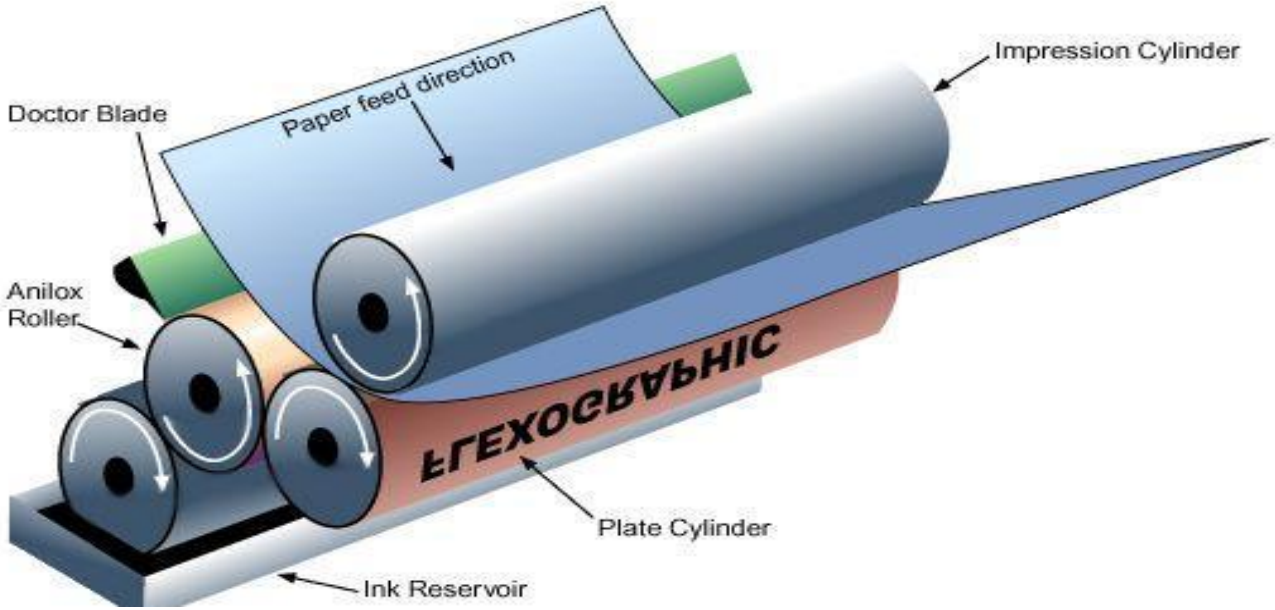
Flexo Printing

- Traditional printing method
- Used in packaging industry and even in printing of newspapers
- The doctor blade scrapes the anilox (removes excess ink)
- Printed ink layers are very thin, usually a couple of µm
- Ink typically 0,05-0,5 Pas



Operation

- The image elements of the printing plate are raised above the non-image elements, forming a relief pattern of the printed image.
- Printing ink is applied onto the image elements via an anilox roller which has small cells engraved onto its whole surface area.
- The surface of the anilox roller is flooded with ink from an ink chamber and excess ink is removed with a doctor blade -> ink remains only in the cells.
- Ink is then transferred onto the raised image elements of the plate and onto the substrate in printing nip under pressure.
- The printing plate is made of soft and flexible material which improves the contact formation at the ink transfer points.

  http://www.youtube.com/watch?v=X8TnIuYlPT8

Flexo, Printing Parameters

- Ambient temp 20 - 25 °C
- Printing cylinder temp as close as possible to the ambient temp
- Substrate (printing) speed 1 – 30 m/min (1 – 8)
- Printing cylinder speed 1:1 with substrate
- Cylinder (nip) pressure 0.1 – 0.5 Mpa (depending on the machine)
- Example of gravure printing compressive forces (“Sampo” SOM-100)

Cylinder pressure	**Nip force**
0.2 Mpa	40 kg
0.3 Mpa	60 kg
0.4 Mpa	80 kg
0.5 Mpa	100 kg

Anilox Roll

- Anilox rolls are typically coated with ceramic material or chrome
- Cells are produced similarly to gravure cylinders - engraved onto its surface either electromechanically or with a laser
- Ink release is typically 40 % from anilox to printing plate
- Resolution typically 100 – 600 lines/cm, it should be >5x printing plate resolution, in order to get good wetting of the image

Flexo Printing Plates

- Flexographic printing plates are typically made of photopolymer (is a simple method which involves only few chemicals water soluble resin with light sensitive binder)
- Photopolymer plate is exposed to UV-A through film negative -> the exposed image areas polymerize and become insoluble. The unexposed material is then washed away
- Plates can also be imaged directly from digital data with laser ablation
- Images are formed from continuous relief which shape, height and material properties can be changed to serve the needs

Factors Related to Printing Quality

- Ink viscosity, surface tension and type
- Printing speed
- Cylinder pressure
- Anilox roll cell geometry
- Anilox roll type
- Plate material and imaging
- Substrate roughness, pore structure and compressibility

Flexo Printing, Pros and Cons

Advantages

- Traditional known technology
- Relatively simple operation
- Suitable for sensitive substrates
- Quite easy to find suitable inks

Disadvantages

- Accuracy could be better
- Lower printing speed
- Plate material limits the amount of suitable inks