Workshop: Procurement of Packaging for Exports
Guyana, April 19-23, 2010

Printing of Packaging; Specifications and Sourcing
(An Introduction for Print Specifiers & Buyers)

TFO CANADA

Experts in trade for developing countries
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Executing/Host Partner:

IICA · GUYANA

Supporting Partners:

Guyana Marketing Corporation

GMSA — Guyana Manufacturing & Services Association Ltd.

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Canadian International Development Agency   Agence canadienne de développement international

Print Preparation and Production
The Options

Traditional pre-press methods
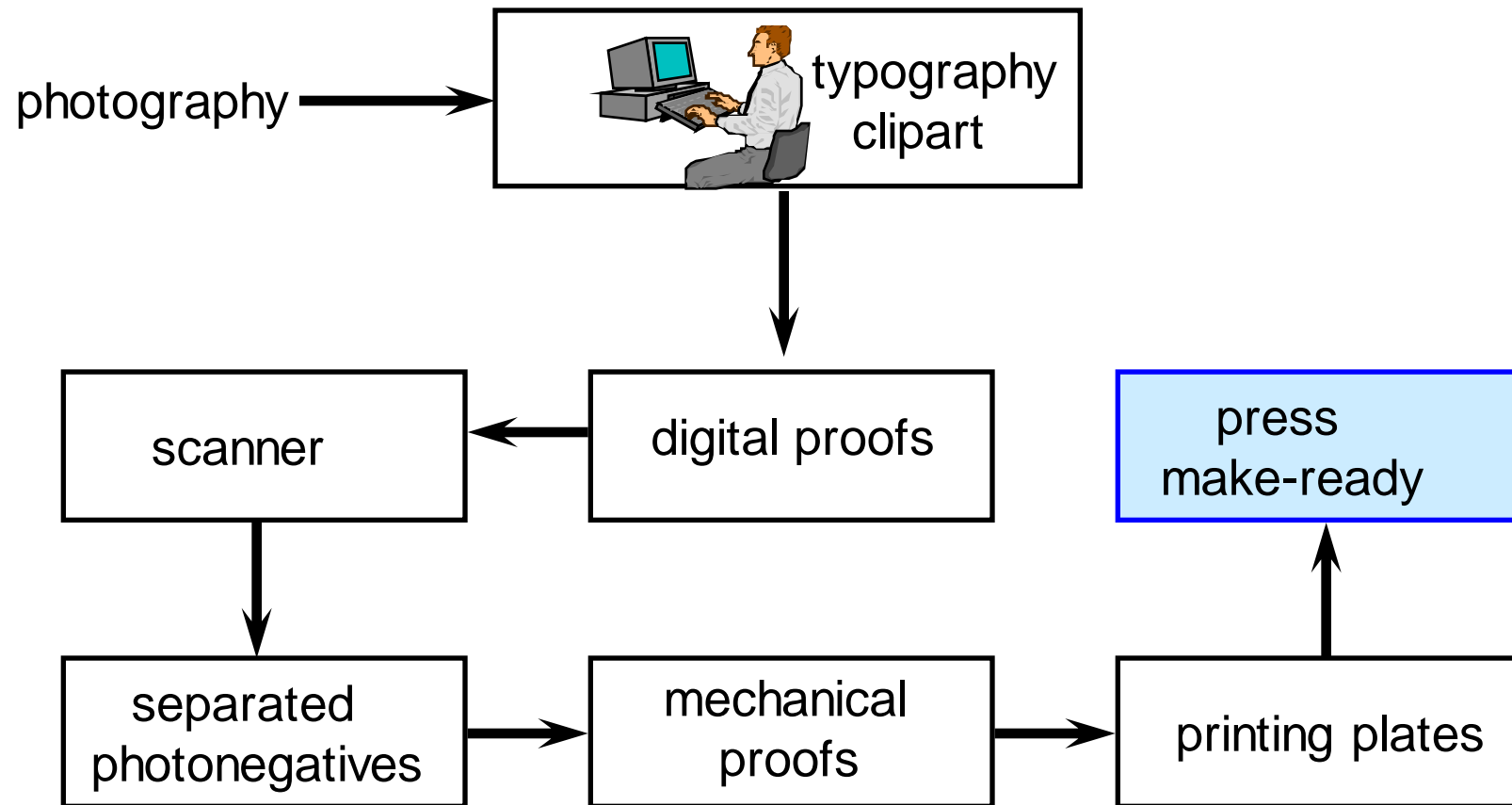
Digital or analog (mechanical) proofing methods

