



TECHNICAL ASSISTANCE

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TA2054 Revised 4/01 CCF

FAQ About Laser and Ink Jet Pressure Sensitive Products

What type of pressure sensitive material should I use for what type of laser or ink printer?

Your pressure sensitive label stock supplier is your first source for guidance in selecting a pressure sensitive laser or ink jet product, especially in recommending the correct adhesive.

The printer manufacturer is another source. Some printer manufacturers have a list of acceptable pressure sensitive media, or at least what their media requirements are (total caliper, basis weight, smoothness, etc.).

You can generally categorize this way:

- **Lightweight laser** (Typically 40# face / 40# liner) = Desktop printers and some slower, smaller medium speed printers and copiers.
- **Mid-weight laser** (Typically 50# face / 40# liner or 40# face / 50# liner) = Most desktop printers and medium speed printers and copiers. Possible lower end high printers and copiers.
- **Medium weight laser** (Typically 50# face / 50# liner) = Limited desktop printers, most medium and high speed printers and copiers.
- **Heavy weight laser** (Typically 60# face / 50# to 80# liner) = High speed printers only.

Always remember the label design, such as die cuts, perforations, matrix removal, grain direction, etc., can affect performance. Also consider how the media is picked out of the tray, the feed path, such as number and tightness of turns, and of course, the end use face requirements. **Some printers do not support pressure sensitive products.** Consult your printer manufacturer's manual or website for advise.

Remember to test. Careful practical testing by you and your customer is recommended.

What grain direction should I use?

The choice of grain direction, long grain or short grain, can be dependent on the weight of the material

used and the feed direction or orientation of the printer, landscape or portrait. It can also assist in the form's capability to perform through the printer.

First let's define grain direction. **Long grain** is defined as the grain direction of the paper fiber running parallel to the length of the form. For example, if the form size is 8.5"x11", and the grain is running parallel to the length (11"), the form is long grain. **Short grain** is defined as the grain direction of the paper fiber running parallel to the width of the form. For example, if the form size is 8.5"x11", and the grain is running parallel to the width (8.5"), the form is short grain.

Now let's define feed direction. **Landscape** is defined as length of the form being the leading edge of the sheet through the printer. For example, if the form size is 8.5"x11", and the length of the form (11") is the leading edge through the printer, the feed direction is landscape. **Portrait** is defined as width of the form being the leading edge of the sheet through the printer. For example, if the form size is 8.5"x11", and the width of the form (8.5") is the leading edge through the printer, the feed direction is portrait.

Because the lamination of a pressure sensitive product lowers the "snap" qualities of paper, "Snap" is how quickly paper recovers to flat once bent. Good "snap" qualities can help a pressure sensitive form negotiate tight turns or high speeds in a printer. Pressure sensitive products are typically stiffer and have better "snap" qualities in the machine grain direction (the direction in which the grain is running) versus the cross grain direction. Therefore it is usually best to have the grain direction in the same direction as the feed path. That is, long grain for portrait fed forms and short grain for landscape fed forms.

However, this is not always the case. Use grain direction to your advantage. For example, a heavier weight stock may be able to process through a printer better if the grain direction is perpendicular to the feed path, making it more conformable to feed through the printer. The grain direction may also



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assist a form that has many perforations or critical die cuts. You may wish to test you media choice converted in the required form design in both long and short grain configurations to see if it helps or hinders performance.

Can gloss and matte coated stocks be laser or ink jet printed?

Unless there is a special receptive topcoat on the stock or it was designed for the print technology, gloss and matte-coated stocks ***can not*** be ink jet printed via the conventional desktop ink jet printers. There are other ink jet technologies in the marketplace that may accept standard media, but without the receptive topcoat or function designed in, the media cannot accept or absorb the amount of ink applied. The results vary from ink running off the paper to excessive bleed.

To a degree, laser printing is the same but much more forgiving. The coated paper must possess the adequate xerographic properties necessary to attract and fuse toner. If not, image drop out or poor fuse quality occurs. Compatibility between the coated paper and the toner and fusing process of the printer becomes more sensitive than that of an uncoated paper, so test thoroughly. Your ink manufacturer may offer a clear ink or varnish to enhance the fuse quality, however be careful for you are essentially tinting the sheet (see “Can laser sheets be tinted or coated?”).

These rules also apply to film substrates. A specifically designed topcoat must be present for such films as vinyls of polyesters to accept these types of print methodologies.

