FlintGroup
Printing Plates

nyloprint® User Guide

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1 nyloprint® printing plates and their applications

The possible uses for nyloprint® plates are so varied that the question of which plate to recommend in any given situation can usually only be answered if specific data, such as the application, is known.

This chapter should help you to choose a suitable plate type on the basis of knowledge of applications and printing technologies.

1.1 Letterpress printing technologies

- Direct letterpress printing
- Indirect letterpress printing

1.2 Applications for nyloprint® plates

- Commercial printing
- Label printing
- Printing on beverage cans
- Tube and cup printing
- Security printing
- Pad printing
- Sheet-fed gravure
- Embossing with nyloprint®

1.1 Letterpress printing technologies

Letterpress printing has led to the development of a number of specialised and special printing presses, including letterset presses, the particular strengths of which make them ideal for specific printing jobs or printing tasks, such as self-adhesive labels, beverage cans, plastic cups, tubes, securities, tickets, etc.

Traditional commercial letterpress printing has been superseded by offset printing, so letterpress printing is now mainly used for special applications with special printing technologies or printing methods. Ultimately it is the substrate that determines the choice of how to print. The reason for this is that the hardness of a letterpress plate needs soft counter-pressure to transfer the ink.

Direct letterpress printing

In direct letterpress printing, the ink is transferred directly to the substrate without any intermediate steps. There are three different types of printing presses in use:

- platen presses
- flatbed cylinder type, e.g. high-speed printing presses
- rotary type, on rotary printing units in label printing presses

Indirect letterpress printing

Indirect letterpress printing is also known as letterset or dry offset printing.

Applications for indirect printing with nyloprint® printing plates:

- Continuous form printing in special dry offset units or in wet offset units with an adequate cylinder undercut
- Tube and cup printing
- Printing on tins
- Security printing on special machines (direct or indirect letterpress plates, or for direct or indirect inking-up)

Using a letterpress plate in an offset press has the advantage that printing does not require a dampening unit and inking is better. Also the durability of a letterpress plate is vastly superior to that of an offset plate.

Plate durability, good ink transfer and long cleaning intervals are important factors in the decision to use a letterpress plate, particularly for printing on beverage cans, tubes and plastic cups.

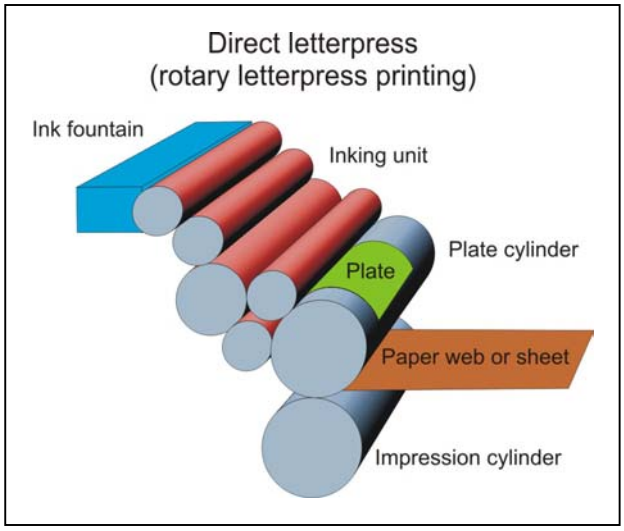

Fig. 1.1

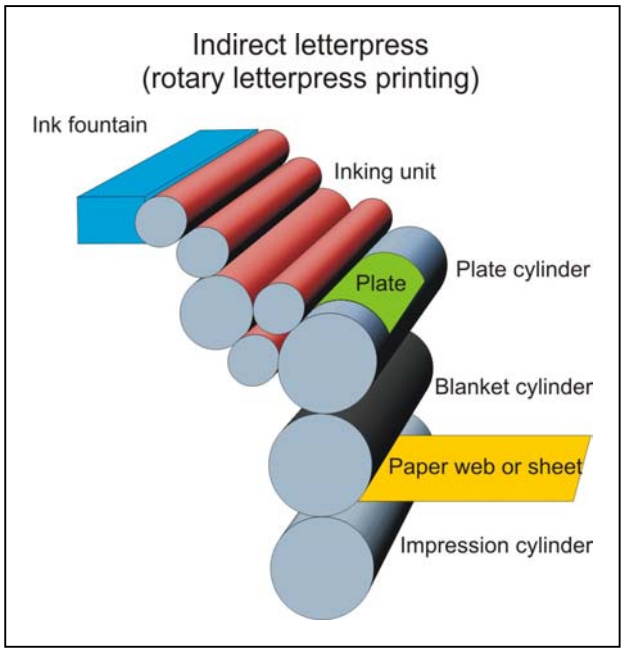

Fig. 1.2

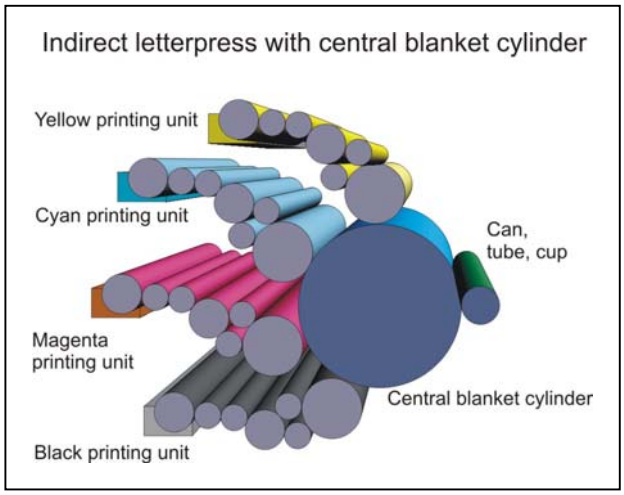

Fig. 1.3

1.2 Applications for nyloprint® plates

Commercial printing

Generally speaking, traditional commercial printing, i.e., the printing of business items, brochures, etc., has moved over to offset, so products are only produced using letterpress plates in isolated cases. Plate types WA 175, WS 94 and the corresponding alcohol-washable plates in flatbed machines are mainly used for these applications.