Line or halftone art; Pantone colour specifications
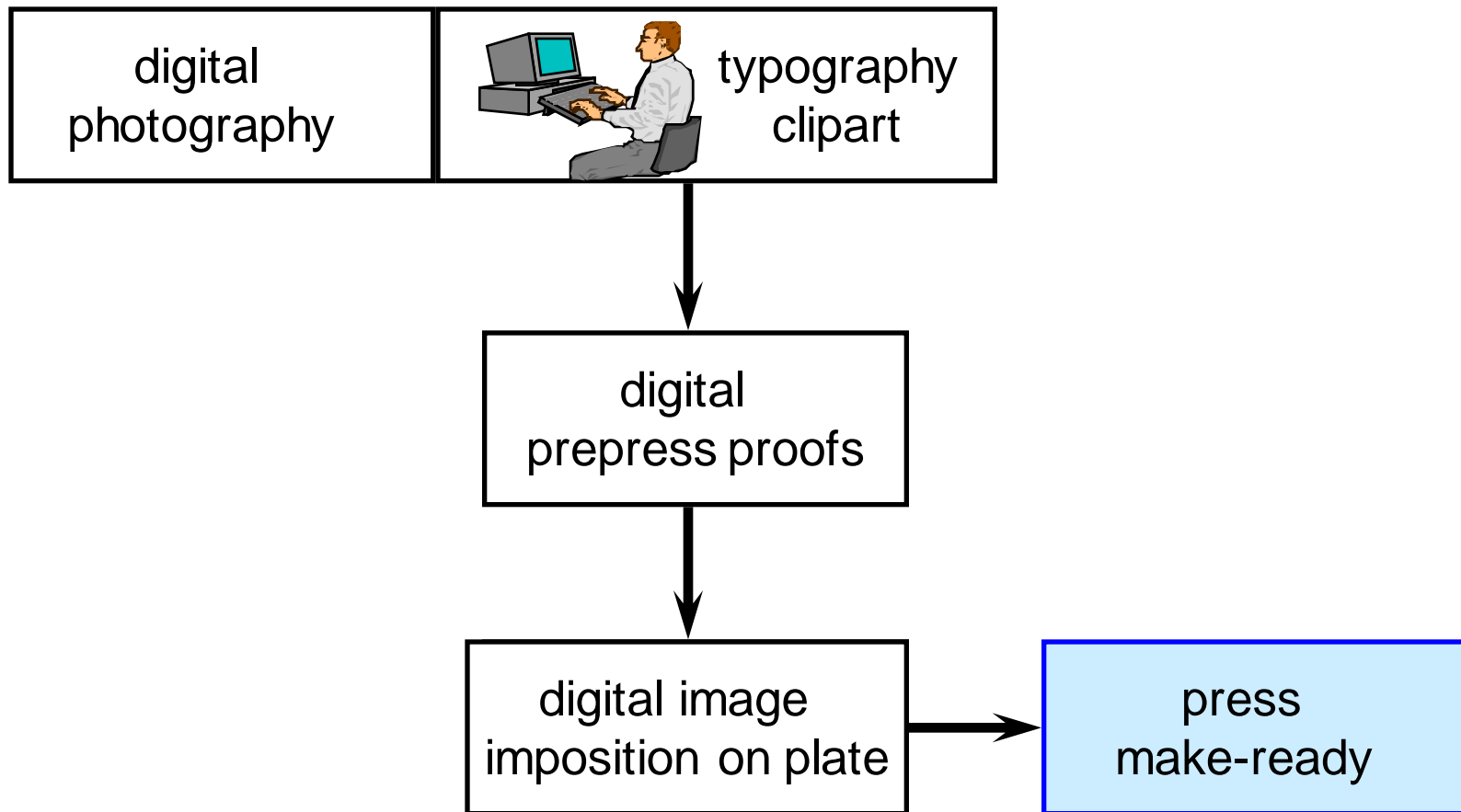
Process art and line print screens

Detecting print defects - bleed, trap and reversed-out print

The main package printing methods, their pros & cons

Traditional Film-Based Prepress

photography → [typography clipart]

digital proofs → scanner

scanner → separated photonegatives

separated photonegatives → mechanical proofs → printing plates → press make-ready

Computer-to-Plate (Digital) Pre-press

digital photography	typography clipart

↓

digital
prepress proofs

↓

digital image imposition on plate	→ press make-ready

Digital Art and Printed Art - the Differences

Computer art mixes transmitted red, green and blue light
Printed art reflects cyan, yellow, magenta & key (black) inks

Typical digital printing creates images using lines of colour, while halftone printing creates images using dot patterns

Most proofing methods use specified substrates
Actual printing is done on wide range of substrates

At the design and art stages, mock-ups and contract proofs typically use different proofing methods

Examples of Line Art

Line art is made up of solid blocks of colour

Line Art and Halftone Art

Halftone art: Images where colour saturation is changed by varying the amount of the ink applied.

