker die. Foam rubber is placed into the die for ejection purposes. Also used in new Auto platen chases to bolt the die against.

BACKPLATE DIES

Clicker and high dies which have a metal back plate welded to the back of the die. The back plate is used as a base against which the stripper material rests inside the die to allow efficient stripping of die cut material from the die.

BACK UP PLATE

A plate normally placed on the back of a die.

BALANCING KNIVES

Also called leveling knives as used in steel rule dies to balance the load on a platen press.

BEVELS

In reference to cutting die blades, the bevel or bevels of the cutting edge determine how a blade penetrates the material being die cut. The bevel on a die blade is identified by the number of degrees on

the bevel or as an inside bevel or outside bevel. Some steel rule blades have a double bevel for certain cutting applications.

BLANKING DIE

This die type is covered here because it employs a form of steel rule, although it is used to convert metal. Normally, the die is made of two parts; the top (female) section, of steel rule set into dense material, sometimes maple plywood; the bottom section (male), a hardened plate which makes with the inside line of the top section to form a shearing effect on the materials being cut. This die is also known as a shearing die, stamping die or metal blanking die. Also used on auto platen presses with a blanking section to separate the finished carton from the die-cut scarp sheet.

BONDED STEEL RULE DIE

A steel rule die which has a top and bottom metal plate which are identical. The die design is laser cut or milled into the plates and the plates are separated by spacers. After the die is knifed, the center core is filled with a bonding material.

BREAKER RULES

Breaker rules break off the outside web of a blank of material to relieve the pressure of the die cut material around a die during the die cutting operation. Same as choppers or chopper rules.

BRIDGING

The placement of notches in steel rule blade so that the blade can fit into its relative place in a die board which leaves an equal bridge of die board along the knifed path.

CAVITY

- (1) One section of a multiple cavity die, where more than one die or sections are mounted onto a back plate as in clicker dies or on a die board as in steel rule dies.
- (2) In laser technology, a cavity is the laser resonator, or tube in which the lasing process occurs.
- (3) Usually refers to the engraving on a rotary die cutter that die cuts a single shape.

CENTER BEVEL RULE

A steel rule blade where the cutting edge is centered in the middle of the thickness of the die blade.

CHISEL

A die blade that creates a slice or tear cut in a die cut piece. It can be anywhere in a die configuration where a separation is needed or could be outside the die to help break away the web of material to relieve cutting pressure to aid in improved die cutting techniques.

CHOPPER KNIVES

Steel rule in a die to cut up scrap in smaller pieces.

COMBO DIE

(1) A die which incorporates both the features of steel rule die with male and female blanking elements. Many times the perimeter of a die may be a steel rule blade and the cutouts can be male and female cutouts. The perimeter may not require close tolerance, but the cutouts may require close tolerance. In some cases, a male/female die is required to cut out intricate designs.

(2) A die layout consisting of more than one box design - multiple cartons of different types in a single layout.

CONTRACT DIE CUTTING

Commercial Die Cutters generally provide contract die cutting to their customers whereby they perform their services on a contract basis for each job.

CUTTING and/or CREASING PLATE

In “onto” cutting where die blades strike against a cutting base the base plate is called a cutting plate normally made out of flat ground stainless steel.

CUTTING HEAD

In die cutting, the cutting head normally refers to the head of the cutting press into which a cutting die is mounted.

CUTTING PRESSURE

This refers to the amount of pressure that a cutting press exerts in the downward stroke of the cutting press. The pressure is normally identified in tons of cutting pressure. Generally a common rule of thumb states that it takes about 500 pounds per lineal inch of blade to accomplish a clean die cut, but that figure varies according to the material being cut and other conditions.

CUTTING SURFACE

The surface against which the cutting die strikes after the die has penetrated the material being die cut. The cutting surface in the case of “into” cutting allows the die to slightly penetrate the cutting surface to create a clean cut and in the case of “onto” cutting the die strikes against or onto a hardened surface.

DIEBOARD

Used as the carrier for steel rule in cutting dies, usually hardwood plywood.

DIE ADAPTER

A device used to modify a die station of one type of press so that it will accommodate dies originally designed to be used on different presses.

DIE ASSEMBLY

Refers to a complete cutting tool assembly. This could include the male and the female elements of a male/female blanking or cutting die.

DIE BASE MATERIAL

Used to hold steel rules in position, can be of various materials, i.e.: plywood, plastic, metal, composition or a combination.

