

Pad Printing Clichés

Manufacturing and Differences

The interaction of the single pad printing components like machine, printing speed, cliché, pad, ink, and printing conditions must be precisely tailored in order to deliver a perfect result.

Choosing the right cliché is one of the most decisive factors. The choice may depend on the differing durability and manufacturing of the available cliché types:

1. Photopolymer Cliché (Plastic)

Being available as either water- or alcohol-washable cliché, both types have the clear advantage that the user can manufacture them by himself with a suitable exposure device and an oven for thermal curing.

Needed is a repro film reversed, positive, and matt, with an optical density higher than log 4.0 and a transparency less than log 0.06. The resolution should be at least 2450 dpi.

By using different screen films for the second exposure it is possible to change the etching depth of the cliché. The most common film for the production of the photopolymer cliché is the 120 lines/cm film with 86-90 % coverage.

Most important to know:

Depth control can be achieved by using different exposure times, different line counts and coverage of the halftone films.

The longer the exposure time, the flatter the cliché becomes.

The fewer lines/cm and/or the higher the tonal value, the deeper the etching depth of the plate, or vice versa:



The more lines/cm and/or the lower the tonal value, the flatter is the etching depth of the cliché.

The lifetime of these clichés (careful handling provided) is made for small to medium print runs. For a good cliché quality, thermal curing at 80 °C after exposure is essential.

Tip: Briefly "dry" the cliché in the oven before each use, as the polymer absorbs humidity which would shorten its lifetime during the printing process.

2. Metal Sheet Cliché

Metal sheet clichés are hardened steel plates with a thickness of about 0.3 – 0.5 mm. They can be produced by etching with iron(III) chloride (FeCl₃) or laser engraving (without repro film). The lifetime of these clichés (careful handling provided) is made for medium to large print runs. Please see #3 for disadvantages.

3. Steel Cliché / flat and cylindrical

Analogous to the metal steel cliché, it is also possible to either laser or etch the cliché plates.

The lifetime of these clichés, provided careful handling and a good steel quality with approx. 15 % chrome content, is designed for large print runs.

Disadvantages:

Etched steel cliché:

- To produce an etched cliché it is necessary to use a reversed, positive, glossy repro film, with an optical density higher than log 3.5 and a transparency less than log 0.06. The ideal resolution is at least 1.200 x 3.600 dpi.
- For 4 colour process prints, a maximum of 80 lines/cm is possible
- The disposal of the used chemicals is complex and expensive
- Due to the complicated manufacturing process, most users are not able to make this type of cliché by themselves and therefore depend on cliché manufacturers

Laser engraved cliché:

- The initial cost of a laser capable of imaging steel clichés in good quality is still very high, so that the production of steel clichés is not economical for most users

4. Ceramic Cliché/ flat and cylindrical

This cliché type can only be produced with laser engraving. The main advantage is the long lifetime, but compared to steel clichés they are much more sensitive to damage. It is an absolute must to treat them very carefully.



5. Laser cliché (plastic)

- There are already some affordable lasers which allow to achieve good results
- With a high resolution fiber laser (> 4000 ppi), the quality is very good

Summary

Photopolymer clichés are most suitable for small to medium print runs, test prints, pre-series prints or quick-service prints. A big advantage is the relatively simple self-production.

Metal sheet clichés deliver good printing results for medium print runs, while steel plates are being used for large print runs and high quality standards.

Ceramic clichés produce very good print quality and are predestined for very large and repeating print runs.

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