Line art: Images composed of solid areas of colour. The printed colour is the same as in the ink reservoir.

Line and halftone art colours can be chosen from the Pantone Matching System (PMS) books.

Colours are identified by standard code numbers; colour chips on various substrates are available for matching.

Only about half the colours can be exactly matched .

Controlling Line and Halftone Ink Amounts

For line art, engraved lines apply ink. Wider, closely spaced lines apply more ink ; narrow lines apply less ink
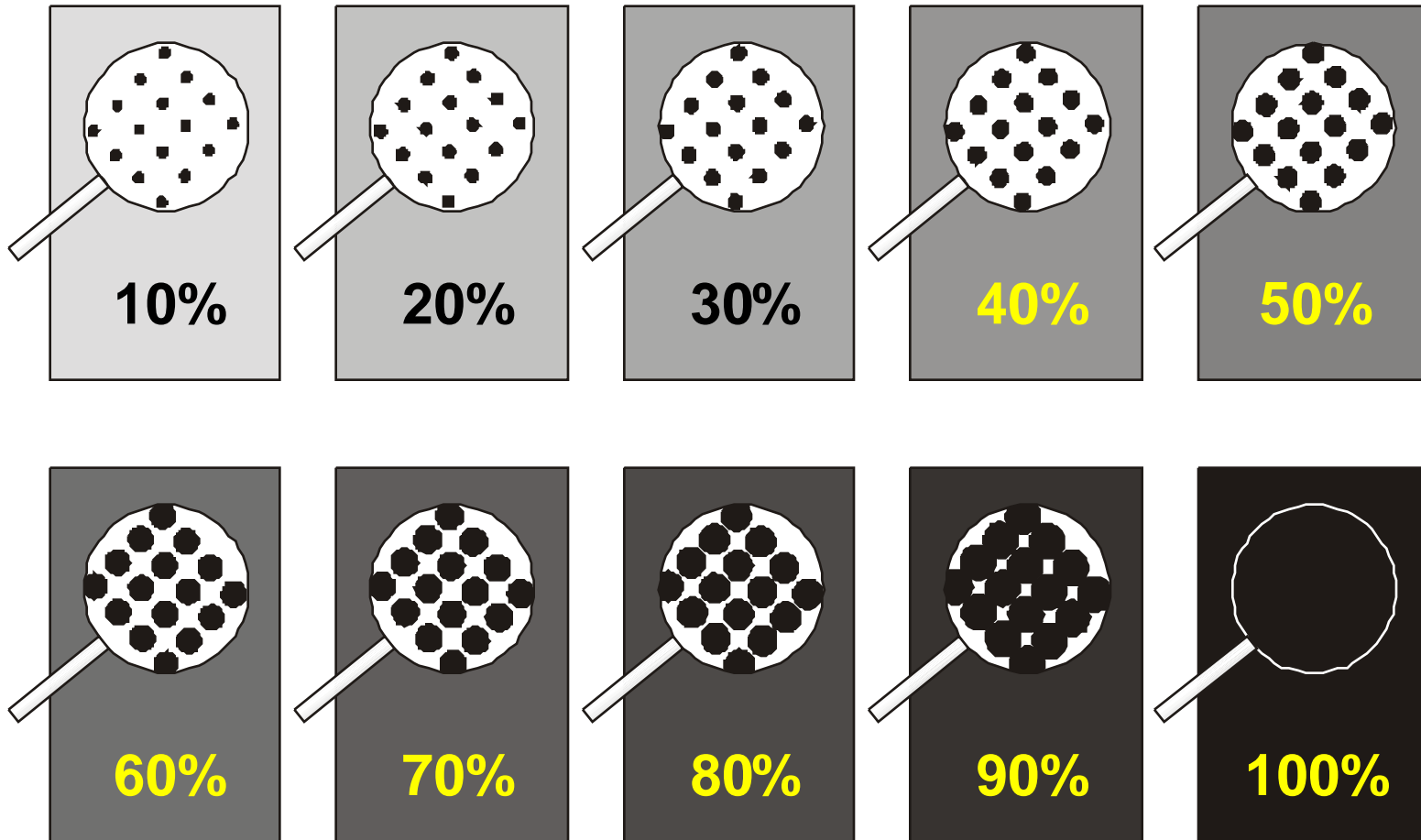
Half tone printing uses dot patterns. Smaller dots apply less ink ; bigger dots apply more ink

