



印刷概论

Printing Brief introduction

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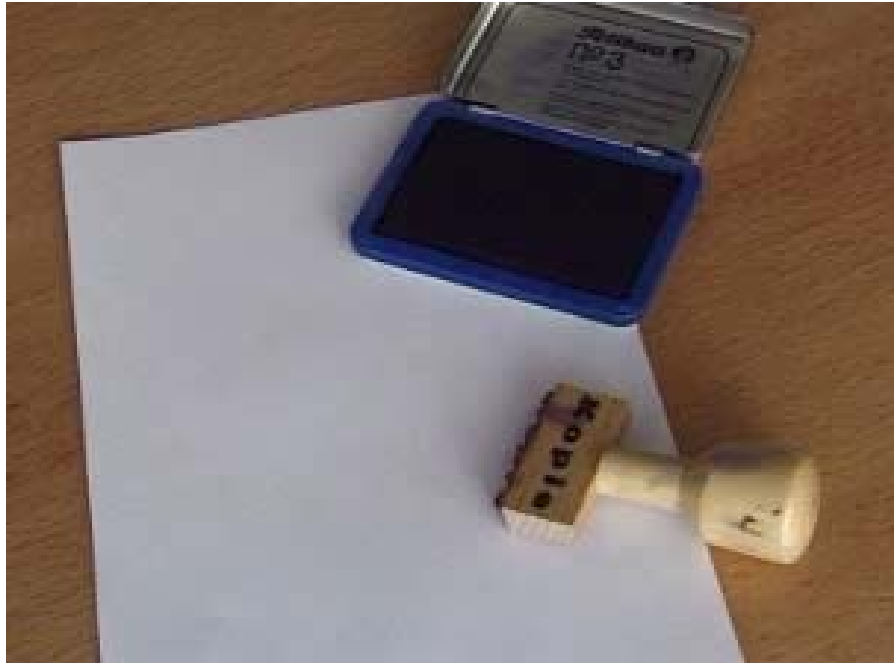
PRESS

- Relief / Flexo / Letterpress Printing
- Gravure Printing
- Screen Printing
- Lithography / Offset Printing
- DI Technology
- Non-Impact Printing
- Comparison of Printing Technologies
- Inline Finishing

Relief / Flexo / Letterpress Printing

- Introduction
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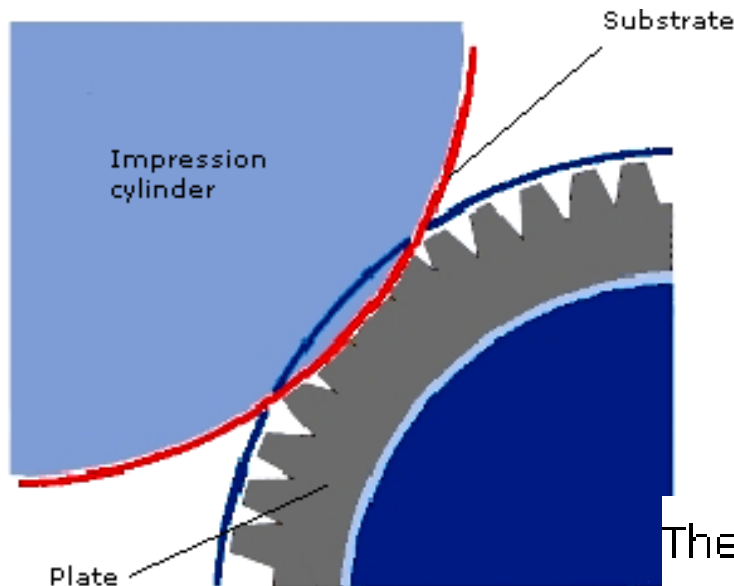
Introduction



In about 1450 Johannes Gensfleisch zur Laden, better known as Johannes Gutenberg, invented this printing technique for the printing of books. Letterpress is a variant of relief printing where the printing areas on the image carrier are raised, basically the same as with a rubber stamp. Letterpress is the oldest printing technology, but it is being more and more edged out by other printing processes. The reason for this is that the production speeds that can be reached with letterpress are much lower than can be attained, for example, with offset presses.

Rubber stamp a kind of letterpress form





Flexography (deformation of the plate)
Source: H. Kipphan

The mounted printing plate is inked by inking form rollers. The ink is transferred from the plate onto the substrate with a high contact pressure. Gutenberg's invention was the making of the printing form from individual lead types. In this way it was possible to change the printing form from job to job. The letters were initially set by hand, and only much later was this manual process replaced by typesetters.