Label printing

nyloprint® plates are mainly used for printing on self-adhesive materials with UV inks. Plates with a flexible foil base are provided for this and are attached to the plate cylinder of the printing press by means of double-sided adhesive tape. Plate types: WF 70 H, WF 80 H, F, M, Q and blue and WF 95 H, F, M, Q and blue.

Some plate types are also available as digital plates.

Plates with a steel base are also still in use, however. These are held on the printing press cylinder either by magnets (in the case of thin steel plates) or by a clamping device.

Self-adhesive labels are also printed with flexo plates (nyloflex®), however. For a description of these plates, see the nyloflex® manual.

More often than not, labels such as wine labels and labels on tins (sleeves) are produced by an offset printing process.

Printing on beverage cans

In this guide, printing on cans mainly refers to printing on two-piece drinks or aerosol tins. These cans are pressed out of sheet metal (aluminium or thin steel) and are printed indirectly in several colours on a rotating mandrel in a printing unit, i.e., via a blanket. The lid (the second piece) is then attached after the can is filled.

The advantages of a nyloprint® letterpress plate are greater durability and long cleaning intervals at very high printing speeds.

For this special application, Flint Group Printing Plates provides plate types S 83 and S 94, WS 73, WS 83 and WS 94.

Some plate types are also available as digital plates.

Tube and cup printing

Tube and cup printing likewise involves indirect printing onto a plastic cup or a tube via a blanket cylinder. The printing process is the same as that for printing on cans.

UV inks are used for printing on tubes and cups.

Plate types to be used: S 73, S 83, S 94, WS 73, WS 83, WS 94 etc.

Some plate types are also available as digital plates.

Security printing

Securities such as banknotes, postage stamps, identity cards or shares are printed not in one but in a series of printing processes, using a combination of special technologies. This means, particularly with banknotes, that various printing processes such as offset, gravure, letterpress and screen printing are combined.

Flint Group Printing Plates provides special plates for security printing.

Plate types to be used: S 73 G, S 73 W, ST 52, WS 73, WS 73 W, WS 73 D, WS 230 S, WSA 52, etc.

Pad printing

Pad printing is an indirect gravure process that uses a specifically designed machine with a silicone pad (printing pad), where the ink is transferred from a gravure printing plate to the substrate, which is usually uneven and shaped. As the soft pad adapts to any shape, it is ideal for printing on ceramics, moulded plastic parts or other objects.

nyloprint® plates specifically designed for gravure printing or those with a suitable surface can be used for pad printing.

Plate types: ST 52, ST 52 K, S 73 G, WSA 52, WS 43, etc.

Sheet-fed gravure

Sheet-fed gravure is rarely seen nowadays. The strengths of sheet-fed gravure lie primarily in the runnability of all sorts of special inks and varnishes (such as metallic, UV-activated or coarse pigment inks) on the widest variety of substrates.

Both cylinders and plates can be utilised as the printing block. For sheet-fed gravure, Flint Group Printing Plates offers the specifically developed nyloprint® gravure plates ST 52 and WSA 52.

Embossing with nyloprint®

a) Blind embossing

So-called blind embossing is achieved by using a female and a male die to deform the substrate. nyloprint® plates can be made for both these dies and fit the machine perfectly. There are certain rules to follow during prepress, which are explained in chapter 5.

Plate types: See page 21.

b) Hot foil embossing

Hot foil embossing is a relief printing process where a metal plate (brass, copper, zinc or magnesium) seals a multi-layer foil onto the substrate. To make this possible, the printing block (cliché) must be heated to a certain temperature.

Since the introduction of embossing foils that can be used in a lower temperature range below 135 °C, it has also been possible to use nyloprint® plates for this application.

Plate types: WA 210, WA 240, WS 152 and WS 175.

c) Hot moulding

The special nyloprint® plates provided by Flint Group Printing Plates for making rubber clichés for stamps and for flexography are noted for their high strength and hardness at elevated temperatures.

After careful drying, the nyloprint® cliché is sprayed with a release agent and placed in the moulding press. Then a special flong, suitable for photopolymer plates, is placed on the plate and under specific conditions, pressed into the cliché. Once cool, the flong can be released from the plate and used as an embossing die (female) for a rubber cliché that can be used in flexography or for rubber stamps.

Plate types: WA 210, WA 240, WS 152 and WS 175.

2 Structure of nyloprint® plates and overview of the product range

2.1 Structure of nyloprint® printing plates

- Choosing the right plate

2.2 Description of the type designation

- What the letters and numbers in the nomenclature mean

2.3 Overview of the nyloprint® water-washable printing plate product range

- All the plate types in one table, both conventional and digital

2.4 Overview of the nyloprint® alcohol-washable printing plate product range

- All the plate types in one table

2.1 Structure of nyloprint® printing plates

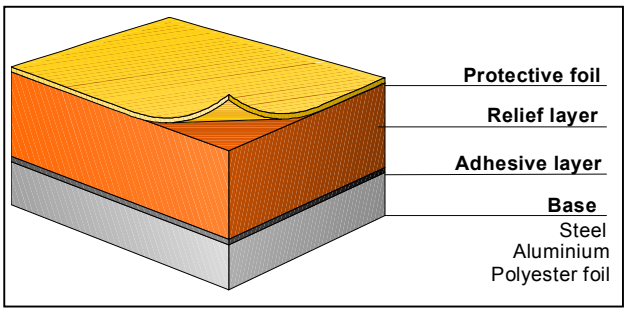

Fig. 2.1

Within the nyloprint® plate product range, Flint Group Printing Plates offers two printing plate groups that are washable in different ways: alcohol-washable and water-washable plates.

The decision about when to use water-washable or alcohol-washable plates and which type of plate to use, is based primarily on the following criteria:

- application
- type of ink
- type of printing press and cylinder undercut
- plate mounting in the printing press

Oil-based and UV inks are the only inks that can be used for printing with both water-washable and alcohol-washable nyloprint® plates. Water-based inks cannot be used.

