

GLOSSARY

Corrugating and the converting industries have many terms that may be foreign to the new or casual user of this manual. The following pages contain an alphabetical list of many of the unique terms you may find in this manual.

AC Drive: A device used to control the speed of an AC motor through pulse width modulation.

AC Vector Motor: An AC motor which uses a closed loop feedback circuit to provide finer control of speed.

Amines: A liquid substance used to reduce the viscosity of ink or increase the pH of ink.

Anilox Roll: An engraved steel or ceramic roll used to deliver a metered amount of ink to the printing plates and subsequently to the substrate to be printed. The amount of ink delivered depends upon the cell volume, cell dimensions, cell engraving pattern, and cell count per linear inch.

Anti-Foaming Agent: An ink additive used to prevent or eliminate the foaming of a liquid or break up foam already formed in the ink.

Anvil Blanket: Steel backed urethane covers which are mounted to the die cylinder into which the cutting die knife penetrates during the die cutting process.

Backlash: Play between the teeth of meshing gears, resulting in unwanted movement or one or more of the gears without corresponding movement of the rest of the connected elements.

Back Stop: A device that supports the trailing edge of the corrugated sheets in the feed hopper.

Basis Weight: The weight of a sheet of paperboard per 1,000 square feet (lbs/MSF).

Bleed: A condition caused by lack of drying of the preceding color, which makes trapping color lose its color value. To diffuse, run, or migrate into unwanted areas adjacent to printed areas. To print an area beyond the cut edge or score resulting in a printed area that extends completely to the edge of the blank.

Board Test: A measure of the bursting strength of a corrugated container.

Body: Viscosity or flow characteristics of an ink or other liquid vehicle.

Cell: An engraved indentation in the surface of an anilox roll which holds the ink which is carried to the surface of the plate.

Center Beveled Knife: Cutting rule that is tapered toward both sides of the knife with the cutting edge in the center of the blades thickness dimension.

Circumferential Score: Steel or plastic scores which follow the curve of the wooden die used to score in the machine direction.

Corrugated Blank: The combined sheet received from the corrugator process which is ready to be fed into the printing and die cutting process.

Cross Machine Direction: Running from the operator to the drive side of the machine the direction in which all shafts and rolls in the machine have their axis of rotation.

Cutting Rule: The term which refers to the various types knives mounted on cutting die.

Circumference: Length of a circle measured around the perimeter which is equal to π times the diameter of the circle.

Compensator: A mechanical device which will change the relationship of the plate cylinder, die cylinder or slotter shaft and it's gear to enable registration of printing, die cutting or slots to the blank.

Compressible Blanket: Also called cushion stickyback. A compressible material designed to withstand shocks to the printing plate and also to absorb differences in caliper of board between the flutes enabling finer print quality.

Coverage: The ink or coating mileage. The surface area a given amount of ink will cover. The percentage of surface area which is printed on a given blank.

Cupping: The exaggeration of slightly upturned edges on all detail of images in flat rubber plates, which results in edges of the plate being higher than the remainder of the plate.

Cylinder: In the flexographic printing process, most rollers in the press are referred to as rolls, with the exception being the one that plates are mounted on and the one that receives the impression. These are referred to as the print cylinder and impression cylinder.

Cushion Die Backing: A compressible backing material designed to minimize shocks to the printing plates and to absorb differences in the caliper of board to enable more even ink coverage and better printing quality.

Delivery End: The end of the machine from which the finished product emerges.

Densitometer: An instrument that measures light reflected from a surface used to check the intensity and uniformity of ink color.

Density: The mass per unit volume of a substance. It may also refer to the strength of color or the opacity of ink.

DC Drive: A device used to control the speed of a DC motor.

Die: The term used to describe any of various cutting forms used to cut the corrugated sheet to proper size and shape to form the finished product.

Diameter: A straight line passing through the center of a figure or body and terminated by its boundaries.

Doctor Blade: A thin flexible blade which wipes the surface of the anilox roll providing a metered amount of ink for transfer to the printing plates.

Doctor Roll: A rubber covered roll which wipes the surface of the anilox roll providing a metered amount of ink for transfer to the printing plates.

Durometer: A measure of the hardness of rubber or other polymers, usually measured with a Shore "A" durometer gage.

Energy Safe: Energy Safe is the machine condition where all forms of energy which may cause a motion are relaxed to the zero point.

Engraving: The term used to describe any pattern that has been cut into surface such as rolls engraved with cells, or rubber printing plates which have a pattern cut into the surface.

Evaporation: The changing of a liquid into a gaseous or vapor state.

Extender: Any material added to an ink to reduce its color strength and/or viscosity.

Facings (a.k.a. Liners, or Linerboard): Facings are a form of liner board used as the flat members of combined corrugated board. They are sometimes referred to as liners.

Feed Direction: The term used to describe the through machine direction from the feed end to the delivery end.

Feed Gate: The variable opening used to ensure that one blank at a time is fed into the machine.

Feed Rolls: Rubber coated and knurled steel rolls used to create a nip which grips the corrugated sheet and feeds it into the first print station.