Letterpress coating form

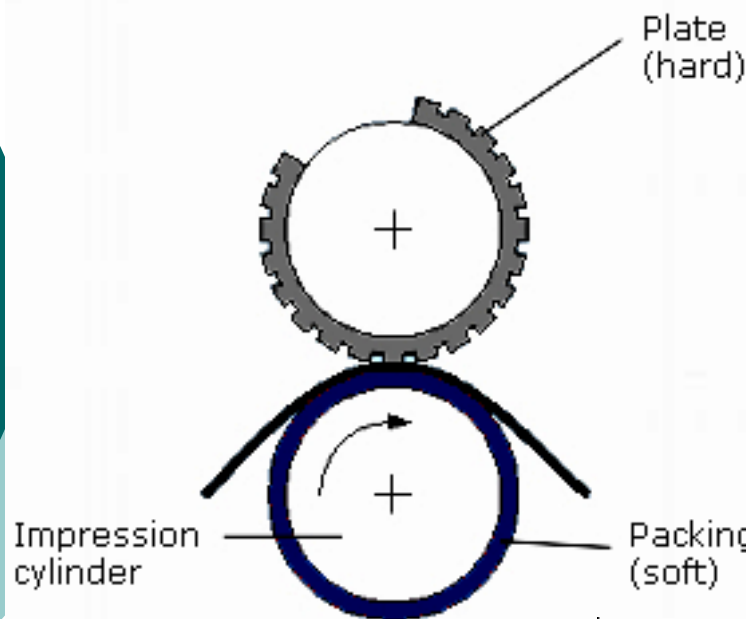


Letterpress machine

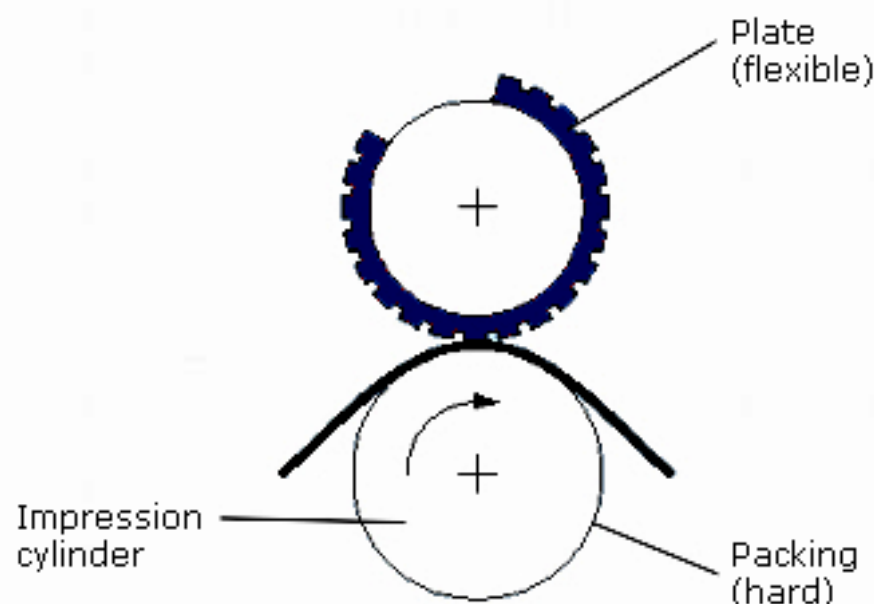
Source: Druckerei Schindler

Alongside the printing of books, letterpress printing also used to be the standard process for advertising material and color brochures. Nowadays letterpress is only used for special applications such as for spot-coating or for embossing jobs.





Letterpress



Flexography

In addition to letterpress, flexo printing is also based on the principle of relief printing. One of the differences though lies with the image carrier. While in the case of letterpress, the image carrier is inflexible and hard and pressed against a soft impression cylinder; in flexo printing the image carrier is flexible and soft and is pressed against a hard impression cylinder. Flexo printing uses low viscosity inks and works with a much lower contact pressure. The technique of flexography can also be used for printing very thin foils and materials with very rough surfaces.