Dot densities are called screens …. the number of dots per linear inch
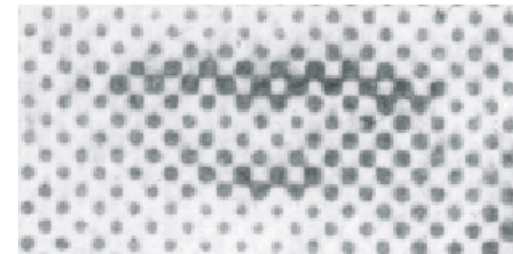
Most printing screens are between 65 and 150 dpi

Finer screens give a better, clearer image

Halftone Screens

Example of Halftone Art

Photographic Reproduction

Process colour art: Images simulate the full range of natural colours by blending varying amounts of four primary ink colours on the substrate

Process art uses four primary ink process colours:

| **Cyan** | **Magenta** | **Yellow** | **Black** |

A halftone printing plate is made for each colour

The four colours are printed over each other, in register, to produce the full-colour image

Summary: To Print a Process Art Image

Separate the image into its cyan, yellow, magenta, and black components. (black is known as the key colour)

Impose the desired screen pattern on each of the four colour records

Make a printing plate for each of the four colours

Print the four colours on top of one another, in register
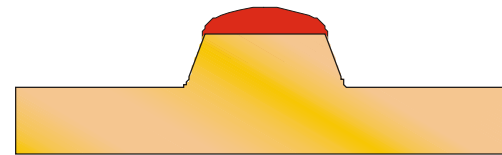
Package Printing Methods

Each printing method requires a means of creating an ink pattern and transferring this pattern on to a substrate
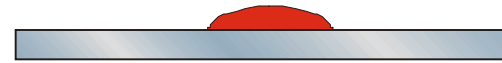
The image carrier is called the printing plate

The printing method is normally described by the nature of the printing plate

Plate Designs used for Package Printing

Flexography, (flexo),
letterpress, dry offset

Offset lithography, offset, litho

Rotogravure, gravure, roto

**Other printing methods include: screen printing,
for textiles & bottles; hot stamping; reflective metallics**
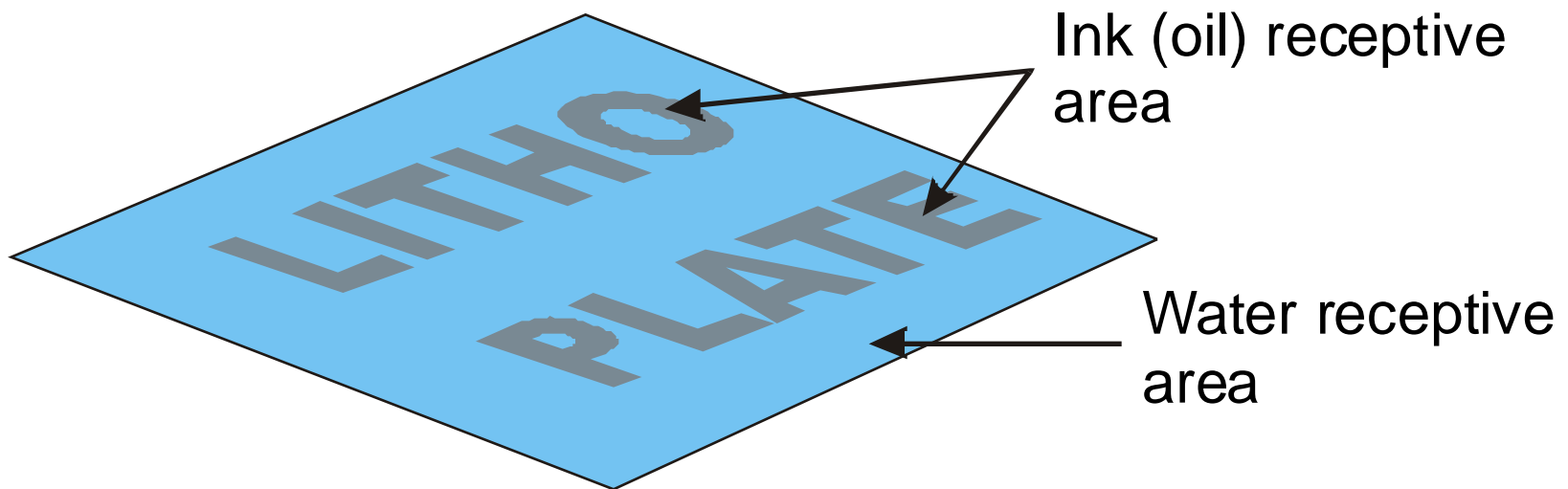
Printing Plate Manufacture

