MacDermid Printing Solutions

Tech Tip 8

Controlling Photopolymer Plate Gauge

MacDermid photopolymer plates are manufactured to the highest quality standards to assure the best image reproduction and the longest press life. One important factor is maintaining plate gauge. There are four areas where your handling and production can affect plate gauge. If you perform the following procedures, quality and consistency will be maintained in storage, during platemaking and on the press.

Plate Storage

MacDermid materials have a shelf life of at least 12 months when properly stored. Temperatures should not exceed 100°F (38°C).

Unopened cases of material should be stored flat. Cases of the same size may be stacked on top of each other. However, metal back materials may not be stacked more than seven cases high, and other type materials no more than 10 cases high.

Open boxes of MacDermid material should be stored with additional support between each case. One half-inch plywood sheet is an ideal support medium.

Handling

The face side of MacDermid materials is protected by a white matte finish protective cover sheet. When handling, it should be carried with the cover sheet up. To prevent delamination, use both hands to support the plate from the center of the plate back, or carry the plate on a rigid sheet. It is important that you do not apply pressure to the plate surface before exposure as this will cause low spots in the finished plate.

Processing, Exposure, and Washout

To assure gauge consistency from plate to plate, it is important to calibrate exposure regularly for the slight variation from lot-to-lot of material and the ever-decreasing intensity of the exposure lamps. If plates are underexposed, the washout solvent will cause excess swell, which may not allow the plate to return to the original gauge. The same is true of washout time. When a plate is washed too long, more solvent is absorbed by the plate, requiring longer drying time. An incorrect blend of wash solvents can also cause plate swell. The most commonly used wash solvents are 75 vol%/25 vol% percholroethylene/ n-butyl alcohol with a specific gravity of 1.41; or MacDermid SOLVIT adjusted to a Brix value of 74.3. Refer to the MacDermid processing manual for more information.

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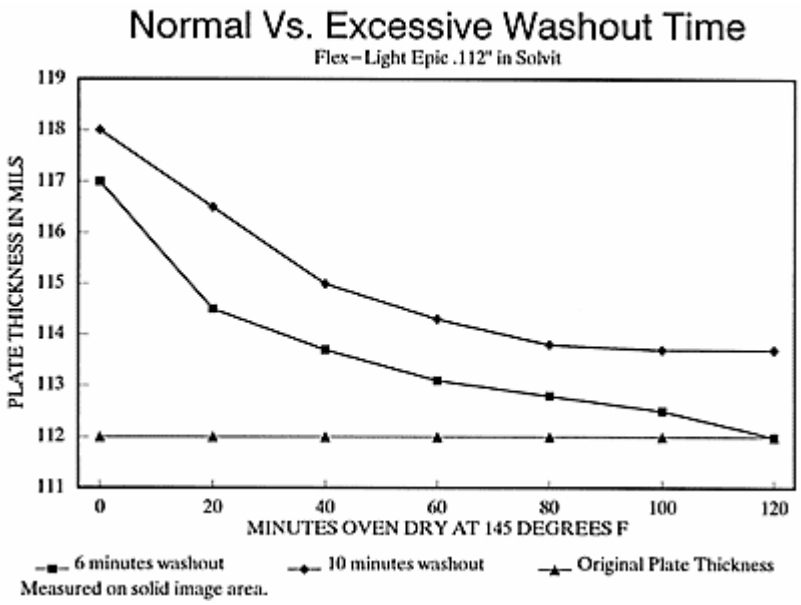

Drying Time

MacDermid plates should be dried in a forced air oven at a temperature of 140°F (60°C). Proper drying time is determined by image detail and the type of solvent used in washout. The oven drying time should be long enough to return solid copy to the original plate thickness. Plates with halftones will require longer drying times. Process color plates should have an additional overnight air-dry. Water washable processed plates should be oven-dried for 30 minutes for line work, 2 hours for process color work. Use the following table to select an initial drying time; then check that the final plate tolerance meets your specification.