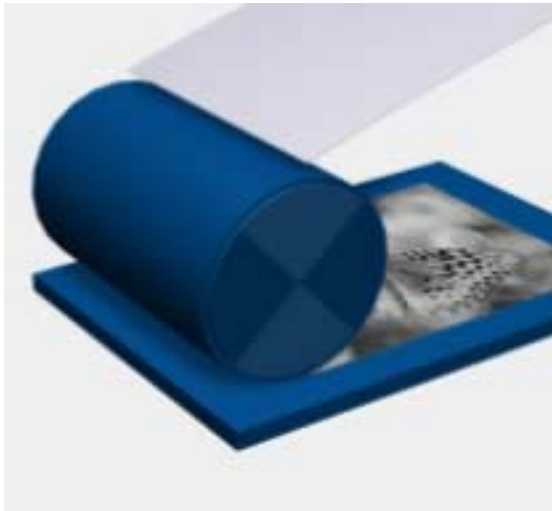




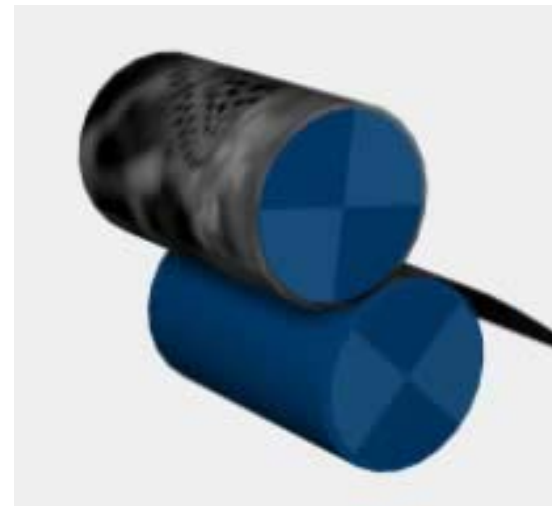
Flat-to-flat

There are three different printing principles that can be utilized in letterpress presses.



