

Development of a Water - Based Ink

NIU Qianqian, LIUXin

Faculty of Printing and Packaging Engineering, Xi'an University of Technology, Xi'an 710048, China

A new patent for green printing water-based inks (application number: 2016104595693) is forthcoming. The water-based ink [1-3] mainly comprises the following components: starch, deionized water, sodium hypochlorite, sodium hydroxide^[4-6], polyvinyl alcohol, urea, nickel sulfate, colorant and auxiliary agent, wherein the water-based ink is prepared Additives for defoamers, driers and surfactants mixture.

1. INTRODUCTION

Water-based ink is a new type of "environmental protection" packaging and printing materials, but the water-based inks currently used for printing still have the disadvantages of complicated preparation process, high cost, single use, water-based ink and pigment^[7], and printing method. The patented water-based ink solves the problem that the existing water-based ink has complicated preparation process, single use, water-based ink application range and pigment type, and the printing method has specific problems. In view of these problems, the invention patent has improved the adaptability^[8-10] of water-based ink, water-based ink, printing method and pigment type, A small investment in equipment; non-toxic tasteless, non-polluting the environment; film of good, with good bonding properties; application is very broad, both for screen printing, flexography, gravure printing can also be used; Pigment type adaptability, both can add pigments, dyes can also be added; in some areas can completely replace the serious pollution and expensive solvent-based inks.

2. BASIC COMPOSITION

The invention has the advantages that the effective components of the water-based ink are as follows: 1 to 3 percent of starch, 70 to 80 percent of deionized water, 0.1 to 0.5 percent of sodium hypochlorite, 0.05 to 0.1

percent of sodium hydroxide, , 2 to 4 percent of polyvinyl alcohol, 0.1 to 0.3 percent of urea, 0.2 to 0.6 percent of nickel sulfate, 5 to 18 percent of colorant, 1 to 2 percent of additive, the mass percentages of the above components is 100%. Wherein the auxiliary agent is a mixture of an antifoaming agent, a drier and a surfactant, wherein the percentage of each component in the total mass of the water-based ink is 0.3 to 0.8 percent of an antifoaming agent and 0.1 to 0.6 of a drier %, And the surfactant is 0.5 to 1 percent; the drier is one of light calcium, calcium chloride and plaster; the defoaming agent is tributyl phosphate; and the surfactant is sodium fatty acid. Preparation of water-based inks used for dyes and pigments pigment.

3. PREPARATION

The patented aqueous ink is prepared by the following steps:

First, the raw materials were weighed out: the raw materials were weighed out in terms of the mass percentages in the above basic compositions;

Then, the starch paste is prepared by adding 7.5% to 12.5% of the deionized water in step 1, adding the starch into 7.5% to 12.5% of deionized water, mixing and stirring to form starch Heating the mixture to a temperature of 80 to 95 DEG C, adding the prepared starch slurry slowly, stirring, and controlling the temperature to 70 DEG C to 90 DEG C; Stirring speed is 400-600r / min, then sodium hypochlorite is added, and the mixture is evenly stirred, and then a mixed solution of nickel sulfate and 4% -10% deionized water is added and stirred, finally adding sodium hydroxide and 0.5-1% Deionized water mixed solution, stirring to obtain uniform and transparent yellow colloid, that is, starch paste;

The polyvinyl alcohol solution is prepared by weighing

35 to 45 percent of the total amount of deionized water in step 1 and the deionized water at the temperature of 20 to 25 degrees centigrade; adding the polyvinyl alcohol to the so-called 35 percent to 45 percent, And the mixed solution is heated to 50 DEG C to 80 DEG C to accelerate stirring, and when the polyvinyl alcohol is completely dissolved, the polyvinyl alcohol solution is obtained;

Then, polyvinyl alcohol starch binder was prepared: the starch paste polyvinyl alcohol solution was mixed in the mass ratio of 1: 1, and stirred uniformly to obtain the polyvinyl alcohol starch connecting material;

Finally, the required water-based ink is obtained: adding the dye or pigment, urea and auxiliary agent into the obtained polyvinyl alcohol starch binder and stirring uniformly to obtain the required water-based ink. When the dye is added, it needs to be dissolved in water and then added; when the pigment is added, it needs to be treated with a surfactant and then added; it is necessary to modify the components according to whether the dye is added or not Mass percentage.

4. CHARACTERISTICS AND APPLICATIONS

1. The film-forming substance in the patent water-based ink formulation Polyvinyl alcohol is a water-soluble polymer resin, the solvent is water, non-toxic, non-polluting, low cost,

2. The other film-forming material in the patent water-based ink formulation is rich in raw material and low in price, and is a natural raw material. The preparation process is simple, non-toxic and tasteless, non-polluting to the environment, good film-forming property and good adhesive property ;

3. The preparation of water-based ink is not required for the pigment, either dye or pigment; and the preparation method of water-based ink is simple, easy to realize, environmental pollution-free, the equipment is inexpensive and small in size.

4. The patented water-based ink has a minimum

viscosity of 0.02 Pa • s (25 ° C) and a maximum viscosity of 40 Pa • s (25 ° C), making it suitable for gravure, flexography, screen printing and transfer printing. Printing method.

5. The water-based ink of the patent has the disadvantage that it can not be used for offset printing and changes the viscosity of the ink by changing the amount of water used to adapt to a variety of printing, and the water consumption is not suitable for a variety of printing.

REFERENCES

- [1] Wang Licheng. The green road of printing ink [J]. Today printing, 2011, 03: 37-38.
- [2] PANG Hong-xiu, ZHAI Hong-jie, LIU San-guo, LIU Ya-xin. Environmentally friendly water-based inks "green" cigarette packs [J]. Print, 2014, 02: 44-45.
- [3] Gong Zhang water.Green ink: the spark can start a prairie fire [J]. Printing industry, 2014, 04: 71-72.
- [4] Yang Hong.Environmental printing ink: the green printing "keywords" [J]. Printing industry, 2014, 07: 62-63.
- [5] Li Baoqiang.Green of the ink, far from the end [J] China Printing, 2014, 08: 81-83.
- [6] Chen Yuitao.Environmental protection of the important protection of green packaging [J]. Printing Technology, 2008, 16: 22-24.
- [7] recipe selection [J]. Guangzhou Chemical Industry, 2015,03: 229.
- [8] Zheng Chunqiu. A water-based ink preparation and its preparation method [P]. Jiangsu: CN105331192A, 2016-02-17.
- [9] Xu Wencai, Hao Yong, Luo Shiyong, Ma Zaizhu, Huo Lixia. Screen printing antique water-based black ink based on corn starch and its preparation method [P].
- [10] Xu Zhonghao, Xu count. An environmental water-based ink and its preparation method [P]. Anhui: CN104987773A, 2015-10-21.