Pad Printing Glossary

The pad printing industry is filled with an array of commonly used terms. In an attempt to explain these words and phrases, we have compiled an alphabetical listing of them and their definitions. If you are new to the industry or even if you are an "old timer" we believe that this glossary will be enlightening.

21 Step Gray Scale
A film positive scale that has 21 gradation points (stepping from 100% solid to 0% open) and it is used to properly calibrate the correct exposure time for polymer clichés.

Abrasion Resistance
The resistance of a surface to being worn away by rubbing or friction. A measure of toughness more than of hardness.

ABS
Acrylonitrile-butadiene-styrene, a thermoplastic.

Accelerator
An ink thinning solvent that has a very fast evaporation rate.

Acetate
Cellulose based thermoplastic.

Acrylic
A thermoplastic. A common one is known commercially as Plexiglass.

Adhesion Test
Test methods used to determine the adequacy of ink coating adhesion to a substrate. A common test is the Cross-cut tape test.

Binder
Portion of the vehicle in an ink composition that, in combination with the pigments, forms a film.

Butyrate
Cellulose based thermoplastic.

Ceramic Doctoring Ring
Typically made from zirconium and used as the ink wiping edge on a closed ink cup.

Cliche
A type of printing plate used in pad printing that has an etched image into the top printing surface. A cliché can be

made from either steel or photo-polymer (plastic) material. See also; polymer, thick steel and thin steel.

Cliché Stroke

The segment of the print cycle where the pad is compressed against the cliché.

Closed Ink Cup

Typically a round vessel for containing and controlling the escapement of solvents from a pad printing system.

Combustible Liquid

Liquid having a flash point at or above 100° Fahrenheit (37.8° C) but less than 200° Fahrenheit (93.3° C).

Conventional Inks

Inks that are solvent based and use evaporation as the primary means of curing.

Corona Treatment

An electronic discharge that is used to change the static tension of a substrate surface to allow better ink adhesion. See also; flame treatment.

Cure

The point at which there are no longer any active volatiles and the ink has finished hardening (for example typically a conventional ink will cure in 24 to 72 hours).

Delrin

Acetal Homopolymer Material

Densitometer

Photoelectric device that measures either the reflected or transmitted density of photographic film or printed color.

Doctor blade

Is a knife-like blade that is used to scrape the puddle of ink from the clichés surface, leaving only the ink in the etched image. Doctor blades are found on open inkwell systems.

Dot Gain

The tendency of a printed halftone dot to change in size at the moment of ink imprinting changing the overall visual quality of the print.

Double Hit

The act of printing on the substrate two times in an effort to lay down a greater quality of ink. This is often done to hide pinholes

Dyne Level

A measurement scale used for determining the surface tension of a substrate. Higher values indicate better ink adhesion.

Epoxy Ink
Two chemical components that when mixed will begin to molecularly cross-link and begin to harden. Typically this process takes between 4-8 hours and typically an epoxy ink will exhibit greater resistance to abrasion and chemicals.

Exposure
To expose the polymer cliché material to Ultraviolet (UV) radiation that will harden the cliché into a usable printing plate.

Fish Eye
An undesirable circular flaw in the printed image usually caused by bubbling of the ink.

Fixture
Tooling used to hold the part that is to be printed in place during the print cycle. A fixture can range from being made out of simple casting resins to complex CNC manufactured tooling. Also known as a nesting fixture.

Flammable Liquid
A liquid having a flash point below 100° Fahrenheit (37.8° C).

Flame Treat
A gas powered flame that when passed over the substrate material changes the surface tension of a substrate to allow better ink adhesion. Is typically a flame treatment that is applied to the substrate after the print cycle to facilitate better adhesion and cure on nylon based materials.

Flash Point
The minimum temperature of a saturated vapor of a specified liquid at which the vapor will ignite in the presence of a spark or flame.

Flood Bar
Is a mechanical device that is used to drag the ink forward from an open inkwell system to flood ink over the clichés etched image area.

Flood Brush
Is a brush-like device that is used to drag the ink forward from an open inkwell system to flood ink over the clichés etched image area.

Flow Agent
An additive used to disturb the surface tension and increase the ink flow.

Four Color Process
Reproducing full color by photographically separating the art into its three primary colors: yellow, magenta and cyan plus black and printing them in that configuration.

Ghost Image
A second image that is slightly visible behind the desired print.
Half Tone
Representing the level of a printed color (or black) with dots of varying size.

Hardener
The catalytic agent of a two-part chemical compound that when mixed together with an epoxy ink will molecularly cross-link, and begin to harden. Typically this process takes between 4-8 hours. This time value is also known as "pot life".

Loop
A printers style magnifying glass that allows you to see defects more clearly. Never give a loop to your Q.C. department!

Matte Finish
A low gloss (no gloss) finish.

Melamine
A very resistant thermoset plastic.

Moire
An undesirable optical effect that can occur when printing halftones or four color process.

Mottle
A spotty or uneven printed surface with is most apparent in solid areas.

Nesting Fixture
Tooling used to hold the (to be printed) item in place during the print cycle. Also known as a fixture.