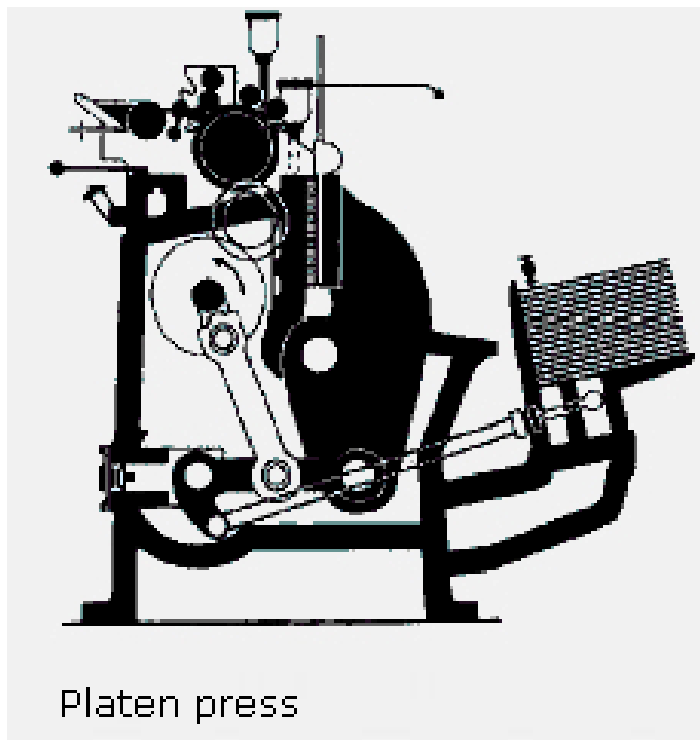


Flat-to-round



Round-to-round

Function



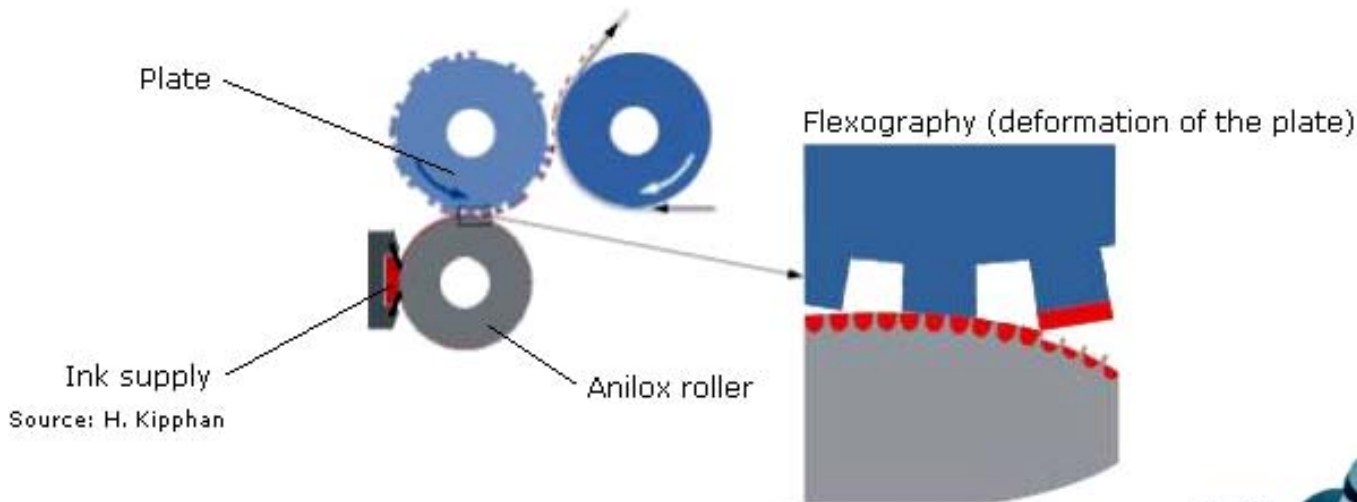
Platen press

The raised parts of the image carrier are inked with viscous ink. Gripper systems carry the sheets to the printing zone. The image carrier is brought into contact with the printing substrate at a very high contact pressure resulting in the transfer of the ink onto the substrate. The printed sheet is transported to the delivery area by the gripper system. Take a look at the video to gain a clearer picture of this.





