

GLOSSARY OF IN-MOLD TERMS

A

Activation temperature

Temperature at which a heat seal coating becomes tacky.

Appliqué

Label or mold insert, either flat or pre-formed, which is placed in the mold and fuses to the part during the molding process; the in-mold label or in-mold decoration.

B

Banana Gate

Also called a “cashew” gate, it is used in injection molding where automatic de-gating (no trimming) is required on a surface near parallel to the parting line of the mold. The resin is channeled through a curved tunnel similar in shape to a banana half or cashew. This gate leaves little gate remnant. This method can be useful to direct the plastic flow behind the IMD appliqué.

Basis weight

The weight of a known area of substrate, usually in pounds/ream or grams/sq. meter.

Bleeding

Printing or decoration defect on the appliqué, where edges are not uniform and the ink appears to bleed into an adjacent area.

Blistering

Form of delamination that is a void or pocket that appears as bulge on the surface of the

Appliqué after injection molding. Often caused by the pressure of gasses created in the injection molding process.

Blocking

The tendency of two plies of substrate to stick together in a stack or roll, especially under heat and/or pressure.

Blow pin

A hollow device, inserted into the hot parison after mold closing, through which high pressure air expands the parison.

Blowmolder

Manufacturer of plastic bottles used for food and household chemicals.

Blowmolding

A process for making bottles by inflating a tube of hot resin inside a steel mold.

Bond Strength The force required to separate two surfaces which have been laminated or heat sealed together.

BOPP

Biaxially oriented polypropylene. Film is stretched in both the machine direction and cross-machine direction to increase its strength.

Bubbles Accumulation of ink material that is viewed as a bulge or protrusion on the Appliqué.

Bubbling Label defect similar in shape to a blister where label is not firmly adhered to container.

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C

C2S

Two (2) side coated substrate.

Caliper

Substrate thickness expressed in mils or points (1 mil = 0.001 inch) or microns (1 mil = 25.4 microns).

Cast film

Polyolefin film, usually polypropylene, which is not oriented after it is extruded.

Cavitated film

A co-extruded film consisting of a partially foamed or “cavitated” inner core layer and thin solid outer layers. This sandwich is much stronger, has better stiffness and has a higher yield than a solid mono - layer film of the same caliper.

Clamping station

Mold cavity on a wheel or shuttle blow molding machine.

Cling

A very mild form of blocking where the plies can be easily separated

without visible damage to either surface.

Clustering

Accumulation of small bubbles on the surface of the appliqué created during the printing operation.

Coextrusion

Simultaneous extrusion of two or more molten polymers to form a multi-layer parison.

COF

(See “Slip.”) Coefficient of friction is the ratio of the frictional force to the force acting perpendicular to the direction of motion. *Static*

COF: The ratio of the force needed to start the motion between two surfaces in contact to the the force acting perpendicular to the direction of motion. *Kinetic COF:* The ratio of the force needed to sustain the motion between two surfaces in contact to the force acting perpendicular to the direction of motion.

Cold slug The leading portion of the melt flow in injection molding that has been cooled below the effective molding temperature of the resin. It usually appears as a flaw on the surface of the molded part.

Contamination

Foreign matter or material embedded in the surface of the Appliqué during the printing process.

Converter

Manufacturer who produces value added products from single web materials by laminating, coating and/or printing operations.

Counter Pressure High Die

Pressure applied against the square cut label stack during the high die-cutting process to improve print-to-cut accuracy.

Couponing The ability to easily remove part of a label for point-of-purchase redemption.

Crack

Splitting or fissures causing separation of the appliqué. Caused by improper packaging or dents on the appliqué edge.

Crazing

Label defect which looks like alligator skin. Also, multiple tiny cracks due to stress exerted on a 3-D appliqué during the forming operation.

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Curl

A label edge or corner that does not lay flat on a plane surface.

Cut in place (CIP)

A device at the molding site that cuts labels from a web and place them directly in a mold.

Cycle time penalty

Time added to IML production cycle due to label insertion or part cool down.

