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- CtP
- Plate Processors
- Temperature Control
- Chillers

Temperature Control for Computer to Plate Technology

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Abstract

Thermal Computer to Plate (CtP), an imaging technology used in state-of-the-art printing presses, has replaced older Computer to Film (CtF) technology. In order to consistently produce the highestquality imaging, components of the CtP platesetter, as well as the processing fluid, must maintain a constant temperature. To meet these requirements, a temperature control unit (TCU) is used. Efficiency in this process is crucial, so reducing temperature control costs and system downtime is an important factor when choosing a TCU. Thermo Fisher Scientific manufactures a range of highly reliable and easy-to-maintain temperature control units, including the Thermo Scientific ThermoFlex series of re-circulating chillers and the Thermo Scientific ARCTIC bath circulators which are ideal for use with thermal platesetters and processors.

Introduction

Thermal CtP technology has revolutionized the offset printing industry by automating the processes that create the printing plates used for lithographic, offset printing. Modern lithography uses polymer coated flexible aluminum plates that get divided into two regions: hydrophilic regions that accept a film of water and reject the ink, and hydrophobic regions that accept the ink but reject the water. These regions define the image to be printed. If the printing plate first transfers the image to a rubber roller, which in turn prints the image on the media, the process is referred to as offset printing.

A typical CtP is comprised of desk top publishing (DTP) software, plate handler, platesetter, plate processor, other peripheral equipment and consumables.

Previously, with the CtF technology, the image is created on a computer and is then converted to a bitmap by the raster image processor (RIP). The RIP projects the image onto film that then gets chemically developed much like a photograph. This film must be carefully loaded into the plate burner which uses UV light to "burn" the image onto the printing plate. The printing plate then needs to be processed to expose the hydrophilic and hydrophobic regions before it can be used in offset printing. This entire process requires a clean environment, skilled workers, and a well thought-out proofing and workflow system to maximize quality.

In comparison, thermal CtP technology significantly increases throughput and lowers costs by eliminating the skilled labor and chemicals needed to develop the film in the CtF process. It also lowers costs for both print houses and their clients by minimizing the potential for dust and scratches appearing on the printing plate. Therefore, print houses no longer have to go through the tedious process of creating new film and printing plate each time a dust mote or scratch appears on the proof sheet. By reducing the amount of chemicals needed, CtP technology helps print houses and publishers meet the new "green" standards adopted by the industry.

Process

The DTP software separates an image into the primary colors to be used; each color will require its own printing plate to recreate the image on the finished media. These images are sent to the platesetter where a laser ablates the polymer surface of the aluminum printing plate. This creates a photographic mask of the image, sometimes referred to as a LAM or "Laser Ablation Mask". From here, the printing plate may be baked to harden the polymer region being retained, improving the durability before moving onto the processor. The processing of a CtP plate is much like the processing of a CtF plate where chemicals are used to remove the unwanted areas of polymer to reveal the mask. Once processed and dried, the printing plates are ready to be loaded onto a drum that rotates in the desired ink color, collecting in the hydrophobic regions. The ink laden printing plate is then rotated against a rubber drum transferring the inked image to it. The polymer drum then presses the image onto the desired media. This is repeated in succession for each color to complete the image reproduction.

Platesetter Cooling

At the heart of a thermal platesetter is the CtP "engine". It includes a power supply, laser diode, Grating Light Valve (GLV) Modulator and a sophisticated micromagnetic sensor (MEM). Replacing a CtP engine can cost more than \$25K; hence, controlling the plate processor's temperature is vital to prolonging its life. Further, by controlling the temperature of the laser diode to a tight stability, the wavelength of light transmitted is maintained ensuring that the CtP system consistently produces the highest image quality.

Typical CtP platesetters have a heat load of 600 to 1500 Watts at a 20° to 21°C setpoint temperature and a required flow rate of 1-1.5 lpm at 50 psi. Fluid requirements vary and include water, deionized water, or a 50:50 water-glycol mix. To meet these temperature control requirements, an external closed loop temperature control unit (TCU) is needed. As a closed loop system, the TCU re-circulates the required fluid at the specified rate and temperature during platesetter operation.

Plate Processor Cooling

In the platesetter process the printing plate temperature has been increased by the laser ablation. The printing plate temperature is further raised if the printing plate has also been baked. Immersing the heated printing plates in the processing fluid raises the temperature of the fluid to undesirable levels, requiring the use of a re-circulating chiller to maintain the proper temperature. The heat load will vary with the number of printing plates being processed per hour and whether the printing plates were further heated by baking. To maintain the processing fluid at or slightly above the ambient temperature, a cooling coil is immersed in the processing fluid bath and temperature controlled fluid is pumped through it by a TCU.

Business Drivers

The TCU must be reliable and easy to maintain in order to lower costs by decreasing downtime and because printers and publishers often run second and third shifts requiring a TCU to withstand near continuous run times in industrial environments. Thermo Scientific ThermoFlex re-circulating chillers offers cost-effective, reliable, and intuitive temperature control that maintains consistent temperatures within the platesetter and processor for the highest-quality imaging.

Conclusion

Temperature control equipment plays an important role in the CtP process by precisely controlling the temperature of the CtP platesetter and plate processing chemicals. The use of an external temperature control unit is critical to ensuring the CtP system consistently produces the highest quality plate imaging as well as extending the life of valuable equipment components. Benelux Tel. +31 (0) 76 579 55 55 info.tc.nl@thermofisher.com

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