Influence of high temperatures on the inks of the sheet-fed litho offset printing inks that cold-set

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Abstract:

A change or difference in the degree of typographical color during the operation is a common problem in many printing presses. It negatively affects on print quality. Achieving the stability of the color score of the print from the first sheet to the last sheet of the one typographical process. It is one of the basics of obtaining printing quality and an important demand among many customers.

During and the production process and after it's. the parts of the machine are usually very hot. and higher than the recommended temperature value. It has low relative humidity. which leads to serious consequences for printing quality and stability of productive process. The workers are also suffering from exposure to these negative conditions in the working environment due to the lack of control over the temperature of the printing hall and machines.

This research aims to know the effect of high ink temperature on the color density of the print, and its impact on the Rheology properties of ink, especially viscosity and tack.

One of the most important research results are low ink viscosity and tack value whenever temperature increases. We found that magenta ink is the most affected by temperature change compared with other operational inks.

According to these results, one of the research recommendations was to maintain ink temperature during operational operations.

Key words:

Temperature , The Rheology properties of ink , Viscosity, Tack

Introduction:

Litho offset printing inks that dry on cold are used in many fields, such as the field of publishing such as newspapers, magazines, books, and commercial publications, and in some fields of packaging and so on. Ink is considered an essential printing material that affects the quality of the printing product, so it was necessary to know its operational properties so that it can be directed and used optimally and correctly and for appropriate purposes, as printing products vary and multiply.

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The viscosity, ink length, viscosity, and thixotropy are among the rheological properties of the ink, which significantly affect the behavior of the ink during the printing process. (2)

Research problem:

Decrease in the quality of printing production using the litho-offset method, with the increase in the temperature of the ink.

Search goal:

This research aims to determine the effect of high ink temperature on the quality of print production.

Research Methodology:

The study relies on the experimental method and case study in the General Authority for Amiri Printing Presses.

To achieve the goal of the research, the following is studied:

1- Theoretical study: - The high temperature during the printing process affects the quality of the prints in one printing process because the printing conditions are unstable, as the high temperatures lead to a decrease in

2- Ink viscosity, with an increase in temperature by 10 degrees Fahrenheit, the viscosity value can decrease to approximately 50% or more, and also when the temperature increases by 20 degrees Fahrenheit, the viscosity value decreases to approximately 75%. (3)

The temperature of the ink rises during the printing process and also as a result of the surrounding environmental conditions, which changes the behavior of the ink as a result of changing its rheological properties, which is reflected in a change in the color and density of the ink (4). This is avoided by changing the setting of the ink keys or reducing the speed of the printing machine, but from Better maintain the temperature of the inking system cylinders.(5)

And the high temperature causes a change in the rheological properties such as a decrease in the viscosity of the ink, which leads to an increase in the rate of emulsification and dot growth, and also the soaking of the print, as well as a change in the viscosity properties, which work on sticking or tearing the paper fluff on the cylinder of the rubber media, which leads to a decrease in the quality of printing.) 6)

Result extraction:

After analyzing the results, the following was concluded:

1- The decrease in the viscosity of the ink when the temperature of the printing machine rises, which leads to low print quality.

2- The inks most affected by the high temperature is the magenta ink, as its viscosity decreases significantly, which affects the printing quality.

3- The least affected by the high temperature is black.

4- Low viscosity value of the ink as a result of high temperature, which leads to a decrease in the printing quality.

5- The color less affected by the increase in temperature in relation to the value of viscosity is the color magenta.

6- Increasing the print density when the ink temperature rises.

Recommendations:

After reaching the results mentioned in the research, the researcher reached the following recommendations:

1- The temperature of the inking system must be maintained between 25° - 27° during printing to avoid the occurrence of many printing problems.

2- Maintaining the temperature of the printing room between 20° - 25°, and the relative humidity between 50 - 65%.

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