

## Содержание:

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# 1The introduction.

The purpose of the label is two-pronged - to attract a buyer and bring to him the necessary information. A label is both a poster, an information sheet, and a way to protect it from a counterfeit, and all this in a one-sided, small-format, single-color or multi-color, high-quality product.

Let's look at the product through the eyes of a printing technologist and see:

- High quality multi-color printing
- Bright and clean colors of line images, text and dies
- High-quality half-tone (raster) images
- Reversing, reversing printing
- Small text and sometimes micro text
- Stamping, pressing foil and holograms, figured cutting of the label itself and micro-digging on the label (when trying to re-paste the label from the original to the sub-layout, the label falls apart due to micro-digging).

And it's all on the same label. And this is all that printing technologies are capable of, and all together, and on a variety of sealed materials.

For a variety of printed materials, manufacturing complexity, a variety of technologies and finishing processes, only packaging competes with the label. Packaging is the same label that has another function for which it was created - to keep the goods intact during transportation and storage, as well as to stabilize, standardize the geometric shape of the goods, making "communication" with them convenient.

What is needed for the manufacture of high-quality labels, counter-labels, collier → and packaging with a complex configuration? In relation to printing, there is a high-quality

classic sheet-fed offset printing, for die-cutting, die-cutters of the most varied design, productivity, and accuracy of work.

Our task is to consider common technological solutions for the production of labels and packaging used in practice.

Since any technology in printing is based on one of the methods of printing, the basic production of labels and packaging are methods of printing and finishing.

So, there are four main methods of printing: high, flat (offset), deep and stencil (silk-screen printing). It will be correct if we consider silk-screen printing as separate printing units in printing machines of other printing methods used for varnishing and applying an additional one or two ink to an imprint of another printing method. The method of intaglio printing has not yet exhausted its potential, but today it is the exception rather than the rule in the production of labels and packaging.

## **2. Offset technology in the production of labels and packaging.**

Today, offset printing method is the most common, most developed and most secured by a variety of equipment, materials and technologies. Off-line technologies are beneficial in any production, when quality requirements are very high and when packaging is made on paper, thin cardboard (up to 1.2 mm), and labels are on plainly and metalized paper, on self-adhesive materials and thin and rigid plastics. And the less post-printing operations, such as varnishing, embossing, pressing foil and holograms, shaped carving and micro-height, laminating, laminating, gluing, the more effective the offset technology.

Printing is carried out on sheet-fed offset machines from two to six colors, without a rotating device, but in some cases with a varnishing section. Depending on mass production, machines of various formats are used: for small-scale production, small-format machines are used, with medium and mass production, full-format and full (70x100) formats are used.

Five-color or six-color machines can be considered optimal in terms of color - four for traditional printing plus a company color, pantone or metallic paint. When printing labels on metalized papers, it is more technological to apply primer, white paint separately and, after drying, print with other transparent inks.

Sheet-fed offset machines are very expensive equipment, but the balance of mass production, color and format of printing machines, printing equipment and post-press equipment, makes offset technologies profitable, as there are no restrictions on quality. In post printing operations, then at the cost of production.

Finishing equipment is one-knife cutting machines, machines for embossing and pressing foils and holograms, die-cutting, laminating, laminating, numbering and packaging machines of finished labels and packages. As a rule, these machines have a lower productivity compared to printing machines, and their combination of efficiency is of great economic importance.

### **3. Production.**

High-quality labels with a stroke image are printed, as a rule, with inter- savings. The number of colors does not exceed five, even if the press uses gold and silver paints. When using mixed paints, rather than metalized ones, as a rule, an additional ennobling operation is used — solid or selective lacquering.

High-quality halftone labels are printed with triad inks or additionally use one, two or more mixed, metallic inks. More recently, continuous or selective varnishing, as well as foil stamping or pancake embossing, complex cutting and cutting, are increasingly being used to enrich label and packaging products.

Five-color printing machine with lacquer section - the best option for the production of labels and packaging offset printing method.

The optimal load of the printing machine when printing label and packaging products - five colors plus varnish. This coincides with the maximum percentage of color-etui → labels. If the products are not varnished, the machine will work with the disconnected varnish section, but with drying.

When printing on metalized papers, the machine works optimally: a substrate plus four triad inks and, as a final product, four inks plus the color of metallic paper.

If on the metalized paper it is necessary to apply an additional sixth paint, then for this you can use fragmentary varnishing with silver, gold or colored varnish. Flexographic inks and a doctor blade painting section can also be used as the sixth ink.

