

# Printing Technology Essentials of Several Special Printing Inks

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**Abstract.** Papermaking technology, compass, gunpowder and movable-type printing, which are called the four ancient Chinese inventions, have been widely known among the national people even by the little pupils in primary school. However, as time changes and technology develops, the four great inventions have been evolved during the long history and are now totally new and different. The four great inventions have one common point – they do not exist solely. Messy materials have been mixed together to play an important role in becoming the great inventions. Without all these materials, they are not inventions which provide convenience to people, but a pack of rubbish. For movable-type printing, the imprinted board plays a crucial role. Ink, however, makes the board much more useful working together. Without ink, the board won't be listed in the four great inventions at all. Ink has been one of the commonly used materials since the movable-type printing was created. Though the modern time is very much different from what it was like in the past, ink has always been an indispensable part in printing industry. Without ink, printing won't be possible. In the modern market, ink is still one of the most important elements in printing industry. It is a fatal product in printing industry because it influences the quality and effect of the printing products. In printing industry, a great part of the products which need to be printed have requirements on quality and design, and ink is the most important part as well as the carrier to meet the requirements of quality and creativity.

The society is developing and people's needs are improving. To meet the various needs of people, special inks are created.

## Introduction

As the economy grew at a high rate, people have higher standard of consumptions, longing for individualism and fashion. Therefore, packaging design and printing varies, too. For package printing, the color of printing, which enhances the publicity effect as well as artistic effect, has always been the focus point of people. Ink, is of great importance for these special effects. Innovative technology products emerge with the prosperous development of China's scientific technology, and they have improved the international reputation of China as a scientific and technological power. The printing industry has also welcomed the good situation of scientific and technological innovation. Researchers have successively created special inks which fit different printing fields, which have greatly enhanced the development of printing industry. Ink might be an unfamiliar word for most of the people and some simply think it as a kind of pigment. However, the components of ink are various, with a lot of materials combined. The main three materials are pigment (the main material), connect material and assistant medicament. These three works together to compose what we call ink. What's more, these three materials are composed of other elements.

Therefore, it is not only one simple material. The elements of special inks are much more complex in order to meet special requirements and to have different effects. People have added some elements which have been discovered to the ink to create all kinds of special inks to meet the requirements of different customers. To meet different printing requirements and show different effect, the materials used in these inks are different. Therefore, the instructions of different inks should vary, too. The techniques suitable for one kind of ink may not be suitable for another ink since the material is different. In order to better show the effect of the special inks and improve the effect and quality of the printing products, the techniques of different inks should be grasped. The following part will focus on some commonly seen special inks as well as the printing techniques.

### **Nighttime Luminous Ink**

Luminous at night is not new for modern people since all kinds of things can be made to be luminous at night. We can become inured to the unusual luminous clothes at night, either. In printing industry, being luminous at night has become a common printing requirement.

To understand from what is written, the nighttime luminous ink should be a kind of special ink which is made of pigment or fuel which can be luminous at night, together with some common ink.

The greatest, as well as the most important feature of the product sprayed or printed by this kind of special ink is that it is luminous at night. The printed products made by nighttime luminous ink can shine more than 12 hours as long as it is able to reserve light and has absorbed light for 10 to 30 minutes. What's more, due to the specialty of the material, it can be repeatedly used.

We can easily find the application of nighttime luminous ink in our daily life. At train station, subway station or some other places where there are a lot of people, luminous ink is used for some emergency evacuation channel instructions, which, to some extent, reduces the risks of danger. Some countries even use these kinds of ink on buildings to lead and at the same time to bring new experience. At the same time, some uses the special ink on anti-fake tags to differentiate the genuine and sham, thus to guarantee the quality of the products.

Since it is a kind of special ink, more attention should be paid during printing. We should correctly understand the feature of nighttime luminous ink in order to better grasp the technical essentials.

Nighttime luminous ink has all kinds of different recipes. Generally, it is collocated according to the consumers' requirements, taking elements such as luminance, color and lifetime, etc., into consideration. The luminance of it will be influenced by the species as well as the number of radioactive substances. In general, the better the radioactivity is, the brighter the product can be. Therefore, when making the ink, different elements should be well controlled to meet the real requirements. At the same time, the nighttime luminous ink requires relative thickness of the ink, and the ones made by silk screen are the most steady and accurate. What's more, to get better quality, the printing speed should be well controlled to meet the requirement. The viscosity of the ink should be adjusted by diluent at proper time to guarantee the effect.

### **UV Crystal Ink**

Generally, the ultraviolet curing ink which is made by special UV resin and other assisted dose is called UV crystal ink. This kind of crystal ink is colorless and tasteless, with relatively high stability. It won't volatilize easily or turn yellow. The curing speed of crystal ink is very fast. Under the exposure of ultraviolet, it only takes 6 minutes to complete the solidification process. What's more, this kind of ink has better hardness than others, with great scratch resistance ability.

This kind of ink can be widely used in printing of many fine products such as crystal scutcheon or cover of calligraphy and paintings.

Generally, when conducting silk-screen printing with UV crystal ink, the 300 Mu nylon band color network should be chosen. The screen printing plate needed for this kind of special ink should be thick film screen to meet the required effect of solid crystal.

Different inks have different features. Therefore, we should not mix different inks in case bad effects occur. Before using, the stirring process should be done for many times, and some diluent can be added when necessary. What needs attention is that the diluent must be especially for crystal ink in case it influences the effect even quality of the product, which might make the consumer unhappy.

### **Intaglio Printing Ink**

Intaglio printing ink is generally used in intaglio printing which have different requirements. Same with the other ink, the basic elements of intaglio printing ink is pigment. However, it is a different pigment which is a colored matter which will be mixed with connection material. This kind of colored matter plays the intaglio role, creating comparison to the original color of the printing products. In this way, can the image be displayed to get the effect. Generally, the elements of the intaglio printing ink is organic pigments, which, comparing to inorganic pigments which are hard to be dispersed, can be easily made into particulate matter and can be easily dispersed in connection material. What's more, organic pigments seldom abrase the forme. This is the advantage of intaglio printing. At the same time, the price of it is relatively high. Therefore, it is suitable to use it on some products which have relatively high value.

The most important thing in intaglio printing ink is the colored matter. Therefore, the technical essential should be related to the colored matter, either. Pigment, which is greatly influenced by its nature, has great influence on inks. The nature of pigment includes dispersity, covering power as well as readability, which should be completely considered during printing since they are of great importance.

Generally, the particle of pigment in ink should be completely soaked to the connection material to get the final effect. Therefore, the size of the particle is strictly restrained under 5 microns. Only when the particle meets this requirement, can the gloss of the product be of its best.

When the pigment shows pellucidity, it means the ratio of the refractive index of figment and the refractive index of connection material is 1. When the ratio is larger than 1, the figment will have color. Different products have different requirements on covering power. Therefore, the ratio must be well calculated to get the best effect.

### **Conclusion**

With the raising of people's requirements towards printing products, special inks appear to meet the various needs of consumers. Different inks have peculiar properties, which can lead to well printing effect as long as the elements of the inks are well known and the techniques are well grasped during printing. A lot more inks will appear in the future. However, as long as you can know the elements of them and have correct understanding, you will be able to grasp the technical essentials of each ink and meet the needs of various consumers.

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