D

Delamination

When the appliqué or label does not adhere to the plastic substrate to any degree.

Denesting

Removal of bottles from cartons.

Die Cut

Labels cut from printed sheets or web using a sharp device similar to a “cookie cutter.”

Die cut punch

Cut on the Appliqué out of registration that is created in the die cut process.

Digital printing

Imaging sent directly from computer to printer.

Dimensional stability

The ability of film to resist stretching or shrinking during converting or blow molding.

Direct Dry Offset

Printing directly onto a container without use of fountain solution.

Discoloration

Color shifts on the printing or decoration on the Appliqué.

Dot gain

Spreading of a printed dot resulting in a loss of image definition or sharpness

Double picking

Two or more labels which stick together when fed from a magazine stack.

E

Edge welding

Labels whose edges are stuck together during die cutting.

EVA

Ethylene vinyl acetate, a polymer used in heat activated adhesives.

EVOH

Ethylene vinyl alcohol, a polymer used for gas barrier in laminations.

Extruder

Machine which melts plastic resin pellets into a molten mass used to form a parison or injected into a mold.

Extrusion

Continuous conversion of resin pellets into a molten sheet, ribbon or tube for further processing.

F

Feathering

Uneven trim edge where the ink protrudes as feathers. This happens when the die has chipped off feather edges of the ink during the die cutting operation.

FIML

Film in-mold labeling.

Flagging

Label defect where edges are lifted from container.

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Flame treat

Surface oxidation required for adhesion of labels.

Flash

Excess plastic which is trimmed off of the part after the part is ejected from the mold.

Flatbed die cutting

Sharpened blades mounted on a flat support which cuts the label from the surrounding matrix.

Flexo(graphy)

Printing process using polymeric plates with raised images and fluid inks.

Foil stamping

Colored metallic foil transferred to the label surface with heat and pressure.

Forming dent

Deformation on the Appliqué that is created in the forming process.

Form register

defect Forming shape that is off register with the printing or decoration.

Friction

The force that resists relative motion between two surfaces in contact.

G

Gang filling

Batch dispensing of product into a group of containers using multiple filling heads. (See in-case filling.)

Gate

The orifice through which resin flows from the runner to the part. This orifice could take various forms depending on the part design requirements.

Gel lacquer A solvent solution of a hot melt heat seal coating applied by heated gravure.

Graphic streak Line shaped color changes on the Appliqué that vary in length and width.

Gravure

(See Rotogravure)

H

HBA

Health and beauty aids.

HDPE

High density polyethylene.

Heat resistance

Temperature to which a bond or seal can be raised before it fails.

Heat seal coating

Adhesive coating which is non-tacky at room temperature but becomes sticky when heated.

Heat transfer

Decal-like label which is transferred by heat and pressure from a release coated carrier web onto a container or molded object.

HIC containers

Containers for household and industrial chemicals.

High die cutting

Off-line process for punching out labels from a stack of 500 to 1,000 label sheets in a single stroke using a hollow cutting tool.

Hot runner manifold

A system used in injection molding where the runner is kept above the melting temperature at all times. This avoids runner waste enabling you to locate the gates on the top of the part, away from the main parting line. This method, used in conjunction with pin gates can be

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useful to direct the plastic flow behind the IMD appliqué.

Hot tack

Strength of still-molten bond immediately after pressure is released.

Hydroforming

An ambient temperature, high pressure forming method in which a plastic sheet is placed between a forming tool and a flexible urethane “bladder”. Hydraulic pressure is applied to the bladder to force the plastic sheet to conform to the forming tool.

I

IMD

In-mold decorating.

IML-B

(See Blowmolding and/or Extrusion)

IML-I

Injection mold in-mold labeling.
(See Injection IML.)

IML

In-mold labeling, usually of containers.

IML foot

The ledge placed at the bottom of a container mold to help capture the label when using a wrap-around label. This prevents plastic from going to the front side of label.

IML-T

(See Thermoform IML)

In-case filling

Gang filling of bottles without removing them from the carton or case.