The type of printing press, especially the cylinder undercut, determines the thickness of the plate.

The following systems are available for mounting a printing plate in the printing press:

- Placing on a magnetic cylinder or a magnetic bed (flatbed)
- Using a clamping system to mount the plate
- Attaching with double-sided adhesive tape

Plates with steel, thin steel, rigid aluminium and foil bases can be selected, depending on the mounting methods used.

2.2 Description of the type designation

The plate designation indicates the plate type, base material and thickness.

A aluminium base
F foil base
S steel base
W water-washable
73 total plate thickness

Example:
WS 94 = water-washable steel base plate, 0.94 mm thick
WS 80 = water-washable foil base plate, 0.80 mm thick
A 175 = alcohol-washable aluminium base plate, 1.75 mm thick

The last letter after the number characterises certain properties of nyloprint® printing plates:

D digital
F flexible
G smooth surface
H hard polymer layer
K pad printing plate for ceramic applications
M medium-hard polymer layer (M = medium)
Q fast processing times (Q = quick)
T thin, flexible steel base (T = thin steel)
W special relief surface for security printing

2.3 Overview of the nyloprint® water-washable printing plate product range, conventional and digital

Plate type	Total thickness (mm / inches)	Relief height (mm / inches)	Base material	Washout time (min)	Temperature	Drying time and temperature	Main applications
nyloprint® WF blue	0.80 / 0.031 0.95 / 0.037	0.50 / 0.020 0.65 / 0.026	Polyester	3 – 4 3 – 4	28 °C / 82 °F	10 min 12 - 15 min at 60°C / 140 °F	Flexible plate for label and rotary letterpress printing; also suitable for exposing with 09N UVA tubes and also washable with brushes, male dies for blind embossing
nyloprint® WF blue D	0.80 / 0.031 0.95 / 0.037	0.50 / 0.020 0.65 / 0.026	Polyester	3 – 4 3 – 4	28 °C / 82 °F	10 min 12 - 15 min at 60°C / 140 °F	Flexible digital plate for label and rotary letterpress printing; also suitable for exposing with 09N UVA tubes and also washable with brushes, male dies for blind embossing
nyloprint® WF-H	0.70 / 0.028 0.80 / 0.031 0.95 / 0.037	0.48 / 0.019 0.50 / 0.020 0.65 / 0.026	Polyester	2.5 3.0 3.5	28 °C / 82 °F	10 - 15 min at 60°C / 140 °F	Flexible plate for label and rotary letterpress printing, male dies for blind embossing
nyloprint® WF-HD	0.80 / 0.031 0.95 / 0.037	0.50 / 0.020 0.65 / 0.026	Polyester	3.0 3.5	28 °C / 82 °F	10 - 15 min at 60°C / 140 °F	Flexible digital plate for label and rotary letterpress printing, male dies for blind embossing
nyloprint® WF-F	0.80 / 0.031 0.95 / 0.037	0.50 / 0.020 0.65 / 0.026	Polyester	4.0 5.5	28 °C / 82 °F	10 - 15 min at 60°C / 140 °F	Flexible plate for label and rotary letterpress printing
nyloprint® WF-Q	0.80 / 0.031 0.95 / 0.037	0.50 / 0.020 0.65 / 0.026	Polyester	3.0 3.5	28 °C / 82 °F	10 - 15 min at 60°C / 140 °F	Flexible plate for label and rotary letterpress printing; also suitable for exposing with 09N UVA tubes and also washable with brushes, male dies for blind embossing
nyloprint® WF-M	0.70 / 0.028 0.80 / 0.031 0.95 / 0.037	0.48 / 0.019 0.50 / 0.020 0.65 / 0.026	Polyester	2.0 2.5 3.5	28 °C / 82 °F	15 - 30 min at 60°C / 140 °F	Flexible, medium durometer plate for label and rotary letterpress printing, for rough or uncoated substrates
nyloprint® WS	0.43 / 0.017	0.20 / 0.008	Steel	1.0	28 °C / 82 °F	20 min at 80°C / 176 °F	Special relief surface for high-quality halftone printing in special printing presses; suitable for exposure with metal halide burners and for pad printing
	0.58 / 0.023	0.32 / 0.013	Steel	1.5	28 °C / 82 °F	25 min at 80°C / 176 °F	Special relief surface for security printing, letterset, sheet-fed rotary letterpress, printing on tubes, plastic cups and berverage cans; suitable for pad printing, female dies for blind embossing
	0.73 / 0.029 0.83 / 0.033 0.94 / 0.037	0.46 / 0.018 0.56 / 0.022 0.67 / 0.026	Steel	2.5 3.0 3.5	28 °C / 82 °F	10 - 15 min at 80°C / 176 °F	Letterset, continuous form printing, printing on tubes, cups and cans, label and rotary letterpress printing, security printing; flexible plate for flat-bed letterpress with magnetic plate mounting, commercial letterpress printing, female dies for blind embossing
	1.52 / 0.060 1.75 / 0.069	1.20 / 0.047 1.45 / 0.057	Steel	5.5 7.0	28 °C / 82 °F	2 hours 3 hours at 80°C / 176 °F	Hot moulding plate for mounting magnetically in the moulding press, hot foil embossing
	2.25 / 0.089	1.90 / 0.075	Steel	12.0	40 - 45 °C / 104 - 113 °F	60 min at 80°C / 176 °F	Hard stencil plate for security printing
nyloprint® WS-D	0.73 / 0.029 0.94 / 0.037	0.46 / 0.018 0.67 / 0.026	Steel	2.5 3.5	28 °C / 82 °F	10 - 15 min at 80°C / 176 °F	Digital steel plate for letterset in security printing and for printing tubes, cups and cans, as well as for label and continuous form printing
nyloprint® WS-S	2.30 / 0.091	1.95 / 0.077	Steel	12.0	40 - 45 °C / 104 - 113 °F	60 min at 80°C / 176 °F	Soft stencil plate for security printing
nyloprint® WS-T	0.73 / 0.029	0.56 / 0.022	Thin steel	3.0	28 °C / 82 °F	10 min at 80°C / 176 °F	Letterset, continuous form printing, printing tubes, cups and cans, label printing, the highly flexible thin steel base allows the plate to be mounted on magnetic cylinders without pre-rounding
nyloprint® WS-W	0.73 / 0.029	0.46 / 0.018	Steel	2.5	28 °C / 82 °F	10 - 15 min at 80°C / 176 °F	Special relief surface for security printing, letterset, printing on tubes, cups and cans; suitable for pad printing
nyloprint® WA	0.73 / 0.029	0.40 / 0.016	Aluminium	2.5	28 °C / 82 °F	10 min at 80°C / 176 °F	Letterset in offset machines, format class V and VI (coating, metallic inks, special inks), metal sheet printing
	1.75 / 0.069	0.67 / 0.026	Aluminium	3.5	28 °C / 82 °F	10 - 15 min at 80°C / 176 °F	Rigid plate for flat-bed letterpress and label printing
	2.10 / 0.083 2.40 / 0.094	1.05 / 0.041 1.40 / 0.055	Aluminium	5.0 7.0	28 °C / 82 °F	60 min 3 hours at 80°C / 176 °F	Rigid moulding plate for making rubber duplicates (hot moulding), hot foil embossing
nyloprint® WSA	0.52 / 0.020	0.20 / 0.008	Steel	2.0	28 °C / 82 °F	20 min at 80°C / 176 °F	Gravure plate for security printing (intaglio master plates), high-quality pad printing, sheet-fed gravure printing

