

Digital textileprinting –a good choice for small scale business

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ABSTRACT-this paper describes the application of digital textile fabric printing willpromote the small scale business of India in global market.Digitization in textile printing has started to play a major role in appealing to large manufacturers who can produce samples in new ranges, with the potential for customisation, without major investment.it is also allows industry to respond quickly to new and changing markets ,especially in the fashion world. For small scale textile printer, digital printing allows experimentation, innovation and production. The main objective of this study is the technology behind digital textile printing, comparative study with traditional printing and the economic aspects of the new technology.

Keyword

Digital textile printing, Process, Advantage, issues, economic aspects.

Introduction

Modern textile trends are concern, more customized, colorways, and complex print designs is driven by importers, brand owners and consumers who are looking for differentiated quality products.

The scope of this paper is the digitalization in textile printing technology in general and its application for a small-scale digital printing production. Particular interest is in utilizing the digital textile printing capabilities..

Traditionally, the fabric was printed on a rotary machine, using expensive rollers made from nickel or copper. These had to

be engraved with the design and a separate roller was needed for each colour. The rollers were loaded onto the machine and the fabric was passed around them. A transfer roller coated the engraved roller with printing paste and the pressure of the engraved roller, pressing against the fabric, produced the printed pattern.

A digital printer can apply a design directly to the fabric, allowing dyes to be directly printed onto any kind of fabric. Using this method a fabric can be printed and finished in around two weeks, rather than the six to twelve weeks it would have taken using conventional printing processes. . Digital printing provides unlimited colours and achieves a quality that was not possible before.

Digital textile printing is referred to when identifying either printing smaller designs onto garments (t-shirts, dresses, promotional wear; abbreviated as DTG, which stands for direct to Garment) and printing larger designs onto large format rolls of textile. The latter is a growing trend in visual communication, where advertisement and corporate branding is printed onto polyester media. Examples are: flags, banners, signs, and retail graphics.

Also applications of these printers are varied with fast developing printing skills, media, ink etc. it is used to produce big size of photos and hanging banners that hang on the buildings to a small multi-coloured designer silk handkerchief & Ties.

Digital textile printing started in the late 1980s as a possible replacement for analog screenprinting. With the development of a dye-sublimation printer in the early 1990s, it became possible to print with low energy sublimation inks and high energy disperse direct inks directly onto textile media, as opposed to print dye-sublimation inks on a transfer paper and, in a separate process using a heat press, transfer it to the fabric.

This technology valued at approximately US \$ 7.5 billion globally the worldwide digital textile printing market for garment, home décor and industrial applications is experiencing strong growth of around 34% CAGR to 2019.

Process

Digital printing uses the most up-to-date technology to produce printed cloth without the need for screens. Design can be created by scanning and manipulating

imagery in a software programme such as Adobe Photoshop, or developing repeats using special repeat software like LectraKaledo or Arahne, Coral Draw and printed fabric can be generated directly from the computer via the digital printer, in a very similar way as one would print onto paper with an inkjet printer.

There are currently two basic print head technologies are available in digital textile printing.

1. Continuous inkjet (CIJ)

Conductive ink is forced through the print head, which is coupled to a piezoelectric transducer, causing the ink stream to break into droplets. Once selectively electrically charged, they are then deflected (binary deflection mode) or variably deflected (multiple deflection mode) as they pass through an electric field. Now the printing technology are available on depend thermal inkjet with touch screen.

2. Drop on demand (DOD)

Developed by Mimaki in Japan, there are currently widely used in the UK, in DOD system, ink is ejected from the need only when needed and there are two types. In the most common piezoelectric (PIJ) head technology, ink is delivered using an electric charge through quartz crystals. It is a 4 or 8 colour process and it is possible to use a range of dyes. The other method is a thermal mechanism (TIJ), where ink is rapidly heated from inside each nozzle causing ejection of an ink droplet. This print head technology is no longer commercially available in digital textile printers.