Can EDP stocks be laser or ink jet printed?

EDP stocks, being uncoated are much more forgiving than coated stocks for laser and ink jet printing, but they may or may not work due to the design of the paper. Remember, EDP paper was designed to accept dot matrix or impact printing, so if it does laser or ink jet print it's a bonus. Laser papers are designed with xerographic qualities, such a specific smoothness and electrostatic properties, to image and fuse toner.

An EDP stock may not have these qualities and the results are poor image or fuse quality. A clear ink or varnish that promotes toner fusion can be applied but you are essentially tinting the sheet (see “Can laser sheets be tinted or coated?”).

Ink jet papers are designed to dry fast and hold the image with minimum bleed, and have sufficient smoothness as not to scatter the ink as it impacts the face. EDP stocks may not dry fast enough or provide poor image quality due to bleed for ink splatter.

Also consider that label stock suppliers source facestocks that have good lay flat stability for laser and ink jet media, so an EDP in a cut sheet lay flat application may not perform to satisfaction.

How much matrix should I remove?

It is recommended to stay within the printer manufacturer's guidelines or form design. Typical matrix width is 1/16” or less. Too much matrix removed can induce picking and feeding issues. The more liner that is exposed, the worse it gets. The exposed, unsupported liner can become bent, or “dog-eared”, during jogging, packaging, handling, inserting into the printer tray, or during picking and feeding through the printer, resulting in jamming.

In addition, label base stock manufacturers produce lay flat laminates. Once the face is removed, the liner may curl on it's own. It is for that reason that MACTac's MP-910 patented non-ooze adhesive is a benefit, because since it is non-ooze, matrix removal is not required.

What kind of perforations should I use?

It is recommended to start with the printer manufacturer's guidelines, however the number of perforations and their location in the design of the label form can be critical. Many printer manufacturers prefer micro-perforations because they are stronger and do not greatly reduce the stiffness or stability of the original laminate. They also usually do not create as much paper dust.

Do not allow perforations to go to the edge of the sheet. Do this by leaving a larger tie at the edge. This prevents the perforations, especially at the edge,

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from breaking when stressed through the printer. Use sharp, clean tooling as to prevent the perforation from tenting. Tenting can cause skew and jamming by inducing additional frictional. They can also scratch the photoconductor, creating image issues over time.

When perforating the full laminate cut the perforations through the face towards the liner to help counter this issue. If perforating the liner in a matrix stripped area, cut the perforations through the back of the liner. This keeps any potential tenting recessed below the surface of the label facestock.

What kind of ink should I use for pre-print graphics?

Discuss recommended inks with your ink manufacturer. The inks should be able to withstand the heat and pressure of the fuser roller (around 400°F and 30 psi typically, but refer to printer manufacturer's specifications) without contaminating the fuser or giving off unpleasant or hazardous fumes. The inks should also have excellent abrasion resistance as to not contaminate the printer. And if there will be print over the pre-print graphics, the inks need to be able to accept and fuse toner.

Can laser sheets be tinted or flood coated?

Tinting, flood coating or large areas of ink coverage are not recommended for layflat laser products. The reason being, the label stock manufacturer has taken great strides in producing a layflat product by obtaining moisture-balanced facestocks and liners, and carefully maintaining that balance during coating and lamination. By adding the excessive moisture through high ink coverage, the product loses this delicate balance, and curl is the end result. It is understood this is can be a necessary evil, so if it must be done, the objective is to get the desired color and density with the smallest amount of ink/moisture. Due to the high viscosity of the inks, offset printing is probably the most successful. If printing water-based flexo, start with a 150-line anilox, try to go to a higher line if possible, and try to dry the ink rapidly but without excessive heat (it is possible to go too far and drive moisture out of the material). Again, the key is to do your best not to add excessive moisture to the product. Also make sure to use inks designed for use in laser printers.

Can I gloss up or matte down a coated laser sheet with a print receptive varnish?

Taking a coated laser product like a semi-gloss of dull coated litho and trying to increase or decrease its

gloss level is not recommended. Why would someone wish to do this? You may come across a Prime Label application that requires variable printing, such as a standard label format that is pre-printed but the product's contents are laser printed into a specified blank area on the label. Like a Prime Label application, the customer may wish to gloss up or down the label for aesthetic appeal or have a varnish to protect the flexo pre-print.