Standard thickness' currently available - subject to change.

All processing parameters were established on nyloprint® equipment. As the processing parameters can differ from these values when other equipment is used, the above-mentioned values should only be used as a guide.

2.4 Overview of the nyloprint® alcohol-washable printing plate product range

Plate type	Total thickness (mm / inch)	Relief height (mm / inch)	Base material	Washout time (min)	Temperature	Drying time and temperature	Main applications
nyloprint® S	0.30 / 0.012	0.03 / 0.001	Steel	1	20 °C / 68 °F	15 min at 80°C / 176 °F	Pad printing
	0.43 / 0.017 0.58 / 0.023	0.20 / 0.008 0.32 / 0.013	Steel	> 3 > 4	30-35 °C / 86 - 95 °F	20 min at 80°C / 176 °F	Letterset, form printing on continuous letterset machines as well as label printing, metal sheet printing, sheet-fed and rotary printing; suitable for pad printing; S 58 suitable for female dies for blind embossing
	0.73 / 0.029 0.83 / 0,033 0.94 / 0.037	0.46 / 0.018 0.56 / 0.022 0.67 / 0.026	Steel	> 5 > 6 > 7	30-35 °C / 86 - 95 °F	20 min at 80°C / 176 °F	Continuous form printing, sheet-fed and rotary printing, wrap-around plate in rotary machines, commercial printing, telephone directories, catalogues, magazines, packaging, labels, and drinks beverage cans; female dies for blind embossing
nyloprint® S-G	0.73 / 0.029	0.46 / 0.018	Steel	> 5	30-35 °C / 86 - 95 °F	20 min at 80°C / 176 °F	Special relief surface for security printing; suitable for pad printing
nyloprint® S-W	0.73 / 0.029	0.46 / 0.018	Steel	> 5	30-35 °C / 86 - 95 °F	20 min at 80°C / 176 °F	Special relief surface for security printing, letterset, printing on tubes, cups and cans; suitable for pad printing
nyloprint® A	0.73 / 0.029	0.46 / 0.018	Aluminium	> 5	30-35 °C / 86 - 95 °F	20 min at 80°C / 176 °F	Letterset plate for offset machines in class V and VI
nyloprint® ST	0.52 / 0.020	0.20 / 0.008	Steel	2	20 °C / 68 °F	20 min at 80°C / 176 °F	Gravure plate for security printing (intaglio master plates), high-quality pad printing, sheet-fed gravure
nyloprint® ST-K	0.52 / 0.020	0.20 / 0.008	Steel	2	20 °C / 68 °F	20 min at 80°C / 176 °F	Pad printing plate suitable for printing on ceramics

Standard thickness' currently available - subject to change.

All processing parameters were established on nyloprint® equipment, using our nyloprint® 241 NP washout solution. As the processing parameters can differ from these values when other equipment and washout solution is used, the above-mentioned values should only be used as a guide.

3 Production of nyloprint® plates

This chapter takes you through the production of nyloprint® plates.

3.1 Stages in the production of a nyloprint® cliché

- Exposure
- Washout
- Drying
- Postexposure

3.2 Testing the processing times

- Flint test negative for nyloprint® letterpress plates
- Testing the exposure time for nyloprint® printing plates
- Evaluating the test exposure
- Testing the optimum washout time
- Drying and postexposure times

3.3 Digital nyloprint® printing plates

3.1 Stages in the production of a nyloprint® cliché (analogue metal and foil plates)

Exposure

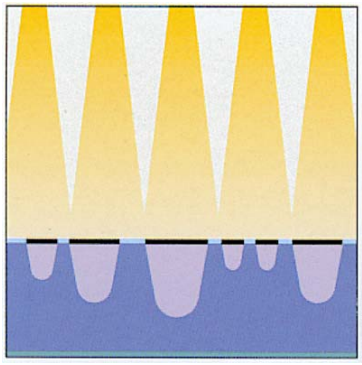

Fig. 3.1

Remove the raw plate from its packaging, cut it to the required size with guillotine shears, place it on the vacuum plate of an exposure unit with the sensitised side upward and remove the protective foil.

Depending on the printing (direct or indirect), place the non-reversed or reversed image negative film, matt face down, onto the plate, roll the vacuum foil over film and plate and activate the vacuum. If necessary, use a soft anti-static cloth or a foam squeegee to ease out any trapped air. After quickly checking the vacuum and closing the lid, start the exposure with the set time.