For mass production of packaging, you can use five- or six-color offset sheet machines with two lacquering sections. Six colors are printed on the line, after drying a dispersion varnish is applied, dried again and UV-curing varnish is applied. This is a complex technology, equipment is expensive and effective only for mass production of luxury packaging, but everything is done on the same line without interruption between technological operations.

If there is a need to print label products in more than six colors + varnishing, then the following scheme will be optimal: printing the first one or two inks on a two-color machine, and the remaining five + varnishes on a multi-color machine with varnish sections.

It is better, of course, when label and packaging products are printed on different belt machines. As a rule, they use universal, rather than specialized, sheet fed offset presses.

In universal sheet-fed offset printing machines, as a rule, sectional or plumier construction. The printing cylinder has a double diameter as compared to the offset cylinder and the transfer device is single cylinder or chain. The characteristic technical parameter for these machines is the amount of printed paper and paperboard. For medium format machines (approximately 500x700 mm), this interval is from 0.04 to 0.60 mm or 0.80 mm of sheet thickness. For machines of full format (700x1000 mm), the upper border reaches the thickness of a sheet of cardboard (1.2 mm). These cars can be without varnish section or with one varnish section for work with disperse paints.

Specialized sheet offset printing machines for printing label production and high-quality sheet products, both medium and large format, usually have a sectional construction, a three-cylinder transfer device and three cylinders of the printing apparatus of each section of a single diameter. These are five- or six-color paint machines without / or with a lacquer section, high-speed with a thickness interval of paper 0.04 to 0.40 or 0.50 mm.

It should also be noted that in small quantities labels can be printed even on copying machines Xerox, Canon, Kodak or on color printers. But these are special cases.

Prints of labels or packages are varnished, cut, cut, die cut, various types of embossing; creasing, punching, numbering, laminating, glue is applied and glued boxes of packages.

## **. 4 Bag Making Systems.**

Packages are packaging products that are primarily manufactured separately from the packaging process. Filling with goods is usually done in filling machines. Paper is used primarily as a material for bags, as well as polymeric films or multilayered materials made from paper and polymers. The external side of packages is usually sealed for product designation or for advertising.

**Under the designation "package" the following types of products are suitable:**

- Triangular bags - packaging means, which when folded has the shape of a triangle and is closed with the help of adhesive bonding;
- Rectangular packages - packages that when folded have a rectangular shape with or without bottom, which are usually single-layered or multi-layered of the same material;
- Bags are bags of various sizes that have handles. As handles, cords can be pulled through the caps, formed in the form of handles and glued to the package strips of paper and cardboard or glued to the package are plates with a hole;
- Bags are bulk (usually multi-layered) packaging products that, when flat, have an area of more than 2700 cm<sup>2</sup>. The design of the bags is similar to the design of packages.

**Then you can highlight:**

- open bags, in which the entire upper part of the bag is a hole for filling with contents;
- closed bags with a special hole in the upper part.

Packages are packaging tools that acquire their volume and shape only after filling with the contents. Therefore, they are compactly packed before filling and can be efficiently transported and stored.

For the manufacture of bags, installations were developed in which all technological operations were integrated, from unwinding the web to packing the bags.

In accordance with their design packages is classified:

• **Flat pack.**

- Formed from a paper sleeve (glued seam is located in the middle of the package surface). The sleeve is divided in the transverse direction so that a connecting pad is formed for the bottom. In the folder, glue is applied to the cover, and it closes in the transverse direction.

- Formed from paper web with two glued seams. At both edges on the lot carved lining for bonding. The canvas is cut in the transverse direction, forming a package blank. Gluing pads are folded, glue is applied to them, and then the bag is closed by means of a valve folding along the bottom line (in the direction transverse to the movement of the web).

- **Flat bag with side fold.**

-The side folds provide more convenient opening of the bag for filling. Lateral folds are formed during the formation of the sleeve with the help of a "double" format metal sheet, around which the canvas is stretched. The bottom is closed either with the help of a lining for gluing, or by wrapping the bottom, glue-coated sleeve edge (in the transverse direction).

- **Package with folding cross bottom.**

Cross-bottom bags are bags without side folds, the bottom is formed at the bottom of the bag and glued together. When opening the package, the bottom is installed in a direction transverse to the surface of the package; a hollow body is formed, which is convenient to fill.

- **Foldable bottom bag.**

Bags with folding bottom are bags with side folds; the bottom is formed and glued together at the bottom of the bag. When opening the package, the bottom is set in the direction transverse to the package surface; a hollow body is formed, which is convenient to fill.

In modern filling machines for packing loose substances (for example, sugar, flour) the formation of the sleeve and the bottom of the package occurs immediately before filling.

## **Literature:**

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