- Most printing plate manufacture employs various photosensitive materials

- For example, plates are coated with photopolymers, uncured plastics that cure when exposed to light

- Light exposure is controlled using photonegatives

- Image imposition using digital data is largely replacing photographic image imposition
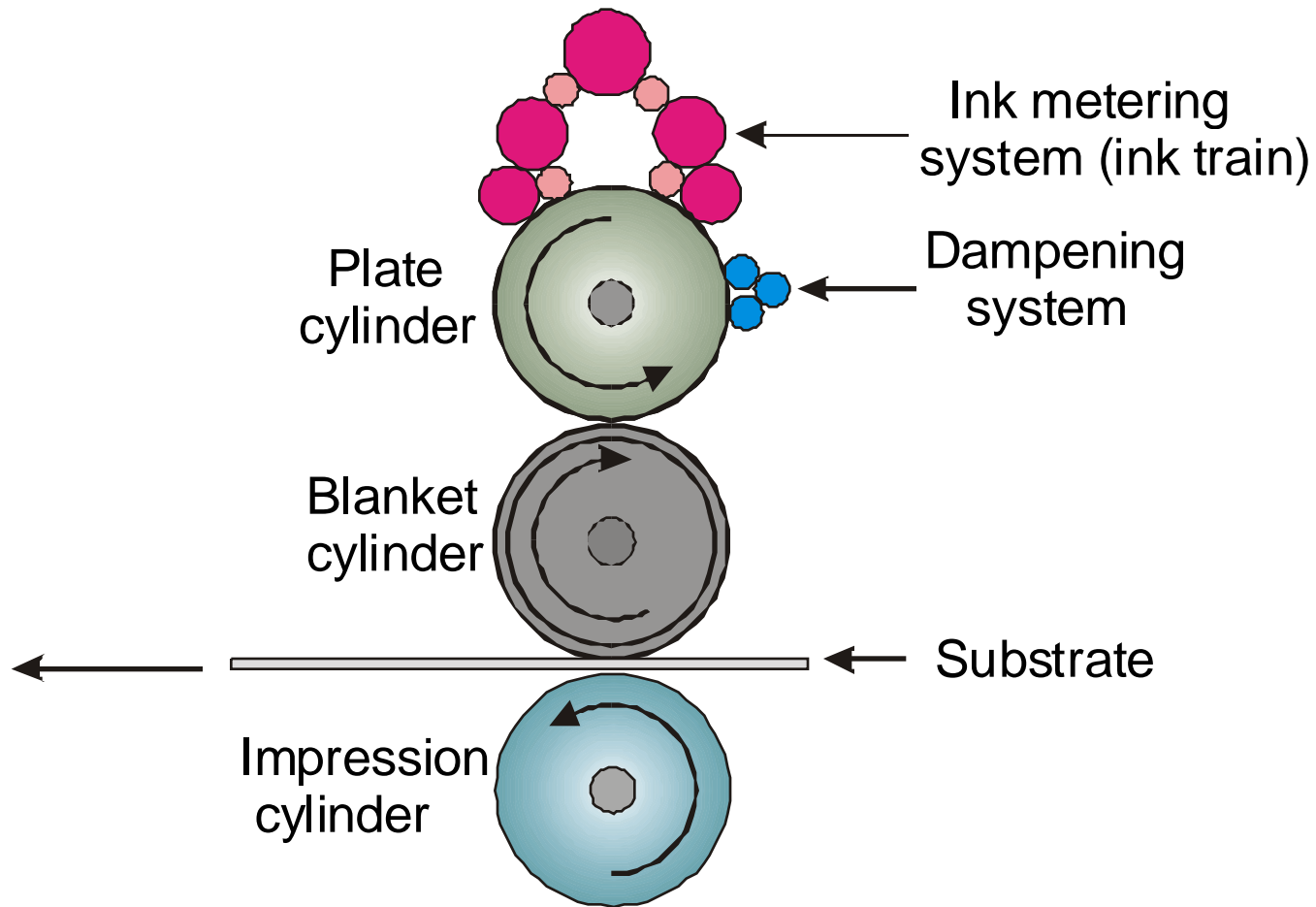
Lithographic Printing Plates