Washout

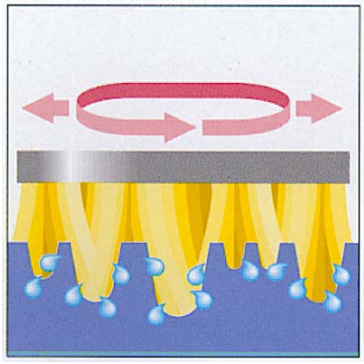

Fig. 3.2

After exposure, the exposed parts on the plate are visible by the change in colour.

Depending on the equipment used for washout, the exposed plates are then mounted in the washer or in a flowline washer, attached to the flowline carrier (adhesive or magnetic plate) and washed out for the specified time.

Drying

Fig. 3.3

In the case of nyloprint® flowline washers (water) with an integrated dryer (DWT), the plate is already dried and postexposed when it leaves the unit. The cliché is ready for immediate use.

When using a washer from the CW combination or a unit with a similar design, once the plate has been exposed, it must first be rinsed to remove any remaining washout solution (alcohol/water mix or water). The plate is then placed in the dryer and dried for the specified time at the specified temperature.

It is important, for water-washable plates, that no residual water remains on the plates, as this could damage the relief layer and the relief adhesion when the plates are heated in the dryer.

Postexposure

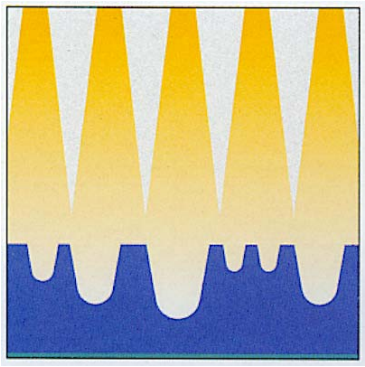

Fig. 3.4

Once drying is complete, the plate is postexposed, so that all the elements that received little light during exposure are adequately polymerised.
Two minutes is sufficient time for postexposure.

3.2 Testing the processing times

To ensure optimum nyloprint® cliché production, it is absolutely essential to know the production parameters of the particular plate type.

This means that the specified exposure time, washout time and temperature, and drying time and temperature must be designed to make the optimum cliché.

Test negative

To determine the optimum exposure time, Flint Group Printing Plates provides a test negative made up of various critical elements, to be used to establish the exposure times.
The test elements shown are combined in a negative film with 8 copies. A step exposure is performed with these 8 copies.

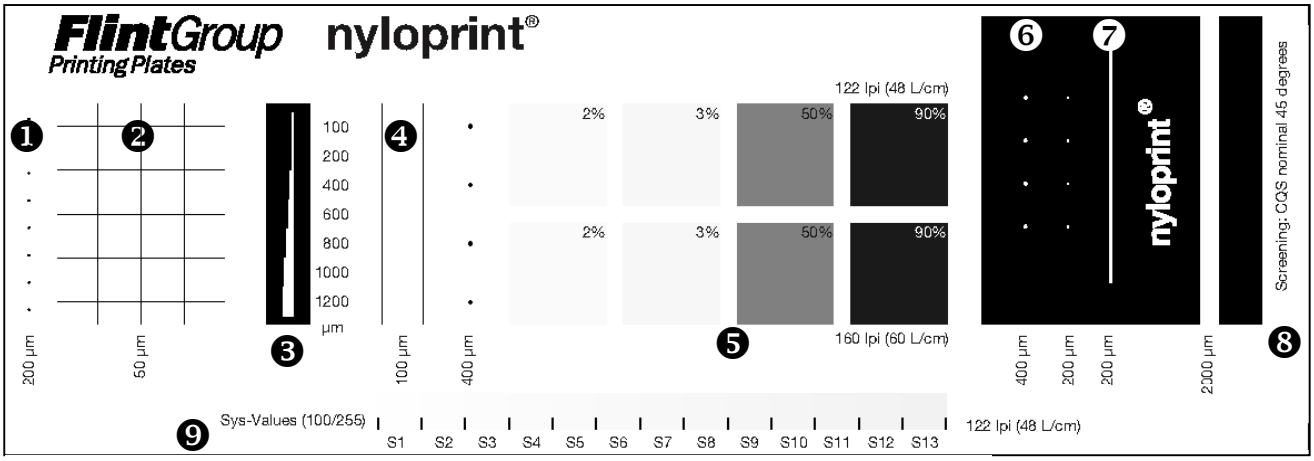

Fig.3.5 Test elements for determining the primary exposure time for nyloprint® plates

❶	Isolated positive dots of the specified dot diameter
❷	Positive line grid of the specified line width
❸	Step wedge of negative lines of the specified width
❹	Positive lines of the specified width
❺	Halftone value fields with specified tonal value and screen ruling
❻	Negative dots of the specified dot diameter
❼	Negative line and negative line depression of the specified width
❽	Screen type and screen angling specification
❾	Screen step wedge, with corresponding system value specification. The system values (Sys-Values) reflect the coverage (100% / 255 grey levels) of the smallest halftone values distinguished by the software. One Sys-Val corresponds to about 0.39%. The system value S5 therefore corresponds to a tonal value of approximately 2% (0.39% x 5).

Washout test

The washout time must be established and checked before determining the exposure time.

To do this, a plate exposed with a test negative is washed in a friction washer, such as a CW unit, until the polymer layer has been completely washed away from all the unexposed parts and all that remains is the base metal sheet or base foil with the adhesive layer or coating. The time required for this is recorded.

It is important to keep to the washout temperature that Flint recommends.

In the case of a flowline washer, the plates are washed out individually at gradually reduced speeds until they have been washed down to the base metal sheet or base foil. The flow rate required for this is recorded.

Note: Please make sure that the relief is not overwashed by too long a washout time. This shows mainly by underwashing at the fine, isolated relief elements.

