

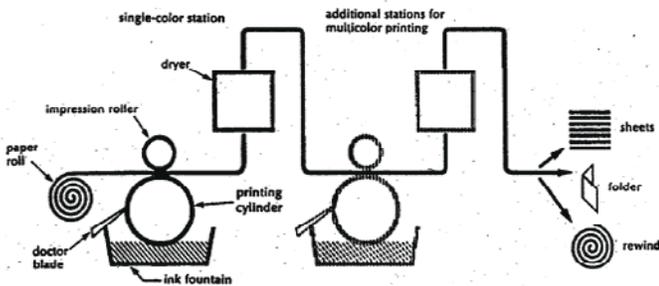


## Learning About Labels

### How does the Gravure press work?

Typical gravure printed products include:

- Food packaging
- Wall paper
- Wrapping paper
- Furniture laminates
- Paneling
- Greeting cards
- Magazines



### Process Overview

Diagram of Image Carriers Used in Printing Processes  
Gravure printing is characteristically used for long run, high quality printing producing a sharp, fine image. The number of gravure printing plants in the U.S. is significantly lower than other printing processes. This is due, in part, to the cost of presses and components. While a lithographic press will cost in the range of \$100,000 the cost of gravure press will be in the range of \$1 million. Additionally a single gravure cylinder will cost around \$5000 versus around \$15 for a lithographic plate. Additionally, the gravure cylinder has a long service life and will yield a very large number of impressions without degradation.

Gravure printing is an example of intaglio printing. It uses a depressed or sunken surface for the image. The image areas consist of honey comb shaped cells or wells that are etched or engraved into a copper cylinder. The unetched areas of the cylinder represent the non-image or unprinted areas. The cylinder rotates in a bath of ink called the ink pan.

As the cylinder turns, the excess ink is wiped off the cylinder by a flexible steel doctor blade. The ink remaining in the recessed cells forms the image by direct transfer to the substrate (paper or other material) as it passes between the plate cylinder and the impression cylinder.

The major unit operations in a gravure printing are:

- Image preparation
- Cylinder preparation
- Printing
- Finishing
- Gravure Inks - Solvent Based, Water Based

Gravure inks are fluid inks with a very low viscosity that allows them to be drawn into the engraved cells in the cylinder then transferred onto the substrate. In order to dry the ink and drive off the solvents or water, which essentially replaces most of the solvent, the paper is run through Gas fired or electric fired driers. The ink will dry before the paper reaches the next printing station on the press. This is necessary because wet inks cannot be overprinted without smearing and smudging. Therefore, high volume air driers are placed after each printing station.

The solvent-laden air from the driers is passed through either a solvent recovery system or solvent vapor incinerator. A typical recovery system uses beds of activated carbon to absorb the solvent. Saturated beds are regenerated by steam. The solvent laden steam is then condensed and the water and solvent separate by gravity. Greater than 95 percent of the ink solvents can be recovered using this process (Buonicore). The solvents can either be reused or destroyed by incineration.

Water based inks, especially used for packaging and product gravure, require a higher temperature and longer drier exposure time in order to drive off the water and lower vapor pressure constituents. As mentioned subsequent sections, Flexo and Gravure inks are very similar and the constituents are essentially the same. Again, a pollution control device may be needed.

### Gravure Press Design and Equipment

Web-fed gravure presses account for almost all publication, packaging, and product gravure printing. These presses are generally custom manufactured machines designed for a specific range of products. The typical press is highly automated and consists of multiple print units. The printing mechanism in a rotogravure press consists of a gravure cylinder and a smaller, rubber clad impression cylinder.

Other types of gravure presses in commercial use today are sheet-fed, intaglio plate, and offset gravure. These types of presses are used primarily for special printing applications.