Drying Time (hours)
140°F-150°F (60°C-65°C)

Drying Time (Hours) 140°F-150°F (60°C-65°C)	Perc or Perc/butanol	SOLVIT	Water Wash
Standard Relief	1 - 1.5	1.5 - 2	0.5
Deep Relief	2 - 3	2 - 3	

Solvent Compatibility

Improper solvents used at the printing press will cause the plates to swell and affect the gauge adversely. MacDermid makes three major types of photopolymer plates, each with

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unique properties and uses. Select a plate that is designed for the type of printing inks you use. Solvents used to clean plates must also be compatible with the plate materials.

Ink Compatibility

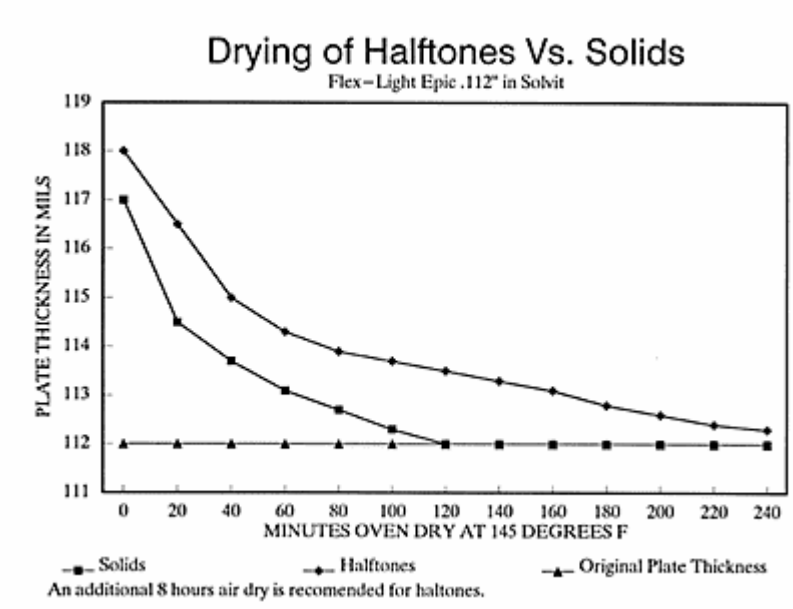
Plate Material	Compatible Inks
KOR, SKOR, EPIC, FLEXCOR	Water- or alcohol-based inks with less than 25% acetate; UV inks
FL-1	Oil, water, or alcohol inks with less than 15% acetate
FL-AL, SPLASH	Oil or water inks; some UV inks

Non-Gauge Problems

Some problems are mistakenly attributed to plate gauge variations. These include:

A. Variations in two-sided adhesive tape thickness.
B. Plate cylinder low spots.
C. Cylinder bearing wear.
D. Press adjustments.

Such problems should be corrected as they arise to ensure consistent, high quality printing.



Measuring Plate Gauge

Plate gauge is one of the most critical aspects of a printing plate. However, there is much disagreement about how to correctly measure plate gauge. Manufacturers normally use the best instrumentation that money can buy, while the instruments in trade shops and plate rooms run the gamut of laboratory grade to non-existent. This Tech Tip will discuss the two main types of instrumentation and the proper procedure for measuring plate gauge.

Before You Measure . . .

There are certain operations that must be done prior to measuring the gauge of a plate. These operations are micrometer calibration and complete plate dry down.

Micrometer Calibration

There are two characteristics that any micrometer must have: accuracy and precision. Accuracy is how close to the correct thickness the micrometer measures. Precision is how much each measurement of the same spot varies. The correct way to test this is to measure a shim of a known thickness. Any feeler gauge shim will work very well for this because the tolerance on them is very small, and the correct thickness is stamped on it.

To calibrate a micrometer, the distance between the anvil and the foot must read zero. The first thing to check is that the foot on the micrometer is tight and that the anvil and foot are free of dust, dirt, polymer, and rust. The foot is prone to work loose and will cause errors when you try to measure a plate. Make sure that the foot is tight.

To zero digital models, lower the foot onto the anvil and press the “ZERO” button. The display should read 0.0000 depending on how many decimal places are measured. To zero analog models (with a rotating indicator), lower the foot onto the anvil and turn the bezel (or gauge face) until the indicator points at 0. The micrometer is now zeroed and can be checked on the feeler gauge for accuracy and precision.