Fill In: Fill in is a term where ink spreads beyond the confines of the area desired to be printed. It is generally caused by excessive pressure between the plate cylinder and the impression cylinder. It is also used to describe the filling of open portions of small type, halftones, and other printed shapes

with ink.

Filling: Filling is a printed defect resulting from the voids in a plate being filled with ink.

First Down: The initial printing station of a sequence of stations in a press or die cutter.

Flexographic Printing: The process of printing with fast drying water soluble inks.

Flow: The rheological property of ink causing it to level out as would a true liquid. Inks with poor flow are said to have short body and those with good flow are described as long.

Flute Direction: The normal flute direction is parallel to the depth of a box.

Foaming: The condition where ink fills with unwanted bubbles due to entrapment of air.

Gear Train: The meshing of gears to transmit power through a machine.

Ghosting (a.k.a Offsetting): Appearance of a faint image of the design being printed in areas which are not intended to be printed.

Halo: A printing defect consisting of peripheral lines around the printed detail caused by excessive ink, excessive impression, dried ink on the plate shoulders or faulty or worn plate shoulders.

Hickey: A small hole or speck in the printed image surface due to dust, loose substrate fibers, lint, dried ink particles or other foreign matter sticking to ink rollers or plate.

Hi-Lo: A defect in combined board resulting from malformation of flutes; alternate high and low flutes.

Hydraulic: Motion operated or controlled by the movement and force of a liquid.

Impression Cylinder: The adjustable roll which supports the corrugated blank sheet providing a solid surface against which the printing plates can transfer ink.

Infeed: A mechanism designed to initiate or control the forward travel of the blank into the press.

Ink Kit: The five gallon plastic bucket in which ink is received from the ink vendor.

Ink Splitting: The process of dividing ink as it transferred from one surface to another resulting in a portion of the ink being on both surfaces.

Ink Tack: The measure of the ability of an ink to dry without sticking subsequent sheets together.

Interlock: A mechanical or electrical device that prevents a machine from being energized unless certain safety parameters are met.

Jog: A slow steady movement designed to move a blank forward in the feed direction.

Journals: Ends of shafts on which the roll rotates.

Kicker Bar: A bar which engages the trailing edge of the bottom corrugated sheet of the stack in the feed hopper, moving it forward into the feed rolls.

Kiss Impression: The lightest possible impression which will transfer ink from one surface to another.

Lead Edge Feeder (LEF): A device which feeds a corrugated blank from the front of the sheet by pulling instead of pushing the sheet into the press.

Leading Edge: The first edge of the corrugated blank to enter the printing or die cutting process.

LOTO, LO/TO: Lock Out Tag Out – The program which ensures a machine is in the zero energy state, and will remain so until locks and tags are removed for safe operation.

Machine Direction: See Feed Direction

Make-Ready: Preparation and correction of the printing plates, before starting the printing run, to ensure uniformly clean impressions and printed images. All preparatory operations preceding the production run. Also a term used to describe all materials used to make the above mentioned preparations.

Metering Blade: See Doctor Blade

Metering Roll: See Doctor Roll

Micron: A unit of measure equal to one-millionth of a meter or about .00004". The useful conversion factor is 25 microns= .001".

Mileage: The usage factor of an ink which refers to the amount of ink used to cover a given area of printed surface.

Mounting: The process of affixing plates onto a cylinder or base in proper position to register color or cut-to-print on the blank to be printed.

MSDS: Material Safety Data Sheets are information sheets which contain all needed information to safely handle chemicals used in plant processes.

Multiple Out (a.k.a. Multi-Out): More than one finished product made from each corrugated blank fed into the machine.

Nip: A line of contact between two rolls or the opening between two rotating rolls, which can be either fixed or adjustable.

OEM: Original Equipment Manufacturer refers to the original builder of a machine such as Ward, Langston, United, Staley, Koppers, Hooper Swift etc.

O. D.: The outside diameter of a cylinder or roll.

Opacity: The quality or state of a substance that causes it to obstruct rays of light. In ink it refers to the ability to hide. The opposite of transparency.

Oscillation: Movement back and forth between two points such as the lateral movement of the cutting die anvil.

Overlay: A transparent sheet attached to copy used to indicate changes, color separation or other details of the job to be manufactured.

Penetration: The degree to which the knife in a cutting die penetrates into the anvil cover material on a soft die cutting process. The ability of ink to be absorbed by a substrate.

pH: The negative log of the Hydrogen Ion content of a liquid used as a scale indicating the acidity or alkalinity of the liquid. The lower the number (0 to 7), the more acidic the solution. The higher the number (7 to 14), the more alkaline the solution. 7 is considered a neutral pH.

Photopolymer: A polymer made so that it undergoes a change upon exposure to light. Printing plates are often made for this material.

Pigment: Insoluble color matter used in finely divided form to impart color to inks, paints, and plastics.

Pinholing: Failure of printed ink to form a complete continuous film; visible in the form of small holes in printed portions of the product.

Pitch Diameter: The effective diameter of a gear used to calculate the speed of the gear, or reduction ratios between two or more gears in contact with one another.