Principle is the mutual repellence of oil and water

Flat aluminium plate treated creating oil-attracting area

Inks must be oil-based

Ink (oil) receptive area

Water receptive area

Lithographic Printing Deck

Ink metering system (ink train)

Dampening system

Plate cylinder

Blanket cylinder

Substrate

Impression cylinder

Lithographic Printing Advantages

Economical and fast plate production

Lowest dot gain, i.e., ink spreading

Best register

Best for fine line print

Some colour adjustment achievable on the press

Lithographic Printing Limitations

System requires water damping of the plates

Inks must be oil-based and so are slow drying)

Heavy inks can't be used on light weight substrates

Papers must be exceptionally clean

Does not print large solid areas as well as flexo & gravure

Litho presses are relatively complicated to maintain

Lithographic Applications in Packaging

Offset lithography, sheet fed:
    Most paperboard for folding cartons, cut labels, other papers and paperboards

Offset lithography, sheet fed
    Flat metal stock for three-piece can bodies & ends

Offset lithography, web fed:
    Similar to sheet-fed applications. Less commonly used in packaging as requires high throughput

Laser Imposed Flexographic Plates

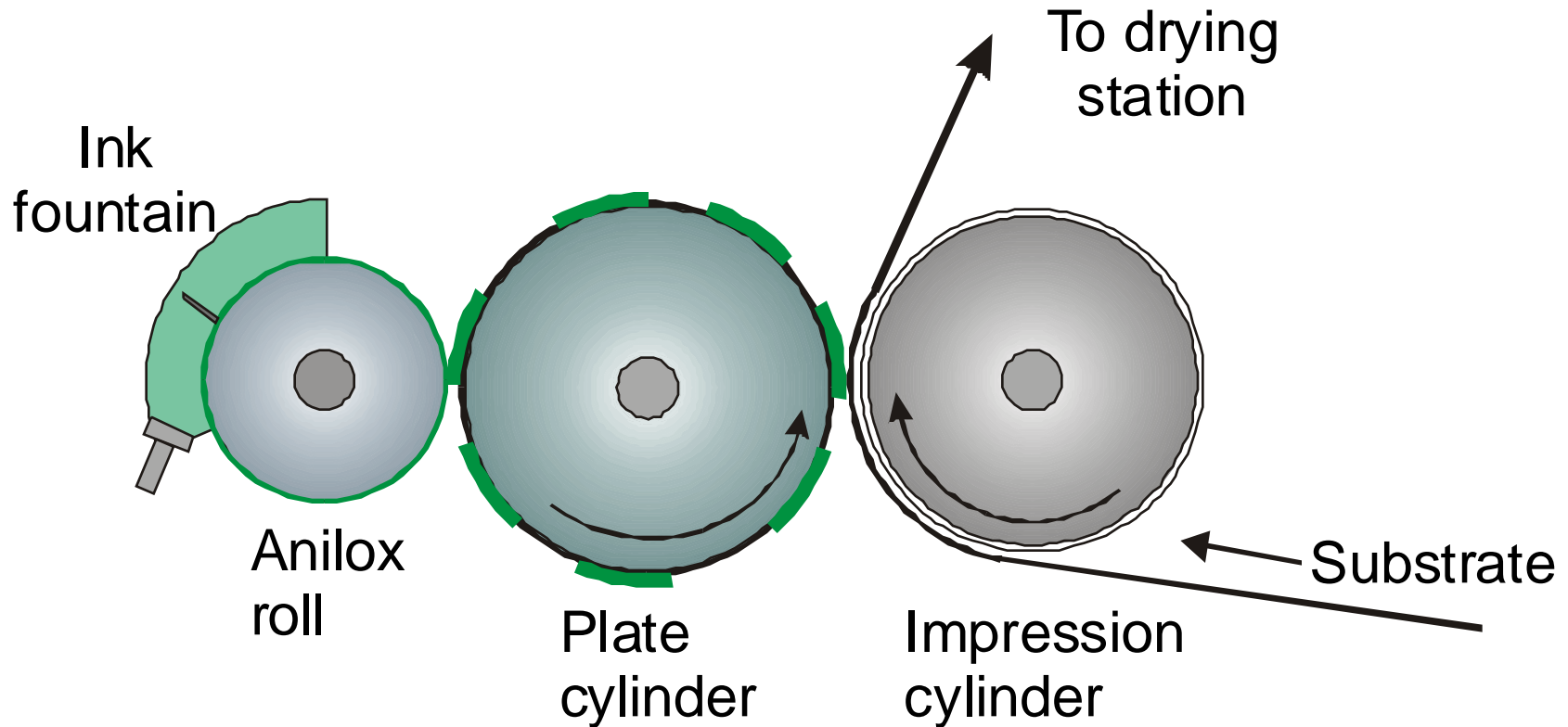Laser receptive coating
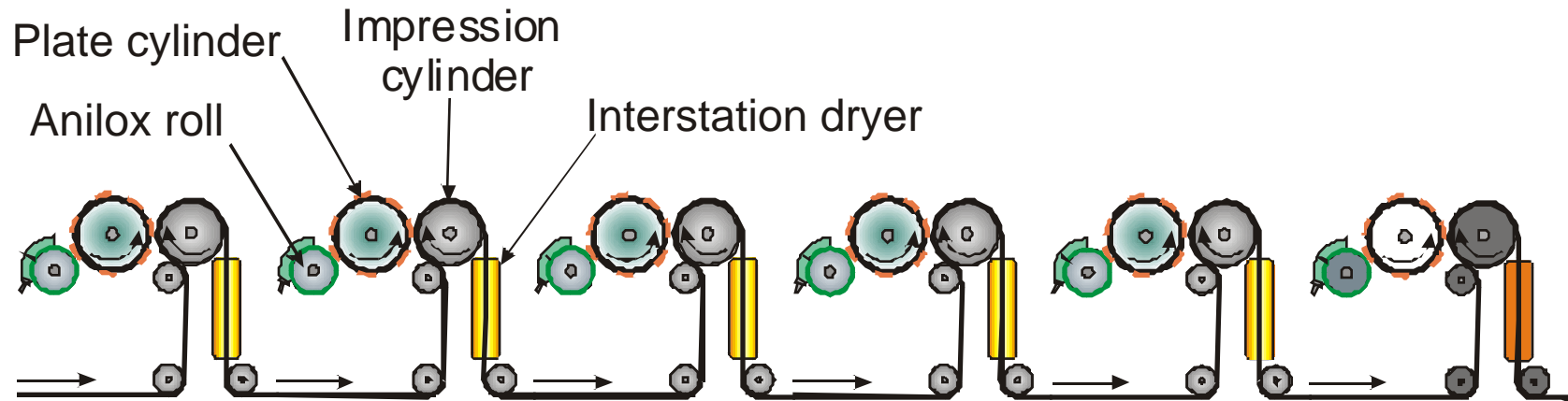
Uncured photopolymer