So why is this bad? First, your supplier has provided you with a facestock designed for laser printing and you have just buried those attributes, even if the varnish is laser imprintable. Second, you are changing the dimensional characteristics of the facestock and could be jeopardizing the lay flat qualities of the product. Third, the varnish you selected may cause poor picking and feeding through the laser printer, and/or may cause contamination issues. Fourth, last, and most importantly, you have now sealed the facestock. Remember that laser is a heat fusing process, so moisture is trying to escape the paper. Being sealed with varnish on top and adhesive on back, the moisture has to force its way out. This causes varying degrees of puckering or blistering of the facestock away from the liner. It can occur across the whole sheet, not just the printed areas since the whole sheet is varnished and the whole sheet is in contact with the heated fuser. The degree of this problem appears to be in correlation with the heat of the fuser and/or the speed of the printer.

Basically, the less it sees heat, the less the problem. Depending on the label design, this puckering or blistering could cause label lift or pre-dispensing. It also causes a poor appearance to the label that may not correct itself once applied to the substrate. The best advice is if the customer wants a matte appearance use a matte coated laser sheet, if they want a high gloss appearance use a high gloss laser sheet, and stay away from the varnish.

What are the best environmental conditions for laser and ink jet products?

From acclimation and storage of unconverted rolls, all the way to processing through your end user's printer, 72°F and 50%RH are the optimum conditions for layflat products. Paper's ability to retain its characteristic moisture level is best achieved at these conditions. When paper gains or loses moisture, it actually expands or contracts respectively, like that wood door or window in your house that sticks shut on a humid day. So when two pieces of paper are laminated to each other and one begins to take on or

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give off moisture, stresses result and curl is the outcome. This is potentially worse with laser or ink jet products that utilize a synthetic face and a paper liner, since the synthetic stocks don't take on or give off moisture like papers do.

Many confuse "climate controlled" as having heat and air conditioning to keep the room comfortable at approximately 72°F, but they forget about the more important of the two, relative humidity. If yours and/or your end user's facility is not climate controlled, that is, lacking a sufficient RH level using a humidifier or de-humidifier to return or take away moisture from the air.

Unfortunately, there will be cases where the area is too large to effect. In that case, try to avoid converting on extremely humid or rainy days, or extremely dry days. If you have to bump your schedule to run on a different day, it's probably easier to do that than trying to sheet, jog, and package curled material. At the end user, have them try putting less material in the trays on such types of days. This limits the exposure to the environment.

How much curl is tolerable?

This can be difficult to determine because, due to their design, some printers may be more sensitive to curl than others. It is best to refer to the printer manufacturer's specifications for media curl. Typically, it is about ¼", but there have been some printers that can handle more, and some much less. For the most part, ink jet printers are less forgiving than laser printers due to the simpler, shorter paper path. However, some have tight a 180° turn it must negotiate with a thin platen after the ink carriage it must pass under.

Off press, you may be able to handle more curl off the sheeter table and in your jogging and packaging than what is required in the printer, but the key is that it go back flat in packaging. Many times curled stock relaxes back to layflat in proper packaging due to a few different reasons. First, the stress of the shrink-wrap, the sturdiness of the chipboard, and the weight of other reams in the carton help press the sheets back flat. Also, paper manufacturers believe the face and liner, when in contact with each other, exchange moisture and help equilibrate or balance each other's moisture contents. So don't be frightened by some curl off press or at the end user. Unless it's excessive or the printer is temperamental to curl, it will probably function. Remember even the 20lb bond can have a tendency to curl yet feed through a printer.

How do I resolve curl?

To a degree, curl can be corrected. If you are experiencing curl off press, the first thing to do is to check your environmental conditions. If the air in your facility is quite dry or humid, that may be your problem and the best solution is to correct the conditions as best as possible to 72°F and 50% RH. Also allow the material to acclimate to the environment for 72 hours if possible. If the conditions are adequate and the material has been properly acclimated, check material for lay flat right off the roll. If the curl is present off the roll, contact your supplier, but here are a few suggestions to try:

- If the curl is **Cross Direction Curl**, either up or down, it is curl induced by tension. Cross Direction Down Curl is the more prevalent of this type of curl and is sometimes referred to as core curl or core set since it mimics the wind of the roll. This type of curl can be "broken" to relax the tension. The most common way is to use a breaker bar, whereby the material is dragged across a bar running cross the web opposite the side the material is curling to. As an example, imagine dragging the edge of a scissors blade along gift ribbon. The result is curled ribbon. If you want to take curl out, drag the blade along the opposite side. However, the downside to this is possible damage or roughing the facstock and inconsistent web tensions.