Exposure test

During the exposure test, a plate is cut to the size of the test negative and is placed on the vacuum plate of the exposure unit. The protective foil is removed and the test negative placed on top. Then the vacuum is activated and the vacuum foil is rolled over the film and the plate.

Once the plate has been exposed for 1 minute, a small cover plate is placed onto the first copy. The vacuum foil stays on the film and plate. The vacuum is not deactivated.

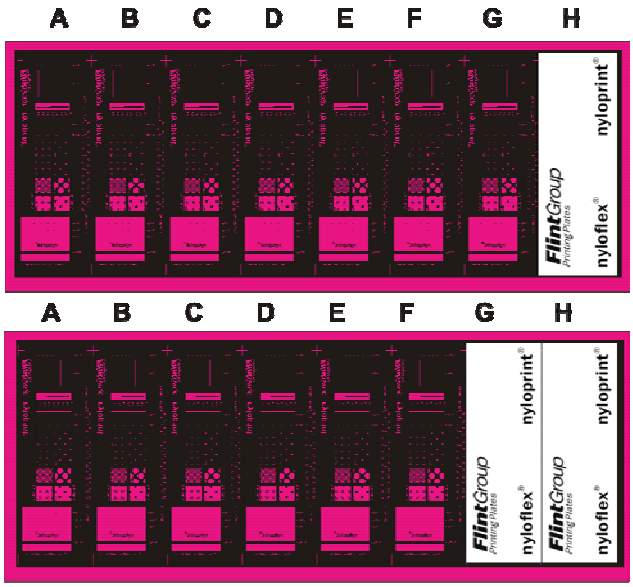

Fig. 3.6 Test exposure

A further 30-second exposure then follows.
The second copy is covered followed by another 30 second exposure and this continues until the last copy has been exposed. The exposure times and intervals between them vary according to the plate type used.

The plate is now washed out using the tested washout time and dried. The test elements can now be used to assess the cliché and establish the exposure times and the upper and lower exposure limit.

The following rules are applied to determine the limits for exposure:

The lower exposure limit - the minimum exposure time - is reached when

- the line grid is neat and straight
- the 200 µm dot is well-based
- the 2 % screen field is perfectly displayed

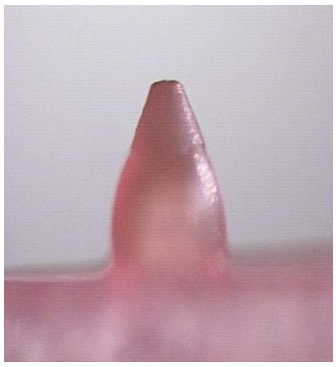

Fig. 3.7 Example of a poorly based, isolated dot

The upper exposure limit is reached when

- the 400 µm negative dot has a depth of 70 µm
- the relief shoulder angle far exceeds 60°

Drying

The Flint Group Printing Plates data must be followed for drying. When using a flowline washer with a dryer, the time is determined by the flow rate. Only the drying temperature can be adjusted here. This should be 80°C for plates with a steel or aluminium base and 60°C for plates with a foil base.

In the case of foil plates, using a higher drying temperature will cause damage due to the shrinkage behaviour of the polyester base.

Postexposure

2 minutes is sufficient time for postexposure.

3.3 Digital nyloprint® printing plates

Where special applications are involved, Flint Group Printing Plates also provide digital plates for laser imaging.

Digital plates have a number of advantages over conventional plates. These benefits include the simple transfer of data to the plate, the low error ratio by avoiding the intermediate step of film production and, last but not least, platemaking without film and its associated potential for error.

The production of a cliché after laser imaging is similar to that of a conventional plate. The only difference is that a vacuum is not applied during exposure.

Structure of a digital plate

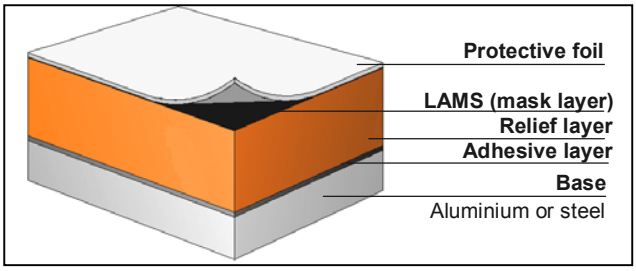

Fig. 3.8

The black mask layer (LAMS), which has virtually replaced negative film, has a precisely defined thickness and density, so that a series of lasers can be used, in accordance with the configuration. YAG, fibre and diode lasers are suitable for imaging a plate.

The other layers of the plate correspond to those of conventional plates.

Processing a digital nyloprint® plate

Plate imaging

Before laser imaging the plate, you first have to check whether the laser you have available is suitable for this application.

As most of the lasers provided for photopolymer plates do not have a magnetic cylinder, caution should be exercised when mounting a steel-based plate.

Please find out from your laser supplier which safety precautions are necessary to prevent the laser being damaged. The laser should always be fitted with a magnetic cylinder.

A cylinder with a vacuum is used for foil plates. If both steel and foil plates are being used, it is advisable to invest in a hybrid cylinder, which has a magnetic cylinder with a vacuum facility.

Digital nyloprint® plates can usually be imaged at a resolution of 2540 dpi. This corresponds to most of the lasers on the market. However, for digital plates to realise their potential and noticeably improve on the quality provided by conventional plates, a higher resolution of at least 4000 dpi is necessary.

Exposure

The imaged plates are exposed without a vacuum in a suitable exposure unit for nyloprint® plates. The exposure times are tested in accordance with conventional plate production. The lasered mask layer takes the place of the test negative. The test file for determining the exposure time can be obtained from Flint Group Printing Plates on request.

Washout

The exposed plate is washed out as usual.

Drying and postexposure

As with conventional nyloprint® processing, plate production concludes with drying and postexposure.