Printing on a platen press



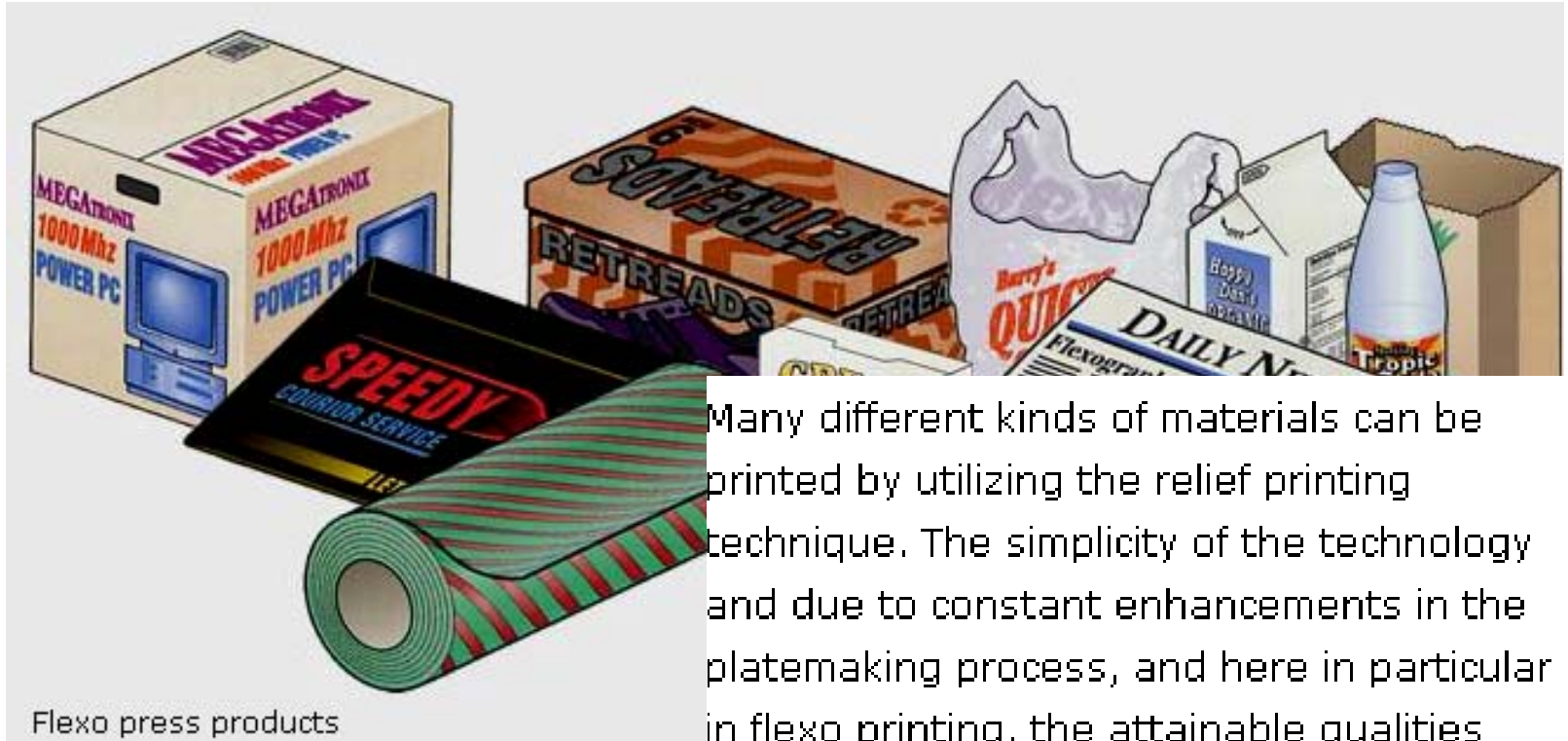
Gallus RCS 330

In flexo printing, low viscosity inks which dry very quickly are used because of the evaporation of the alcohol or solvent content. The ink is transferred to the printing

form by an anilox roller. The cell depth of the anilox roller determines the ink volume. Flexographic presses are usually designed as rotary presses, thus allowing for high printing speeds.



Substrates



Flexo press products

Many different kinds of materials can be printed by utilizing the relief printing technique. The simplicity of the technology and due to constant enhancements in the platemaking process, and here in particular in flexo printing, the attainable qualities almost come up to those of offset printing.



Presses


Printing method:

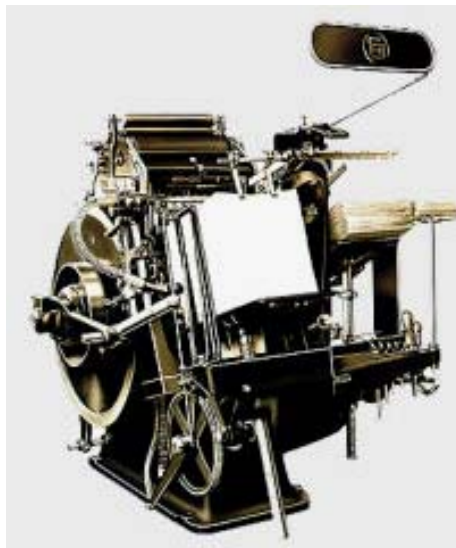


OHZ Heidelberg Cylinder

The automatic cylinder presses utilize the flat-to-round principle. Here, the substrate lies on a cylinder. The printing form lies flat and moves backwards and forwards. Using this technique, printing speeds of up to 4000 impressions per hour can be reached. Automatic cylinder presses can process format widths of up to 140 cm.



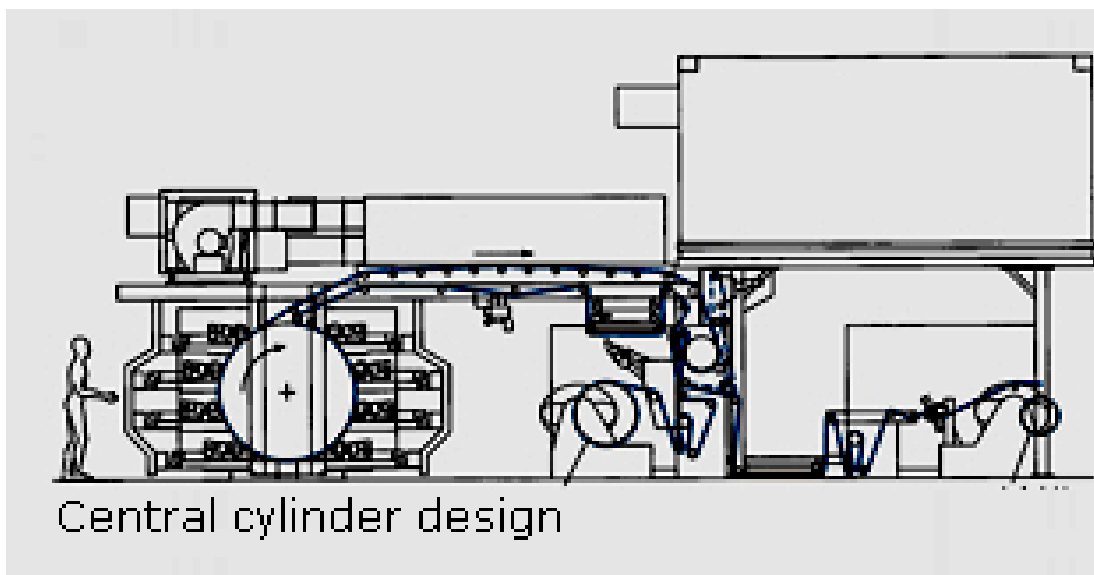
Printing method: 



Platen presses utilize the flat-to-flat principle. They can print substrates of up to A3. These presses are exclusively single-color presses and reach printing speeds of up to 5,000 impressions per hour.