Using these printers, photographic quality imaging for printed textiles is achievable. There is no colour limit and a wide range of fabrics from velvets to sheers can be printed with reactive dyes, allowing tremendous scope for innovation. It is also possible to print a repeat unit of up to 5m (16ft) in length.

The dyes that are used in DDP are real textile dyes adapted to go through the fine nozzles of the printer. Because these dyes are thinner than those used in traditional printing, different printers can be set up to use one of a variety of dye types (ex. reactive, acid, disperse and pigment) and these inks come in liquid form with a self-life of 1-2 years. A pioneering feature incorporated into the TF220 printer is Dynamic variable DOT imaging technology. This feature enables the printer to independently produce multiple and unique dots and to adjust the size of the ink droplets produced by each of the print head nozzles on the fly. The result is finer detail and smoother gradients in highlighted areas and crisp colours in the mid tone and shadows, ink drop size range reaches from 5.4 ng to 41.5 ng. The associated soft RIP driver and textile design software enables the printer to work with any TIFF files produced from any CAD, photo or paint package. Mostly 4-6 colours head are available with 256 nozzles per colour and 8-12 ml inks for 1 sq. Meter printing.

Cloths have to be pre-treated prior to printing. Pre-treated cloth should be stored away from direct sunlight and also has a life span of 1-2 years. The

fabric needs to be prepared by soaking it in thickening agent. This agent reacts to moisture by swelling. As a drop of dye touches the pre-treated fabric, the thickener will swell up, keeping the dye in its place. Without this agent the dye would run and bleed on the fabric. Fabric is steamed in the normal way using a cabinet steamer and washed out in an industrial machine before being passed through a press and rolled.

Most digital printers have seven colours; red, blue, yellow, green, magenta, cyan and black. These seven colours can be mixed in any colour combination required, resulting in a staggering 16 million colours. Printers have special feeding and winding systems, which means that both woven and knitted fabric can be passed through them. Depending on application and resolution (360, 720, 1440, or 2880 dpi), the textile Falcon printer has a print speed up to 47.2 square meters per hour. Using no paper backing, the fabric width up to 223 cm, uproll mechanism and take off system. Both 220 cm and 160 cm printing widths are available, the former useful for household products such as bed linen.

Advantage

A DDP system means that companies can:

- Print their existing fabric on line, directly from their existing CAD system, using real textile dyes.
- Produce environmentally friendly fabrics, as there is no paste or waste to dispose of

- Produced fabric that are light, fast and washable after they have been finished
- Print continuously up to 200kg rolls
- Print samples of colour ways and short run production lengths in a few hours
- Compete competitively with just in time production by eliminating the need for screens and rollers.
- Extend their product ranges without keeping expensive stocks.
- Be flexible in a quick changing market by printing only what they know will sell
- Print complex design inexpensively, as the cost is the same as simple design, which will mean increased profits.
- It can also be used in conjunction with the traditional methods of printing.

Issues

The following is a list issues causing problems in digital textile printing:

- Digital textile printing is prone to banding.
- Contact of print head with fabric may cause image distortion or printer damage.
- There are problems in reproducing half-tones.
- There are problems in colour repetition, especially in side-by-side printing.
- Digital textile printers use expensive inks.
- Digital textile printers run with limited speed.
- Digital textile printing is currently economical only for short runs.

Most of the problems and inconveniences with digital printing would be solved with the introduction of new generation of print heads and dyes.

Digital printing	Traditional printing
No limit to the number of colour that can be printed at the same time	A different roller has to be engraved for each colour and the fabric has to be passed under each roller to be printed
Samples are printed in a matter of hours	Samples take weeks to print
Designs can be changed on screen and new samples printed	If design are changed new rollers have to be engraved

Conclusion

Digital printing technology has high precision, high speed output and life like

colours suit the needs of all business enterprises and provide stable working environment. It provides reliability and low running cost. The digital printer has

with more humanized design as well as more convenient and simple operation and maintainance.this printing technology reduced the printing cost and time for the customers.so it's a good choice for small scale business and new entrepreneur.

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