Injection IML

Method where die cut label and a forming core

is placed in a mold. Molten plastic is injected into the inner space between the back side of label and the forming core.

Injection stretch blow molding (ISBM)

Blow molding method where a parison preform is made, then reheated, stretched and blown to the bottle shape.

Ink wash

An area on an IMD decorated part where the ink has been moved around or destroyed by heat, friction or pressure from the injection molding process. Sometimes called ink blowout.

ISBM

(See Injection Stretch Blow Molding.)

K

Knit lines

Flaws in the surface of a plastic part caused by the meeting of two or more flow fronts during molding. These flaws can range from lines to deep crevices.

L

Lenticular

An imaging technique using parallel “corrugated” lenses applied over an image to impart a visual effect of depth and motion.

Letterpress

Printing process which transfers ink from raised image areas on metal or polymeric plates.

Lint

Fabric debris entrapped on appliqué during the printing process.

Litho

(See Offset lithography)

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M

Mandrel

Part that transfers label to female side of mold.

Match metal die

A more expensive die used for cutting 3-D appliqués. This die is constructed from hardened tool steel and the punch and die are precision matched to form the cutting edge. This type of die is useful where the cut is not on a planer surface or where you need to cut on the side of a 3-D appliqué.

MD

Machine direction orientation. The axis of orientation of a film parallel to the direction of the forming web movement.

Mold release

Additive in plastic resin which prevents molded container or part from sticking to the mold.

MSI

Thousand square inches, commonly used measure for label pricing.

MSW

Municipal solid waste.

Multi-shot molding

A process where two or more injection processes take place during the cycle. This could be multiple colors, clear and opaque, hard and soft, dissimilar materials or the same material shot at different times. Normally if the materials are dissimilar, special “over-molding” grades are used.

N

Narrow web

Press that uses a maximum web width of 18 to 24 inches.

O

Offset lithography

Printing method in which a grease-like ink is transferred or “offset” from the image to a rubber “blanket” cylinder and then to either a web or sheet of substrate.

Offware

Rejected blow molded or injection molded containers.

OPP

Oriented polypropylene, usually biaxial.

Orange peel

Textured or micro-pitted label surface appearance resembling the surface of an orange. Usually caused by partial collapse of the cavitated film core during molding.

Overprint lacquer

A clear varnish or coating applied over a printed surface to protect it.

P

Packaging

How in-mold labels are packaged for shipment to molders for usage.

Panel bulge

Outward bulge of the labeled side of an in-mold labeled bottle, common to paper labels and some plastic labels.

Parison

Tube of molten plastic extended from extruder which is captured by the closing mold.

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Parison “touch down”

Premature contact of parison with back of label during blow molding cycle.

PCR

Post consumer resin.

PET

Polyethylene terephthalate (polyester).

Pick and place

Articulated robotic device which picks up a label from the magazine stack and positions it in the open mold.

Pin gate

Used in injection molding in conjunction with a hot runner manifold or a 3-plate runner system. This gate is automatic de-gating (no trimming) and leaves a small remnant in the shape of a pin mark.

Pinning Device

Mechanism for holding an in-mold label against the interior wall of a mold until the resin is introduced into the closed mold.

Pitting

Crater-like imperfections on the surface of the appliqué after injection molding. These are caused by foreign matter between the appliqué and the cavity when injecting resin.

Plasticizer

A low molecular weight polymer additive used to soften or make pliable an otherwise hard or brittle plastic.

PP

Polypropylene.

Pre-decorating

Labeling of packaging before filling with product, usually at molder.

Puckering

Label defect where the label edge is lifted away from the container.

R

Reciprocating Flat Bed

Roll fed die cutting process where web stops to allow die head to cut a single label from the web.

Regrind

Offware which is granulated and fed back into the extruder.

Release liner

Paper or film carrier for heat transfer or pressure sensitive labels.

Retained solvents

Solvent or water trapped in a coating, adhesive or ink.

Rheology

Deformation and flow properties of polymers.

Rippling

Ridge or wrinkle shaped label defect.

Rotary die cutting

Offpress process of punching out individual labels using sharpened rules mounted in a support bed.