Platen press

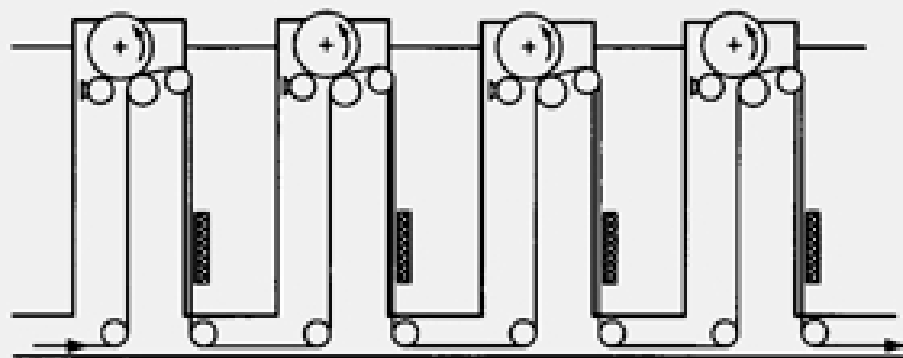




Central cylinder design

This is a flexo printing press in central impression or satellite design. The eight printing units are arranged around a common impression cylinder. This configuration allows for very compact press designs





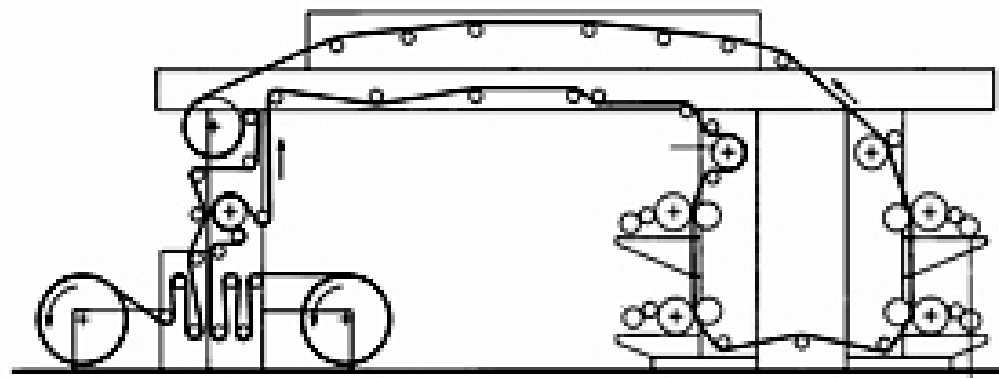
Unit design



Gallus flexographic press

This is a flexographic press in unit design. Identical printing units are arranged in a line one behind the other. The paper web is fed through each printing unit.





Multi-cylinder design

This is a flexographic press in multi-cylinder design. The four printing units are arranged separately and the paper web is fed through each printing unit.



Characteristic features



Letterpress machine

As you already know, letterpress is the oldest printing process. Because letterpress forms are expensive to produce and also because of its low printing speeds, traditional letterpress no longer has a market share of any significance. The second type of printing from raised type, flexo printing, has a relatively large and increasing market share amongst the different printing technologies. The printing quality attainable with flexography comes very close to that of offset printing. The very simple inking units of flexo presses allow for a quick and stable ink adjustment. Click on the little photographs to find out more about the qualities or characteristics of the two relief printing technologies.





Type case with letters used for letterpress printing

The variable printing form of conventional letterpress, with its individual type, allows changes to be made shortly before printing. However, it has the disadvantage of being very time-consuming to produce and can only be used economically today in special cases.





In the case of flexo printing, the presses can reach printing speeds between 150 m per minute to up to 600 m per minute.



Letterpress form



Halo effect



Typical print result in letterpress printing

The halo effect is a typical characteristic of letterpress and flexographic printing. This printing defect is characterized by the accumulation of ink at the edges of printed letters caused by the high printing pressure.

