

Tech Tip 13

Storage of Materials

Storage of Flexographic Materials and Finished Plates

Soft, elastomeric raised-image plates are a key element in the flexographic printing process. A variety of elastomers are used as plate materials, but they can generally be classified as either photopolymers or molded rubber. Proper storage procedures will prolong plate life and improve printing. This Tech Tip outlines proper procedures for storing raw photopolymers, and finished plates.

Raw Photopolymer Materials

Raw photopolymer sheet material must be protected from exposure to ultraviolet light and from pressure that will deform the sheet. For best results, photopolymer material should be used within 12 months of manufacture.

1. Store photopolymer sheet in the original shipping container.
2. Keep temperature of storage area below 100°F (38°C).
3. Photopolymer sheet *must be stored flat*. NEVER stand boxes on end.
4. Do not stack small boxes on top of large boxes, or small sheets on top of large sheets.
5. Do not stack boxes more than seven high.
6. Keep photopolymer material covered to protect from exposure to light and dust.
7. Boxes that have been opened must be supported by a flat, rigid surface.

Finished Photopolymer Plates

Plate storage area should not exceed 100°F (38°C) temperature and should be located away from ozone sources such as power stations, press motor drives and corona treating units.

- Plates should be cleaned and dried before storage.
- Always use soft plastic-bristle brushes or clean shop towels. Never use brass brushes and make sure that shop towels are not contaminated with metal filings.
- Make certain that cleanup solvents are compatible with plate materials. Consult the manufacturer for washup solvent recommendations, or test a small sample of the plate material by immersing it in the solvent. Leave it for one hour. After one hour the solvent can be considered compatible if the sample material does not swell in thickness more than 5%, and the plate surface does not become tacky.



- Prevent exposure of plates to light. Exposure to light sources rich in ultraviolet light (such as sunlight or high pressure mercury vapor lights) will cause a loss of physical properties. Protect the plates from light by storing them in envelopes or film drawers.
- Do not stack one plate directly on top of another. Use separator sheets between sheets and do not stack over 6" high.
- Temperature in the storage area should not exceed 100°F as high temperatures can cause the plates to become tacky and will accelerate ozone attack.
- Protect plates from ozone by storing them away from power stations, press drives, corona treating units and other sources of electrical discharge.
- Storing plates on cylinders or in a curved position increases surface tension and makes them more susceptible to ozone attack. If plates must be stored in this way they should be wrapped in black polyethylene to protect against ozone attack.

When high ozone levels cannot be avoided, use ozone-resistant photopolymers and/or apply ozone-resistant finishes to the cleaned and dried plate before storage. Humidity does not usually affect plate life and no special precautions are necessary to control humidity in the storage area.



Protecting Flexographic Plates from Ozone Attack

Ozone is always present in the atmosphere where it is created by the action of ultraviolet light on oxygen. In printing plants, ozone levels are often many times higher than normal because ozone is also generated by a number of different pieces of electrical equipment such as press drives, tension-control motors and corona-treating units.

Flexographic plate materials, especially photopolymers, are susceptible to ozone attack. Exposure to high ozone levels, particularly in finished plate storage, can cause fine lines or cracks to form in the plate surface. These cracks usually start in a direction perpendicular to the direction of plate stretch. The cracks may continue to widen and deepen until large pieces of the polymer separate from the substrate. Moreover, the higher the temperature the more severe the ozone attack.

The following steps will help eliminate ozone damage to MacDermid's photopolymer and rubber flexographic plates. All of them may be required when ozone levels are very high.

- Use ozone-resistant materials.
- Follow platemaking techniques discussed below.



- Store plates properly.
- Apply protective treatments when ozone conditions are severe.

Ozone-Resistant Materials

Photopolymer materials such as SPLASH and KOR are specially formulated to resist ozone attack.

Platemaking Techniques that Increase Ozone Resistance

Photopolymer plate exposure has a major effect on the ozone resistance of finished plates...under-cured plates are more susceptible to ozone attack. Exposure is especially important for corrugated printing dies where long storage under less-than-ideal conditions is common.

1. Run an exposure calibration test on a regular basis to establish the optimum back and face exposures times.
2. Use the recommended plate post exposure to thoroughly cure the photopolymer. For most plates, the post exposure time should be approximately 5-10 minutes.
3. Using excessive light finishing to detackify plates will decrease ozone resistance. Minimum light finishing times should be used.

Finished Plate Storage

The plate storage area should be located as far away as possible from ozone generators such as electric motors, power stations, battery charging stations and corona treater units. Since ozone attack increases with increasing temperature, the plate storage temperature should not exceed 100°F (38°C). Storage recommendations include:

- Always clean and dry plates before storage.
- Plates should be stored with as little surface stretch as possible. Flat storage is preferable to hanging.
- If plates must be stored on cylinders, protect the plates by wrapping with black polyethylene.

Protective Treatments

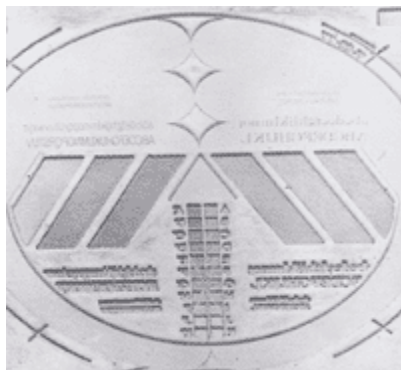
When ozone conditions are especially severe, finished plates should be treated with anti-ozonant solutions. These solutions are sprayed on the cleaned and dried plates to form a protective layer. After spraying, care must be taken in handling the plates so as not to wipe off the protective layer. The most widely used sprays are ArmorAll®, Son-of-a-Gun®, or their equivalents. Protective coatings must be washed off prior to using the plate, and reapplied each time plates are returned to storage.

Typical deterioration caused by ozone attack (ozone level of 50 ppm).



Note that cracks start and propagate at right angles to the direction of plate stretch.

Photopolymer before ozone exposure



Photopolymer after ozone exposure