Coating is removed by laser

Photopolymer is cured with UV light

Flexographic Print Deck

Ink fountain

To drying station

Anilox roll

Plate cylinder

Impression cylinder

Substrate

In-line Flexographic Press

Plate cylinder

Impression cylinder

Anilox roll

Interstation dryer

➤ Web-fed presses can be very fast

➤ Unlike litho, inks can be dried on the press

➤ Webstock can be die-cut on exit from the press

Flexographic Printing Advantages

Prints well on rough, uneven and low strength substrates

Economical and fast printing plate production

Many ink formulations available, including water based

Better for large solid areas than litho, worse than gravure

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Flexographic Printing Limitations

Sensitive to printing pressure changes

May produce halo effects around line art edges

Dot gain (ink spread) is higher than for litho or gravure

Line screens available not as high as for litho or gravure

Not as good for fine type as litho but better than gravure

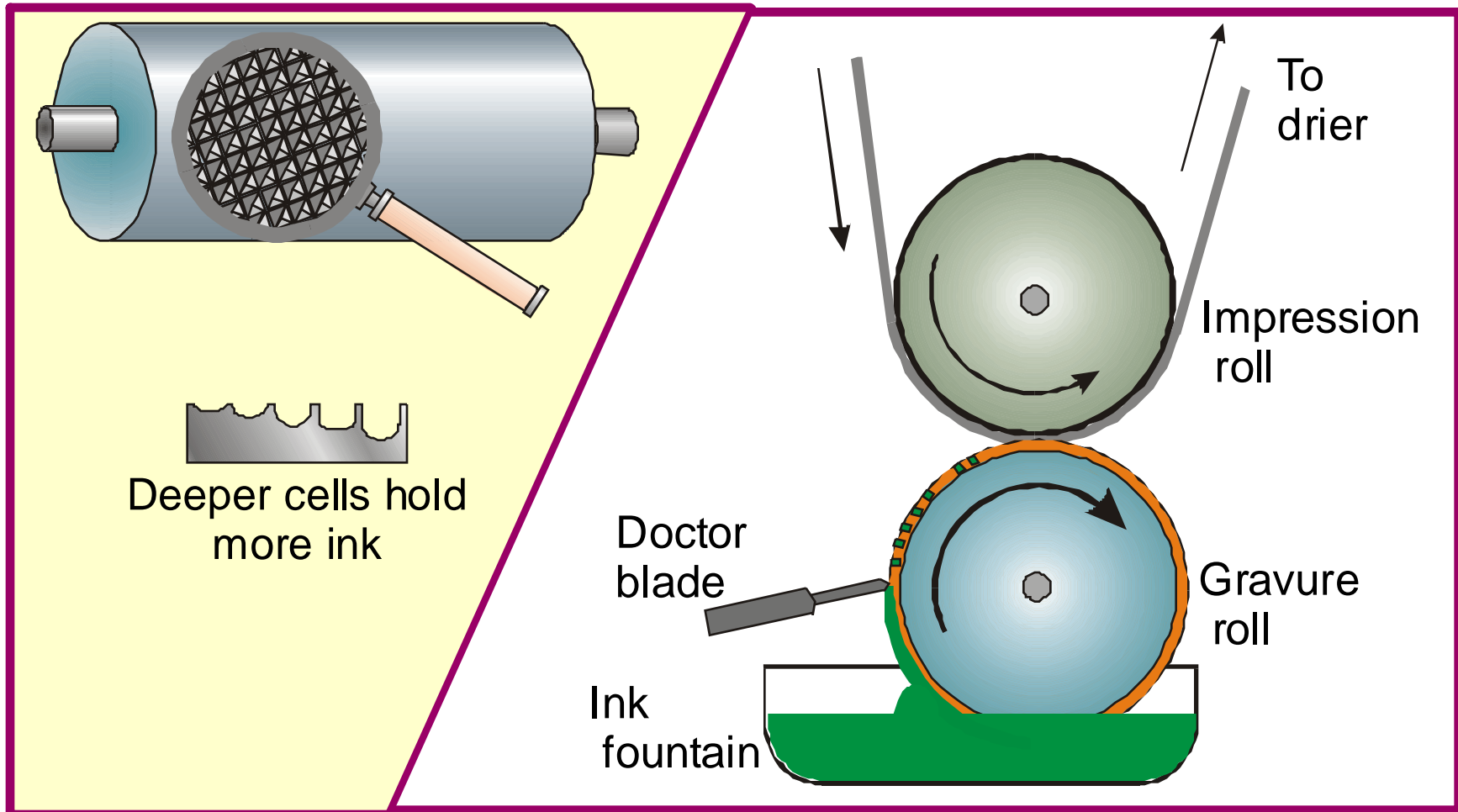Hard to achieve smooth transitions if printing vignettes

Letterpress

Uses a relief plate similar to that of flexography

Uses a heavy paste ink, as in lithography

Ink metering is done with an ink train, not a roll

Poor print definition, so seldom used in packaging

Gravure Print Station

Deeper cells hold more ink

To drier

Impression roll

Doctor blade

Gravure roll

Ink fountain

Gravure Printing Advantages

Most durable printing plates

Excellent colour consistency over long runs

Relatively fast printing press make-ready

Fastest printing speeds for long runs

Best for heavy ink, eg.metallic/glossy/opaque, applications

Gravure Printing Limitations

Most costly printing plate

Lead times for plates are longer than for litho or flexo

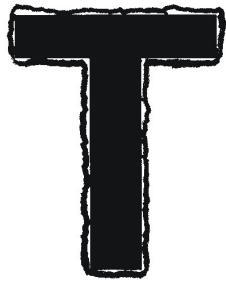Inventory and storage of base plate cylinders is costly

Poor print quality on rough surfaces

Fine line and type resolution poorer than with litho or flexo

Printing Method Recognition
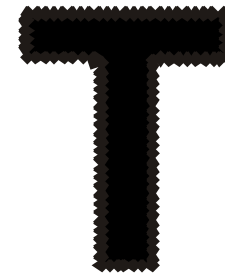
Examine the edges of line art images

The bar code image is one of the best places to look

flexography:
ghosted edges

lithography:
smooth edges

gravure:
saw-tooth edge