

# P.C.B Diazo – Duplicating Films

## Handling Instructions

### GENERAL

Diazo films are direct-positive contact films for ammonia development. The photosensitive diazo layer is applied to one side on 180 micron of dimensionally stable polyester film.

### HANDLING

The films are sensitive to UV light. Processing in subdued room-light (ideally yellow light) is possible. However, it is essential to avoid direct sunlight and prolonged storage in an illuminated room. Sunlight destroys the light sensitive diazo coating in a short time.

### DIMENSIONAL STABILITY

Diazo films are packed practically air-tight at the factory to prolong the shelf life. Before use, they should therefore be conditioned to the relevant processing environment. Where the dimensional stability has to meet high requirements, it is advisable to condition the films together with the originals, sheet by sheet, in light-proof cupboards (protected from ammonia vapours).

Important: Polyester reacts rapidly to temperature changes (minutes) but slowly to changes in atmospheric humidity. Recommended pre-conditioning time: should be min. 18 hours.

### EXPOSURE

Spectral sensitivity range: about 350-430 nanometers (maximum at 390 nm).

Suitable copying lamps: metal halide lamps doped with gallium or iron iodide.

Ideal power: 3000-6000 watt (depending on size of apparatus).

Diazo films with matt surface give optimum vacuum properties (rapid air draw, no air pockets).

Light sensitivity about 400 – 500 millijoules/dm<sup>2</sup>. Exposure time approx. 40 – 60 second, depending on lamp quality, collimation angle and lamp distance.

For fast vacuum draw on soldermasks with tacky coatings we recommend our semi matt version. For high resolution pattern and dry film photo resists we recommend our glossy version.

### DETERMINATION OF EXPOSURE TIME

The correct exposure time can be determined by using an exposure step test. For this purpose, the diazo film, together with an appropriate test original, is subjected partially to different exposure times. The minimum exposure time is obtained when no background colouration is visible in the image-free areas and an invariable background density is measured (check with UV densitometer). The best UV-light transmission is given by the lowest possible D-min. It is also possible to use so-called transmission step wedges. Usually step wedges are available on thin PET carrier only therefore an additional 180 clear PET-film (absorber) must be placed between the light source and the master film. The step with an optical density of at least 0.15 should be burned out on the diazole film (e.g. step 1 in UGRA offset test wedge 1982 or Stouffer step wedge).

To burn out cut edges of film base, dust particles, etc., the minimum exposure time must be increased by about 20-40 %.

Under-exposure gives background fogging in the image-free areas (High D-min).

Over-exposure can lead to undercutting of fine image pattern.

### DEVELOPMENT

Diazo films must be processed in dry ammonia machines. The processing conditions in each case are film-specific and machine-specific. They must be determined by appropriate tests.

Development is correct if a uniform and steady coloration is achieved. For a fast development the coating side must be down. After the first pass the final coloration should be nearly obtained. For a safe density and an equal development of the whole surface the film must be turned 180° and at least passed twice. If the temperature is low or ammonia is not properly evaporated it will be necessary to pass the film several times to get the full density. If the equipment would cause scratches on the film surface it would be recommended to use a plotting paper to protect the coating. Over-development is not possible but a too high development temperature may lead to a shift in visual contrast and base film shrinking.

Note: After development, the image may shift in colour or density. These could be caused by a pH shift when the ammonia is drying out from the coating.

Important: Use only concentrated ammonia solution (about 25 %).

## CORRECTIONS

Image elements may be removed with a razor blade or similar scraping (touch up) tools. For touch up work, we recommend solvent based red or black masking pens (check for compatibility).

## CLEANING

Most commercial film cleaners may be used (check for compatibility).

## STORAGE

Unprocessed films: Cool (15-20° C) and dry (less than 60 % relative humidity) - in a sealed package and protected from light and ammonia.

Processed films: normal room condition in filing cabinets (prevent permanent exposure)

VISUAL EFFECT	POSSIBLE CAUSE
<b>INADEQUATE IMAGE DENSITY (UNIFORM)</b>	Improper development: Processing temperature too low, processing speed too high, ammonia flow rate or ammonia concentration too low, machine has not yet reached proper processing conditions. Image density of master too low. Film exposed to white light prior to processing.
<b>HIGH BACKGROUND (UNIFORM)</b>	Under-exposure. Master shows background. Film has been exposed to ammonia vapor or high humidity prior to exposure. Shelf life expired.
<b>INHOMOGENEOUS COLOUR OF IMAGE AREAS</b>	Improper development: Processing temperature too high, processing speed too low, ammonia flow rate too high.
<b>EDGES SHOW DISCOLOURATION OR HIGH BACKGROUND</b>	Improper storage conditions: Opened package has been exposed to ammonia vapor or high humidity. Shelf life expired. Inadequate illumination.
<b>POOR RESOLUTION</b>	Improper contact of film to master: Inadequate evacuation, not emulsion-to-emulsion. Over-exposure. Reflective backing of copy board. Straylight caused by hazy master.
<b>OTHER POSSIBLE PROCESSING PROBLEMS:</b>	<b>Ask for our detail "trouble shooting guide"</b>

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