Open Ink Well
A pad printing system in which the printing inkwell is fully exposed to the surrounding air environment. This style of system allows a much greater amount of solvent loss and is universally understood to be more problematic than it's modern day closed ink cup counterparts.

Over Compress
Occurs when too much downward pressure is applied to the printing pad. If the over compression occurs on the cliché stroke, it will cause the ink to be pressed out of the corners of the etched image. On the print stroke, the image will be blurred with jagged edges.

Pad Delay
This is a time value that can be set on your Pad Printing Machine which allows the ink to tack on the printing pad

before printing.

Pad Durometer
This is the hardness value that is specified to the silicone pad and it is typically based upon the 00 (double-ott) scale.

Pin Hole
A defect or void that appears in the desired print, usually caused by the trapping of air between the pad and the substrate material. This defect is often seen in highly textured surfaces.

Polymer
A type of photosensitive plastic cliché material, that when exposed to Ultra-Violet (UV) radiation it will harden into a usable printing plate.

Post Treat
Is typically a flame treatment or corona treatment that is applied to the substrate after the print cycle to facilitate better adhesion and cure on nylon based materials.

Pot Life
The value of allowable time after the catalytic agent of a two-part chemical compound has been mixed with an epoxy ink. Typically with most inks the working pot life is between 4 to 8 hours.

Pretreatment
Is defined as a chemical wipe, an electronic discharge (corona) or gas powered flame that is used to change the surface tension of the substrate to allow better ink adhesion. Typically polyolefin plastics need to be pre-treated.

Print Stroke
The segment of the print cycle where the pad is compressed against the part or substrate.

Retarder
An ink thinning solvent with a very slow evaporation rate. Also knows as a "slow speed thinner"

Polycarbonate
A thermoplastic that is heat and moisture resistant. Commonly used for industrial components and also food containers and baby bottles.

Polyester
A thermoplastic most commonly used in the form of DuPont's Mylar.

Polyethylene
A thermoplastic commonly used in the packaging industry. It is strong, lightweight and highly resistant to breakage.

Polypropylene
Claimed to be the lightest commercially available thermoplastic. It has a high rigidity and surface hardness.

Commonly used in the manufacture of housewares, luggage and bottle caps.

Polystyrene
A thermoplastic known for its rigidity, hardness, heat and dimensional stability as well as ease of fabrication.

Registration
The color to color relationship in a printed image. The print quality of a multi-color image is largely dependant upon artwork, machinery & quality tooling.

Resin
A solid (or semi-solid) which can be dissolved to a liquid state, suspended in a vehicle to make an ink or coating and which, upon drying, forms the solid part of printed film.

Scooping
Is the unwanted result that occurs when the Doctor Blade or Ink Cup scoops ink out from the clichés etched surface. This is more common when attempting to print large images.

Solvent
Any dissolving, thinning or reducing agent.

Spider Webbing
Small strings of ink that appear around the edge of print. These are usually caused by static electricity or surface tension problems.

Steel Doctoring Ring
Typically made from carbide steel and used as the ink wiping edge on a closed ink cup.

Streaks
Elongated defects in a printed image.

Substrate
Also known as the material or part that is to be printed.

Surface Tension
The measurement of ink acceptance also known as the wetting ability of a substrate material.

Tack Free
Ink that is dry to the touch but is still not cured.

Tack Time
The time required for the ink to flash off enough solvent to be considered tack free. This time is typically between 10-60 seconds depending upon the ink type, thinner used and image size.

Tampon
Is another (typically German) name given to the silicone transfer pad. A tampon is used to transfer the ink image from the Cliché to the substrate.

Tape Clean
The use of adhesive tape to remove any unwanted material from the Printing Pad. On all microPrint machines this process is automated and included as a standard feature.

Thick Steel Cliché
A hardened steel printing plate that is chemically etched to create a cliché. These clichés are typically 10mm thick and the etch depth of the image is typically around 22 to 30 microns.

Thin Steel Cliché
A high carbon steel printing plate that is chemically etched to create a cliché. These clichés are typically 0.5mm thick and the etch depth is also around 22-30 microns.

Thinner
Solvent added to printing ink to help alter the viscosity as well as control the tack time.

Thixotropy
The property of a compound to liquefy under vibration or shearing (by a squeegee).

Transfer Pad
Silicone pad used to transfer the ink image from the cliché to the substrate.

Trapping
Is the method of laying out multi-color artwork so that the alignment of the black (or darkest) image can be printed slightly over the edges of the underlying colors. By properly trapping your artwork, this will greatly aid in the simplification of your multi-color printing set-ups.

UV Inks
Inks that are cured only when exposed to high levels of Ultra Violet Radiation.

Viscometer
A device that is used to measure the viscosity of printing inks. On all microPrint pad printers this process control is automated and a standard (optional) feature on most machines.

Viscosity
Term used to quantify the thickness of a liquid. In pad printing it is specifically in reference to the printing ink and thinner mixture.

Vinyl

A versatile thermoplastic available in rigid as well as soft form.

Volatile

Subject to evaporation at a relatively low temperature.

Wet on Wet

Describes the printing of multiple colors onto a substrate before the previously printed colors have completely dried