Other possible ways are running the material through a turnaround station, a small S-wrap, or a tight turn around a small idler. You also wish to speak with your press manufacturer regarding a de-curl unit.

- If the curl is **Machine Direction Curl**, either up or down, it is curl induced by moisture imbalance between the face and the liner. Basically one of the laminates has lost or gained moisture than the other, and its shrink due to this loss is creating tension between the two. This is difficult to correct since the way to correct it is to add or take away moisture to the side that needs it. If you are in a dry environment, the side it is curling towards is most likely losing moisture. Try adding water via a high line anilox and using the fan or low heat setting on the dry to flash off residual surface

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moisture. The most effective way to restore moisture is by a remoisturizing unit, which are available for presses. If you are in a humid environment, the side it is curling away from is most likely gaining moisture. Try removing the moisture by applying heat from the ink drying stations to the appropriate side of the web.

- If the curl is **Diagonal Direct Curl**, it may be a combination of both tension and moisture. Therefore use varying degrees of these techniques to correct

If the material is flat off the roll, it is most likely being induced via the converting process. Dissect the press and look for any area(s) that may be inducing curl such as excessive ink lay down, excessive or insufficient dryer oven heat, heavy die strike or dull dies, hung up idlers, tight web turns, etc.

If the **curl is observed at the end user**, it is typically due to poor environmental conditions. Check the conditions of both the area the media is being used and the area the material is stored. Also determine how long the material has been allowed to acclimate. Again, 72 hours or more is best. If the environment is low or high in humidity, recommend the customer try to control it at 52% RH. This may be accomplished by the use of a humidifier or de-humidifier. If the curl is tension related, inspect the packaging for potential issues.

How should I package the material?

Your customer will most likely tell you how they wish to receive the product, but there are some pitfalls. Many customers want very little packaging for such reasons as efficiencies, ecology, costs, and so on. But you want to be sure that your customer receives a product that is truly layflat for ink jet and laser printing. Your label stock supplier and your press operator worked to produce a lay flat product. Poor packaging can induce damage and curl during transport, storage, and handling, resulting in jamming and imaging issues for your customer.

The standard method is chipboard on top and bottom of a ream with shrink-wrap. The chipboard should be sturdy and supportive, not flimsy and weak. A minimum thickness of 40 mil is usually sufficient, but you may wish to go thicker. It should also be

equal to or slightly larger than the size of the sheet to ensure the edges of the media are supported and protected from damage. Another innovative idea is to have the grain direction of the chipboard in the opposite grain direction of the media, since it too can

be effected by moisture. Therefore, if the media and the chipboard begin to curl, they are not curling together and counteract each other. This also helps in regards to stiffness and counteracting tight shrink-wrap.

Generally, 200 sheet reams are the best maximum. Too many sheets in a ream have a tendency to overwhelm the packaging, and protection to curl is compromised, and too few sheets increase costs. Also, be aware of the tightness of the shrink-wrap. Shrink-wrap that is too tight can induce curl due to tension, and if too loose, the media can jostle causing edge damage. The corrugate box the reams are shipped in should sturdy with little play in the ream movement inside. Stack the cartons only as high as the carton's ECT (Edge Crush Test) rating. Bulk packaging by lining a corrugate carton with a poly bag is probably the worst thing you can do. This type of packaging provides very little support to the media and usually results in curled and damaged corners and edges. Worst yet, your customer has to dig their hand in to retrieve the media, or pulls the whole poly bag out of the carton, causing additional damage. There are many unique and innovative ways to package laser products, some which almost appear bullet proof. The first priority to consider in your packaging design is that you adequately protect the media.

Should label stocks be fanned?

Many people fan pressure sensitive stocks before placing them in the tray, but it is **not recommended**. Think of how label dispensing equipment works or how someone might try to hand remove a label from a liner – the liner is bent back against itself to get the label to “pop” off. When label stocks are fanned, that same back-bending action is taking place, and it is possible to get a label initiated off the liner. That label can then pre-dispense in the printer and cause feeding and/or imaging/fusing issues. If fanning must be done, it is best to bend the ream towards the face instead of towards the liner to prevent labels from lifting off.

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