



Tech Tip 4

Determining Optimum Exposure Times

Determining Optimum Exposure Times for MacDermid Photopolymers

A concern of all platemakers and final plate users is the ability of a polymer plate to hold the finest positive detail, yet keep reverses open to avoid fill-in on press.

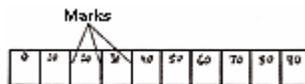
Following proper procedures for calibrating exposures is important. Back and face exposure tests should be performed periodically for optimum plate quality and, in turn, optimum printed results.

Determining Exposure Times for a MacDermid Plate

The Back Exposure test is used to determine the time to produce a desired floor and relief thickness. The Face Exposure test is used to determine the best time for properly formed relief images.

Back Exposure Test Procedure

1. Cut a strip of plate material 4" wide and 30" long. (If your MacDermid sheets are smaller than 30" long, use multiple strips.) Measure and make note of the thickness.
2. Use a ruler to mark the strip every three inches. Use a ball point pen to draw a line on the polyester plate backing that leaves a permanent depression at each 3" mark so that the strip is divided into 10 sections.

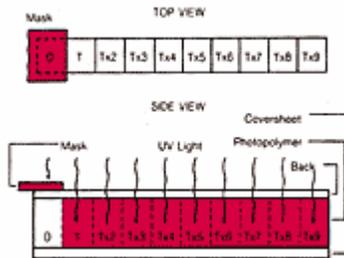


Test Strip Marked in 10 Step Exposure Sections:

3. For plates .125" or less, number the first section as 0 seconds, the second section as 10 seconds, the third section as 20 seconds and so on until each section is marked with an exposure time of ten seconds more than the previous section. For thicker plates use an interval of 20-30 seconds. The objective of the test is to select exposure times that will result in a variety of floor thicknesses from thinner than desired to thicker than desired.

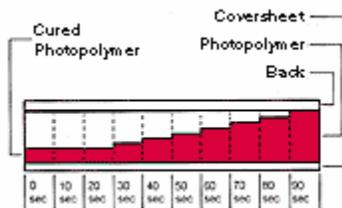


4. Preheat the exposure tubes immediately prior to beginning any exposure test.
5. Place the test strip in the exposure unit with the back facing the exposure lamps. Use an opaque material to cover the entire test strip EXCEPT the second section marked 10 seconds. Back expose the strip for 10 seconds. Next cover all the sections but leave the 20-second section uncovered, and back expose for 20 seconds. Cover the rest of the strip and back expose the third section for 30 seconds. Proceed until all the plate sections have been exposed for the amount of time marked on that section. **Be sure to mask everything else on the strip each time.**



Masking & Exposing Test Strip

6. Wash the test strip in the washout unit. Allow enough wash time to remove all unexposed polymer.
7. After the test strip has dried in the oven 15-20 minutes, measure the amount of floor achieved at each exposure step. You will find that the longest exposure times produce a sample where the polymer does not wash out. These sections are over back exposed. Determine which exposure time produces the desired level of plate floor.



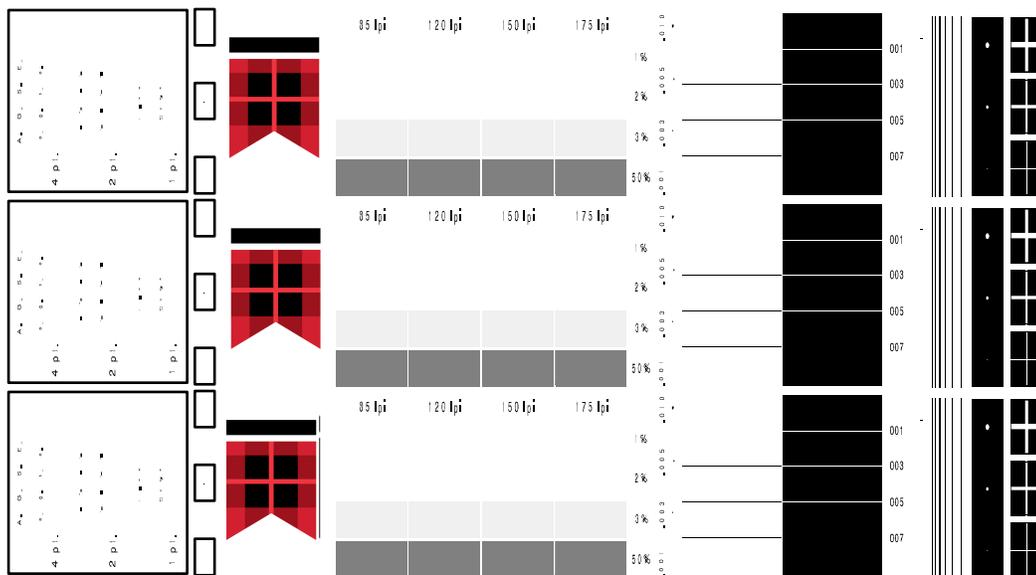
Back Exposed Test Strip:

Face Exposure Procedure Test

The Face Exposure Test is a procedure that helps the operator determine the correct amount of time to expose a particular type of plate. Use a stepped image negative with at least four segments. We have developed such a test negative with four identical segments containing fine lines, reverses and halftone dots in screen rulings from 65 lines to 150 lines per inch.

MacDermid's test negatives are available by request from your distributor or sales representative.

1. Cut a piece of MacDermid material to fit the test negative.
2. Select proper back exposure time through the Back Exposure test, and back expose the plate for the correct period of time.
3. Remove coversheet in one continuous pull.
4. Prepare and position the test plate and test negative for face exposure.
5. The object of the test is to select a face exposure interval that results in the first segment of the plate being slightly underexposed and the last segment slightly overexposed. Select exposure time intervals, typically 2 to 3 minutes. Use a longer interval of 4 to 5 minutes for EPIC.



Standard Test Negative
Figure 1

6. Expose the entire test negative/plate for a fixed amount of time. This amount of time is used in each of the increments of exposure time.
7. Mask off the first segment with opaque material and expose the remaining three segments for the same amount of time. Mask off the first and second segments and expose the remaining two segments for the same fixed amount of time. (Now the two remaining unmasked segments have been exposed to three times as much light as the first segment.) Finally, mask off the first, second and third segments and expose the final segment again (at the same fixed time). The result is a plate with four different face exposures as shown in Figure 4 E.
8. Wash and dry the test plate. Determine which exposure holds copy detail best. The information you get from face exposure tests allows you to select proper exposures



to hold fine details, tones and reverses for MacDermid plate material. Repeat this test on a periodic basis (once per month is recommended).

Factors that influence exposure include:

1. UV Lamp Age

As lamps age, UV output decreases. Different types of UV lamps have different outputs and age differently. Therefore, exposure time must be increased accordingly to maintain consistent plate quality. Lamps should be replaced at regular intervals. Check with your lamp manufacturer for recommended usage time. Lamp lifetimes are typically 750-1000 usage hours.

2. Copy Detail

In order to create proper support for fine detail, particularly halftones, longer-than-normal face exposures is required. Halftones will require up to twice the base exposure time. Repeat face exposure testing when graphic requirements change. A 2% tone requires longer face exposure than a 3% tone, a 150 lpi screen takes longer face exposure than a 120 lpi screen, etc.

3. Relief Depth

Face exposure time is dependent on the relief depth required. The deeper the relief, the longer the face exposure required to achieve adequate character support. In general, shallower reliefs improve image fidelity.