DIE CUTTING

The method of using sharp edged cutting dies to cut out shapes from a wide array of soft to semi-rigid materials. The action of making piece parts from bulk materials using cutting dies and presses.

DIE EDGE BEVELS

The bevel on a die blade depends on the intended use of the die blade. The bevel is generally pre-shaped in the blade. A blade can have a short or long bevel, a center bevel, multiple bevels depending on what the blade is to be used for. Most steel rule die blades have a counter bevel on the cutting edge required in manufacturing the blade, but, clicker and high die blades generally do not have a counter bevel. The reason probably is that a clicker and high die blade is heat treated harder and lasts longer in cutting when used in “into” cutting.

DIE SIDE

The view looking down on the sharp edges of the knife, also called the “inside view” in paperboard cartons.

DIE STOP

A die stop is a block of steel that is placed close to the mechanical or hydraulic posts of a cutting press. The die stop limits the downward stroke of a press so that the die attached to the head of the press is limited to not travel below the die stops.

DIMENSIONAL STABILITY

Ability to maintain size; resistance of paper, film or other material to dimensional change with change in moisture content or relative humidity.

DXF

An acronym for “Data Exchange File” . A type of file used to store CAD images and export them to a plotter or other drawing or cutting device.

EDM

Electronic Discharge Machining Process for removing metal – as in rotary dies.

FEED THRU PUNCHES

Cutting punches used in cutting dies which have clearance built into them so that the material being die cut in the punch flows up through the punch and ejects out the back of the punch.

FEMALE STRIPPING SYSTEM

A stripping unit consisting of a male stripping die and female stripping die components that is placed into an auto platen die cutting press after the die cutting station to strip out scrap sections of a die cut blank.

HYDRAULIC BEAM PRESS

A cutting press normally having two or four hydraulic cylinders. Beam presses are used in “into” cutting of leather goods, fabrics, and many other materials. The cutting die can be either mounted onto the head or base of the press.

INCREMENTAL FEED

A feed system for a cutting press which incrementally feeds material to be die cut into a die press in increments of inches equal to the depth of the cutting bed of the press. Also called progressive feed as in P-Feed dies.

IN NICK

A nick or small “V” shape, half round shape or square shape, put into the edge of the die which cuts out a small section of the die cut piece. It is used as a location device to align various die cut sections for assembly.

KNOCK-OUT

A knock out is any device that knocks out the scrap from a cut out in a die.

LAMINATE

A web material formed by bonding two or more materials together as in a pressure-sensitive construction. To apply one layer of material over another.

MASTER ROLL

A full width roll that has finished primary manufacturing process and is usually untrimmed and unslit.

MATRIX (WASTE SELECTION)

The face material and adhesive surrounding a self-adhesive label, usually removed after die cutting.

METAL BLANKING DIE

Otherwise called a male/female die having a male section which entered in to the female section of the die crating a shearing action to cut both soft and rigid materials.

MULTI-LAYER CUTTING

Many materials are laid up in multiple layers before die cutting. It is not uncommon to lay up many thicknesses of fabric 3 or 4 inches in height and have a die cut through all the layers in one down stroke of a press.

NESTING

The nesting of similar or different parts to be die cut on a printed sheet or layout to maximize the material utilization of the material being used in the die cutting process.

OFF PRESS MAKEREADY

The off press preparation of a die along with its cutting plate to insure that the die will cut perfectly with not set up time once the die assembly is placed into the cutting press.

PERFORATING RULE

A cutting rule that produces perforations in the material to be die cut The perforations can be an aid to better glue adherence in the folding and gluing process of folding cartons.

PNEUMATIC PRESS

An air operated cutting press.

POWER STRIPPERS

A pneumatic tool that pierces into a stack of die cut blanks to strip away the excess materials from the finished die cut parts.

PRESS HEAD

Platen (upper) which you print or die cut against.

PRESS PLATE

Cutting surface under which makeready is positioned.

PRESS SET-UP

Often called makeready.

PROGRAMMABLE FEEDING

Computer operated automatic advancing of the material to be die cut into the cutting area of a cutting

press.

PROGRESSIVE DIES

Cutting dies that have more than one cutting station to perform complex or complicated die cutting and stripping operations.