Fig. 3.9 Digital nyloprint® plates

4 nyloprint® processing aids

4.1 Negative film requirements for the production of nyloprint® printing plates

4.2 Expansion constants

- A table listing the expansion constants by plate thicknesses
- A formula for calculating the distortion factor

4.3 Suitable light sources

- Tube light exposure units
- Point light exposure units

4.4 Washout solutions

- Water-washable and alcohol-washable plates
- Checking the alcohol washout solution

4.5 Cleaning agents

- Suitable cleaners for letterpress and offset inks
- Suitable cleaners for UV inks
- Cleaners not suitable for nyloprint® plates

4.6 Plate storage

- Storing raw nyloprint® plates
- Storing clichés

4.1 Negative film requirements for the production of nyloprint® clichés

To achieve optimum quality for your Flint Group Printing Plates photopolymer printing plates, the negative film must meet the following requirements:

Matt film layer side:

Perfect contact between the negative film and the plate is very important for the best possible reproduction of all the relief elements during plate exposure. A heavily matt film emulsion allows the optimum vacuum and thus good contact.

Sufficient film density:

The films must have an optical density of more than D_{log}. 3.50. Films that are not sufficiently blackened (because of their chemistry, for example) can be penetrated by UV light, which could cause unwanted polymerisation.

Maximum transparency:

The transparent parts in the film must not have any grey or yellow fog (density < D_{log}. 0.06). This is the only way to ensure sufficient polymerisation.

Flint Group Printing Plates provides its customers with a non-rated and continually updated list of films for guidance.

4.2 Expansion constants

If the nyloprint® plate is usually exposed flat with a negative and mounted around a cylinder, the plate surface is stretched. The print image gets longer. This must be taken into account when producing the negative film and compensated accordingly.
As a result, the print image is shortened when producing the film. The requisite degree of shortening (distortion factor) is determined by the expansion constant.

The expansion constant can be calculated. However, this will be influenced by the printing conditions, which is why the values listed in table 4.1 below may differ. The larger expansion constants given in brackets have been determined as a result of practical experience. The user is also advised to start with the table values and adjust them based on practical experience.

Table of determined expansion constants*

Plate type	Expansion constant
S 43 / WS 43	2.08 mm
S 58 / WS 58	2.90 mm
S 73 / S 73 G / WS 73 / WS 73 W	3.85 mm
S 83 / WS 83	4.49 mm
S 94 / WS 94	5.19 mm
WS 73 T	4.34 mm
WF 70 H / F	3.82 mm
WF 80 H / F / Q / blue	4.27 mm (4.40 mm)
WF 95 H / F / Q / blue	5.32 mm (5.40 mm)
WF 70 M	4.03 mm
WF 80 M	4.63 mm
WF 95 M	5.24 mm

Table 4.1

* Standard plates and thickness' currently available. Subject to change.

The following formula should be used to calculate the distortion of a relief plate that is exposed flat and printed in rotation:

$$L_p = L\left[1 + \frac{t - h}{R_p}\right]$$

Lp = print length expansion
L = print length (undistorted negative)
t = plate thickness
h = half the base material thickness
Rp = plate cylinder radius

If the print length corresponds to the entire plate cylinder circumference (rotary printing presses in label printing, for example), then

Lp – L = expansion constant (D_K)

The following formula should be used to calculate the distortion percentage.

$$\%\,\text{Distortion} = \frac{D_L - D_K}{D_L} \times 100 = \left(1 - \frac{D_K}{D_L}\right) \times 100$$

or

$$\%\,\text{Distortion} = \frac{D_K \times 100}{D_L}$$

D_L = plate cylinder print length
D_L = [plate cylinder diameter + (2 x adhesive film) + (2 x plate thickness)] x π (3.14)
D_k = distortion constant

4.3 Suitable light sources for nyloprint® plates

nyloprint® plates only react to certain light wavelengths, to UV light with a wavelength of about 365 nanometres. The only suitable light sources are those that emit light in this wavelength range.

Flint Group Printing Plates recommend the following lamps as a suitable light source:

For tube light exposure units

- Philips TL 10
- Philips TL 10R
- Osram Eversun L 78R
- Silvania BL 366

Note: Luminous intensity should be at least 10 mW (measured with a UV meter).

For point light exposure units with an MH burner

Theimer 3007, 5007, 6007, 3027, 5027 or 6027
Olec Spectramatch L1261, L1281

These metal halide lamps (MH burner) have iron-doped burners, which emit UV light in a UV spectrum suitable for photopolymer plates.

However, these lamps contain a high proportion of white light which is over 400 nanometres and which can harm some nyloprint® plate types. A Kokomo filter has to be used in this situation. This filter cuts off all light over 365 nm, so that only useful light reaches the plate.

Note: Because of the Kokomo filter, less light comes through to the plate. The luminous intensity should not fall below 6 mW.

4.4 Washout solutions for nyloprint® plates

There are water-washable and alcohol-washable nyloprint® plates available.

Pure tap water, without additives, is used to wash out water-washable plates.

However, in the case of alcohol-washable plates, an alcohol/water mix must be used. The composition of this mix is prescribed.

Flint Group markets this mix under the product name nyloprint® R 241 NP.

nyloprint® washout solution can also be reclaimed in a distillation unit after use.

Distillation units: Ofru, IST, Renzmann.

The alcohol-water ratio can alter during distillation, making the washout solution ineffective.

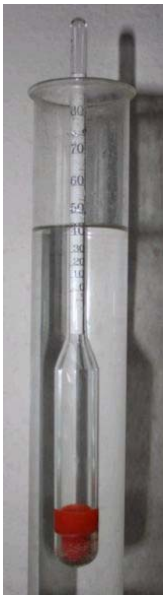

Fig. 4.1

It is therefore necessary to check the composition of the alcohol/water mix with an areometer (figure 4.1). The areometer measures the specific gravity. When the washout solution is properly adjusted, the scale on the areometer shows a specific gravity of 0.834g/cm³ at 20 °C.

Checking the alcohol/water mix

The newly distilled washout solution is poured into a glass measuring cylinder and the areometer (with a measuring range of between 0.800 g/cm³ and 0.860 g/cm³) is dipped into the washout solution. How low the areometer floats in the solvent is determined by the specific density of the washout solution and the areometer's scale indicates the specific gravity.