Rotary machine

Blow molding machine which has blowing stations mounted on a vertical or horizontal wheel.

Rotary screen

Printing method where ink is forced through a screen cylinder by a doctor blade inside the cylinder.

Rotogravure

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Printing method which transfers ink or coating to a substrate from tiny cells etched in a metal cylinder.

Runner

The channel in the mold body through which the resin flows to the part.

S

Scrap (See “Offware.”)

Scratches

Surface imperfection due to abrasion that removes small amounts of Appliqué material.

Scround

A square or rectangular container with rounded corners.

Set-off powder

Starch-based powder used at end of sheet fed offset press to prevent face-to-back transfer of wet ink in stacked sheets.

Sheet offset (See Offset lithography)

Shuttle machine

Blow molding machine which has blowing stations on either side of a central extruder. Mold shuttles between extruder and blow station.

Sink marks

Depressions on the surface of a molded part caused by a low pressure situation in the injection molding process. This can be caused by under-packing of the part due to process or by achieving gate seal prior to a thick section being solidified.

Slip (See “COF.”)

Term used in the opposite sense of COF. A high slip normally refers to low COF and a low slip refers to high COF.

Spot

Dot shaped mark on the Appliqué caused by ink or foreign material during the printing process.

Sprue

The part of the runner formed by the resin flowing through the sprue bushing, a feature of the mold that interfaces with the injection machine nozzle.

Sprue gate

Where the part is filled directly from the sprue bushing of the injection mold. This leaves a large “carrot” looking gate remnant that must be trimmed.

Steel rule die

A less expensive die used for cutting the appliqué or label. This die is manufactured by bending a steel rule cutting blade around a form such as wood. The cutting action is performed between the sharp edge of the steel rule and a flat surface of wood, plastic or metal. (like a cookie cutter). This die is good for simple and flat cuts.

Stress mark

A white or gold colored defect that appears on the Appliqué when it is formed, bent or creased.

Sub gate

Also called a “tunnel” gate, it is used in injection molding when automatic de-gating (no trimming) is required on a surface near perpendicular to the parting line of the mold. The resin is channeled through an angled, tapered tunnel, entering the part on a side wall. This gate leaves little gate remnant.

Substrate

Film or paper on which a label is printed.

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Sustainability

Sustainability in the labeling or decorating of plastic objects is the use of minimum resources to accomplish the task, including materials, energy, labor and money.

T

Tab gate

Gate used in injection molding that is simply a tab cut on parting line connecting the runner to the part. Post-mold trimming is necessary.

TD

Trans-directional or cross web orientation of a polyolefin film.

TF-IML (See Thermoform IML.)

Thermoform IML

Method where die cut label is placed in a mold, a plastic sheet is indexed over the mold then heated and forced into the mold forming the container.

Tie layer

Extruded adhesive layer used to bridge or bond together two otherwise incompatible polymer films.

U

UV flexo

Same as flexo except uses 100% reactive inks cured by UV radiation.

V

Vacuum port

Small openings in mold that hold labels in place during blow molding.

Valve gate

A heated gate used in injection molding to produce a remnant free part. The only thing

visible is a circular impression similar to an ejector pin mark. The straight or tapered pin valve is actuated by hydraulics or pneumatics on a timer. This gate can be useful to direct the plastic flow behind the IMD appliqué and to reduce shear and ink wash on the appliqué near the gate.

Vertical insert molding

A process using an injection molding machine with a vertical clamping unit. The machine can use horizontal or vertical injection units or both. Some presses use a rotary or shuttle table for increased production. This process uses gravity to hold inserts in the mold while injecting the resin.

Viscosity

Resistance of a coating or ink to flow under applied force.

W

Web

Substrate to be printed or coated as it unwinds from a roll.

Web offset (See Offset lithography)

Wheel machine Continuous extrusion blow molding machine which has molds positioned around a large wheel.

This glossary is continuously updated by IMDA. Suggestions for additional terms and/or definitions are welcome.

Contact IMDA with ideas and suggestions at info@imdassociation.com