PROGRESSIVE FEED DIES

A steel rule die made on a long die board sometime up to 30 feet long used to die cut many component parts of a product, like automobile upholstery, carpet treads, etc. The die is incrementally fed under the head of a full head cutting press in increments equal to the depth of the cutting head so that all sections of the die cavities of the P-Feed die are cleanly die cut.

PUNCH

There are a wide variety of cutting punches used in the die cutting process. Different types of punches are used in different types of cutting dies to cut out round holes, ovals, squares, rectangles and other shapes in a die cut piece. Typical types of cutting punches are: Center bevel punches Feed thru punches Cup punches Hang hole punches Inside wall punches Seamless punch Serrated punches Side outlet punches Threaded screw punches Tube punches

QUICK RELEASE MECHANISMS

Quick release fixtures and assemblies designed into the heads of cutting presses to rapidly remove and insert cutting dies intended to eliminate to drastically reduce down time caused in the changeover of tooling.

RECEDING HEAD CUTTING PRESS

A type of a cutting press where the head of the press moves back out of the die cutting area after it has completed its downward and return upward stroke. The advantage of this press is that an operator can have a full view of the work area in advancing material and placement of the die for the next die cut

RELEASE LINER

The components of the pressure-sensitive label stock which functions as a carrier for the pressure-sensitive label. Prior to application, it protects the adhesive, and readily separates from the label immediately before the label is applied to product.

REPEATABILITY

The ability of cutting a die to reproduce an exact duplicate cut part after each cutting action. Reparability also refers to the ability of a system to exactly duplicate its actions. Specification denoting the ability of a plotter or samplemaker to return to a previous position accurately.

RE-RULING

Re-ruling refers to the re-knifing of a steel rule die to replace a dull or worn steel rule blade so that the die will be sharp again for continued effective use.

RESHARPENING

Clicker and high dies can have their cutting edges resharpened many times. In resharpening a small amount of height is lost on the die as the edge is rubbed down to flat and parallel condition. The cutting edge is then filed back onto the die to regain its original condition. Where overall height is critical, the back of the die can be spot welded to add height and then the die is blanchard ground back to its original height.

ROTARY DIE

A curved cutting die, used in a rotary die cutter. It can be constructed in several methods using curved steel rule blades more being machined by CNC or EDM methods from a solid cylinder blank. Flexible etched magnetic rotary dies are turned around a magnetic cylinder.

ROTARY DIE CUTTER

A cutting press that cuts and scores a soft to semi-rigid material with rotating (rotary) dies. Principal benefits are speed and long die life.

RUBBER EJECTION

Rubber used to eject the finished product from a cutting die.

RULE, PERFORATING

Steel rule die blades that make perforated cuts in the material being die cut

SCORING RULE

Steel blade that leaves impression in blank without cutting – usually a fold line.

SHIM

A thin strip of steel or plastic, even hard paper used as filler to build up the height of cutouts in a cutting die.

SHOULDER CUTTING PUNCH

A cutting punch which has a shoulder machined onto the base of the punch.

SIDE OUTLET PUNCH

A cutting punch that ejects the die cut pill or slug out the side of the punch rather than flowing directly through the punch and out the back of the die.

SOLID MILLED CLICKER DIE

A close tolerance clicker type die manufactured out of a solid piece of tool steel. It can be either milled out on a milling machine or wire cut on a Wire EDM machine. Normally bent for forged clicker dies are constructed to a commercial tolerance of W0.015” , but when a closer tolerance is required, the die maker will often manufacture a solid milled clicker die to maintain closer tolerances.

STATIC

Electrical charges generated in handling materials which cause materials to cling together. Can jump to humans or equipment causing shock or fire if solvents are present. With reference to films, causes them to cling to one another or to other insulating surfaces.

STEEL COUNTERPLATE

Steel rule cutting plate with creasing channels that can be either chemically etched, machined or engraved into the surface.

STEEL-TO-STEEL

Die cutting method where a steel cutting die is cut against a steel cutting base. Also a method where by two rotary dies are cut against each other.

STRIPPING DIE

A two piece die normally used on an automatic platen press to mechanically remove scrap from a die cut sheet.

STROKE

The upward or downward action of stroke of a cutting press.

TONNAGE

Each die cutting press has a specific capacity or tonnage or pressure available on the down stroke of the head of the press. One ton equals 2000 pounds of downward pressure.

UNWIND STANDS

Roller stands that unwind a coil of material just before a die cutting station.