Plate (a.k.a. Printing Plate): The rubber or photopolymer used to print by transferring ink from the anilox roll to the surface of the product to be printed.

Plate Backing: Material on which the rubber or photopolymer material of a printing plate is mounted for dimensional stability and for attachment of mechanisms for mounting the plates to the printing cylinder.

Plate Cylinder: The roller that carries the printing plates so as to make one revolution for each blank fed. The circumference as measured over the plates determines the press size and direction of feed.

Pneumatic: Motion operated or controlled by the movement or force of air.

PPE: Personal Protective Equipment – The safety equipment required by plant safety rules to be worn to protect employees from injury such as safety glasses, safety shoes, hearing protection, gloves, etc.

Print Slug: Individual print pieces used to do simple printing where a printing plate is not cost effective.

Printing Plate: See Plate

Print-To-Cut Register: Alignment of printing with the die cutting on a sheet.

Print-To-Print Register: The relationship between each printed color the preceding and successive printed colors.

Pull Bands: Rubber or polymer bands mounted on die backing used to pull the sheet through the machine when there is little or no printing on the sheet.

Pull Roll: Full width cylinders used to convey the blanks through the press. These may be knurled or engraved in some manner to increase the coefficient of friction of the materials as compared to smooth rolls of the same material.

Quality: Those characteristics of a product that allow, at a cost price relationship, the level of uniformity to meet all customer specifications.

Registration: Alignment of printing and die cutting to precisely the same place on a substrate on each successive blank fed through the process.

Register Variation: The amount or degree of printing and die cutting variation from blank to blank in a given order.

Reverse Print: An image formed by the lack of ink in an otherwise printed area.

Running Register: A mechanical or digital device used to index the print or die cutting tooling to register print-to-print or print-to-die cut on the blank.

Score Beads: The portion of a score head or die which makes an impression in the corrugated blank material for the purpose of facilitating bending, folding or tearing.

Scores: Making a cut or impression in the corrugated blank for the purpose of bending, folding or tearing.

Scoring Rule: Rule used on cutting dies for the purpose of making an impression in the corrugated blank for the purpose of bending, folding or tearing.

Screen Count: Identification of the number of cells engraved on an anilox roll per linear inch and the type of cell configuration, i.e. "165P" screen count refers to 165 cells per linear inch of the pyramid type.

Serrated Knife: Knife on a cutting die with scalloped knife edges to facilitate cutting.

Set-Up: Performing make ready on a machine prior to operation.

Shore A Scale: The hardness scale used to measure the hardness of rubber rolls and printing plates. (See Durometer)

Side Guides: The portion of the feed hopper which locates the blanks laterally for feeding. The portion of the counter ejector which locates sheets laterally for stacking.

Skew: A loss of parallelism of the corrugated blank in the cross machine direction.

Skip Feed: Feeding over-length sheets every other revolution of the cylinders of a press. Allows re-inking of anilox roll and plates twice between sheets.

Slots: A cut made in a corrugated sheet, usually to form flaps that permit folding. Widths of 1/4 and 3/8 are common. DC slots may have tapered sides to facilitate scrap removal.

Solvent: A liquid used to dissolve solid materials.

Streaking: A defect in printing normally caused by a mechanical defect in the machine. Characterized by unwanted lines in the print.

Strength: Intensity of the color of a flexographic ink.

Substrate: A foundation material on the surface of which a substance may be deposited for a purpose such as printing or coating.

Surface Speed: The velocity of a point on the surface of a rotating or translating object.

Thixotropy: The property of ink which results in a loss of viscosity under agitation.

TIR: Total Indicated Runout is the measure of the tolerance with which a roll was manufactured.

Trailing Edge: The last part of the corrugated sheet to enter the printing or die cutting process.

Trapping: Overlapping of various colors in a print design to prevent their separating and not touching as a result of registration variation during the printing process. The printing of ink on ink, or superimposing one color on another in which the first down color is sufficiently dry to allow the second color to properly hide the first.

Vibration Analysis: A maintenance procedure which uses the natural frequencies of rotating elements of a machine to predict failure when the frequency signature changes with time or wear.

Viscosity: A measure of the resistance to flow of a liquid.

Warp: Deformation of the corrugated sheet caused by an imbalance of forces introduced during the corrugating process.

Washboard: A board defect having the appearance of washboard because the liner is depressed in the area between the flute tips.

Wiper Roll: A roll, usually covered with neoprene, which is kept close to or in contact with the anilox roll for the purpose of metering excess ink from the anilox roll.

Yoked Heads: A physical connection between top and bottom scoring and slotting heads to ensure they move in unison.

Zahn Cup: A standard instrument for measuring the viscosity of inks. It consists of a standard sized cylindrical cup supported by a wire handle with a rounded bottom drilled with a standard size orifice. Orifice sizes range from 1 – 5 each having progressively larger orifices. A #2 Zahn cup is most commonly used in the corrugated industry.

Zero Crush: Rubber or polymeric rolls designed to yield when contacting the corrugated sheet thereby minimizing the crush caused by the rotating roll.

Zero State: The position of all gears of all of the components of a press such that all of the sections are in the proper relationship to enable registration to be obtained and maintained.