Using this value in conjunction with the chart shown below (4.2), it is possible to determine how much water, for example, has to be added.

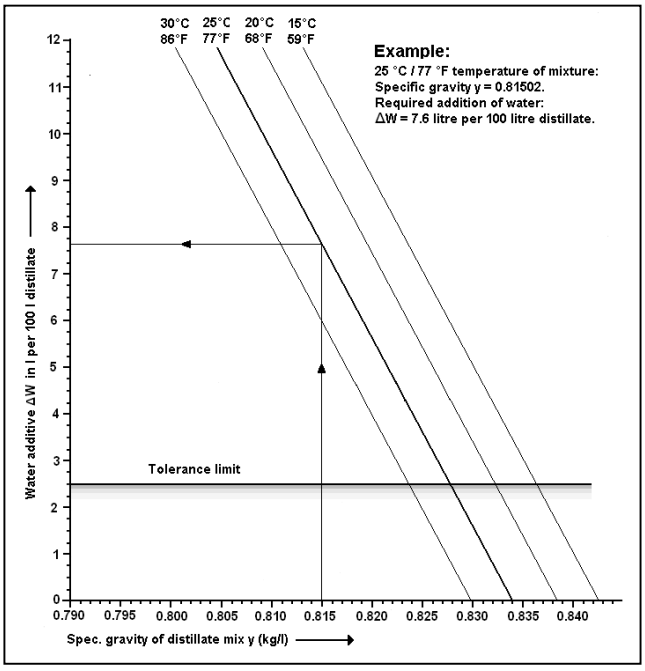

Fig. 4.2 Adjusting the alcohol/water mix

4.5 Cleaning agents for nyloprint® plates

The only solvents to be used for cleaning nyloprint® plates and clichés are those that are good at removing printing ink from the plate but which do not act on the relief.

In many cases, particularly for UV inks, ink manufacturers provide cleaning agents that are at least good at removing the ink.

When using a cleaning agent that you are unfamiliar with, it is advisable to carry out a test first. Flint Group Printing Plates helps the user to do this.

Water and alcohol are usually ruled out as unsuitable. However, there are certain exceptions when cleaning clichés that have been printed with UV inks.

Suitable cleaners for letterpress and offset inks

- aliphatic hydrocarbons
- cyclic hydrocarbons (e.g. cyclohexane)
- aromatic hydrocarbons (e.g. benzine, toluol)
- Polyflex Clean S 1 (Polywest)*

Suitable cleaners for UV inks include

- ethyl acetate
- Polyflex Clean UV (Polywest)*
- Flexo UV Wash (FlexoClean)*
- Wash-up Ultraking NHBR (Flint Group)*
- plate cleaning agent UN 3295 (Druck Chemie)*

Cleaners not suitable for nyloprint® plates include

- water
- alcohols (aliphatic and aromatic)

* tested by Flint Group Printing Plates

4.6 Storing nyloprint® plates

Storing raw plates

nyloprint® printing plates are supplied wrapped in moisture-resistant and airtight foil bags that are impervious to light. Sturdy corrugated cardboard packaging provides protection during transportation.

Both, the foil bags and the outer packaging are each labelled with details of the goods supplied.

Should you wish to make any complaints, it is important to specify the batch number when doing so.

nyloprint® printing plates that have not been exposed should always be stored somewhere cool and dry, sealed in their foil bags. We recommend that they are stored at a relative humidity of 50% - 60% and at a room temperature no higher than 25 °C.

Storing clichés

nyloprint® plates (clichés) that are ready for printing are hygroscopic, particularly in the case of water-washable plates. This means that the relief layer can both dry out easily and absorb water from the air when humidity is high.

When plates are drying out, clichés will curl and, in the case of plates with a steel base, there is a noticeable upward bend towards the sensitised side and the plates become extremely stiff. This makes it considerably more difficult to mount them on the cylinder, particularly with foil plates. The humidity level of a cliché is unlikely to become excessive.

The conditions for storing clichés are the same as those for the raw plates. They should also be stored at a room temperature no higher than 25 °C and a relative humidity of 50% - 60%.

It is particularly important for the clichés to be packed in airtight foil bags, ideally black in colour.

Should the clichés still dry out significantly and become stiff and brittle, they can be placed in warm water at 25 - 30 °C for about 5 minutes and then left to dry for 10 minutes at 60 °C. It is advisable to store the clichés with foil plates rolled up according to the printing cylinder in a foil bag.

5 Special applications for nyloprint® plates

This chapter tells you about special processes for specific applications.

5.1 Blind embossing

- Producing film for the male die
- Mounting on the printing press
- Recommended plates for blind embossing

5.1 Blind embossing

Fig. 5.1

Producing film for the male die

Please note that with blind embossing, the print image of the male must be smaller than the print image of the female die, in accordance with the substrate.

To achieve this, you can use the trapping software option to reduce the print image in the file when producing the film.

The degree of trapping is determined by the thickness of the substrate and is calculated using a simple formula:

substrate thickness x 2 = trapping.

Mounting on the printing press

To ensure that the female die and the male die fit perfectly, the male die is fixed in the precisely mounted female die and transferred to counter-pressure by printing. Double-sided adhesive tape is affixed to the back of the male die.

Because of the different print elongation of the male and female dies during rotary printing, the male die must be no longer than 10 - 12 cm (in the print direction).

Recommended plates for blind embossing

Metal-based plates are generally used for the female die and their thickness or relief depth is determined by the required embossing height.

The following plates are suitable:

WS 58, S 58, WS 73, S 73, WS 83, S 83, WS 94, S 94, WA 175.

Foil-based plates are used for the male die. The plate type and plate thickness must match that of the female die.

The following foil types are suitable:

WF 80 H, WF 80 Q, WF 80 blue, WF 95 H, WF 95 Q, WF 95 blue.
For blanket cylinders (offset), WF 70 H, WF 70 Q.

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