Micrometer Accuracy & Precision

Micrometer accuracy is checked by measuring the thickness of the feeler gauge shim and comparing the micrometer reading to what is stamped on the shim. They should agree. If the two readings are different, have the micrometer serviced. To check for precision, measure the same spot on the shim several times. The readings should not vary. If they do, have the micrometer serviced. Now use the feeler gauge to make sure the micrometer foot is perpendicular to the anvil. With the foot lowered on the anvil, try to slide a .0025 or the thinnest shim available under each side of the foot. If the shim will slide under one side, adjust the micrometer head until the shim cannot be inserted under the foot without manually raising it. At this point, the micrometer foot will be perpendicular to the anvil and should give accurate readings.

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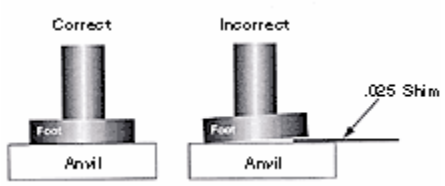

Figure 1

Plate Drydown

When a sheet printing plate is washed out in a solvent, the plate swells due to solvent absorption. This swell will be uneven because large solid areas absorb less solvent than screened areas. As the plate dries, the solid areas will dry and shrink faster than the screened areas. The plate must be fully dried so that all areas of the plate will be at the original gauge. This is critical to accurate and precise plate measurement. While thinner plates may dry down in 1-1/2 hours, thick plates may take as long as 3 - 4 hours. Make sure your plate is completely free of solvents before you measure it.

Types of Micrometers

Micrometers used in plate rooms are generally of two types. These are a Table Micrometer and a Snap Gauge Micrometer. There are two areas of particular interest with these micrometers. These are the size and weight of the foot mechanism, and the area of placement on the plate.

The size of the foot should be approximately 0.375 inches diameter, parallel to the anvil, and of a minimum weight. A weight that is too heavy will compress the plate and cause the plate to read under gauge.

The area to be measured is on a large solid that is bigger than the foot diameter. A screen area will compress under the weight of the foot and read low.

The Snap Gauge

The Snap Gauge is a hand held type that is operated by a lever which raises the micrometer foot above the anvil for measuring. Snap Gauges come in various sizes, and they are some of the least expensive types of micrometers. This can result in greater variation in readings. Since the instrument is hand held, the angle of the anvil with the plate surface can and does vary. When this happens, the plate drapes around the anvil, and the measurement reading is not accurate. There can be as much as 0.005” difference in a plate’s thickness simply by changing the angle of the gauge! In addition to this, only a small area of the plate can be measured due to the small design of the Snap Gauge. While perfectly acceptable for measuring large, rigid materials, the Snap Gauge is not recommended for measuring flexible

materials such as printing plates. However, if you are using a Snap Gauge, good results can be obtained if you are careful. The best method is:

- Rest the Snap Gauge flat on a table top.
- Raise the foot and place it as far into the plate as it will go to minimize the plate angle in the gauge.
- Lower the foot onto the plate.
- Read the measurement from the display.
- Measure several areas of the plate.

The goal is to keep the plate surface as near parallel to the micrometer anvil as possible. Care must be exercised so that a flat plate is not rejected due to measurement error.

Table Micrometer
Figure 2

The Table Micrometer is the preferred instrument for measuring printing plate gauge. The measuring head is securely mounted, and the table is large enough for the plate surface to lie flat.

The method of plate measuring is simple and straight forward:

- Calibrate the micrometer as described above.
- Lift the foot and slide the plate area to be measured under it.
- Release the foot and allow it to rest on top of the area to be measured.
- Read the micrometer display to determine the plate thickness.
- Measure several areas of the plate.

The foot can be lowered either by free-fall or by controlled release with the lifting cable. Either method can be used as long as the plate surface is not pitted or damaged by the foot, and the method of lowering is consistent. A large solid area is best for determining plate gauge, with the screened areas being measured to make sure the plate is fully dried down. An 8-hour overnight air dry is preferred for process plates in addition to the time spent in the drying oven.

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Table Micrometer
Figure 3

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