

Case Study

Ink cooling reduces solvent consumption and provides excellent savings on a rotogravure printing machine

Industry: Print and Packaging

Application: 8-colour rotogravure printing press

Background

A leading Indian converter, manufacturing flexible packaging laminates, has an 8 colour rotogravure printing press. Print runs include both surface and reverse printing on films and paper. Web width is 1300 mm and rated speed of the press is 280 metres per minute. Solvent based inks with a viscosity of 16-20 seconds (B4 cup) are normally used. The client wanted to optimise solvent consumption, without compromising the print quality.

Process

On each print station, an ink circulating pump delivers ink from the tank to the tray (pan) through a filter. As the print run progresses, temperature of the ink rises and then stabilises at a high temperature over time. The high ink temperature results in high solvent evaporation, which in turn results in higher top-up solvent consumption.

Solution

A system was needed to reduce ink temperature to minimise fugitive solvent losses; thereby reducing total solvent consumption. This had to be done, without hindering the process. Critical design parameters that were considered included ambient conditions, reasons for ink temperature rise, flow rate of the ink and permissible pressure drop of the application.

We evaluated the application data through heat exchange and CFD modelling to arrive at a compact design with optimal performance. A shell and tube heat exchanger design was preferred for this application, due to its dependable (leak proof) construction with chilled water as the media of heat transfer.

We then went into details of the application aspects to engineer a product that allows the ink to pass through easily, without any spots where ink could possibly accumulate. I T S P u m p Ink tank Cold ink to tray or chamber Filtered ink to ITS The Valflow Ink Temperature Stabiliser (ITS) design thus has a low pressure drop, is sleek and simple to fit. The design also ensures that cleaning is easily done by passing solvents through the heat exchanger at high velocity.

Result

Without a heat exchanger, temperature of the ink stabilised at 33°C when productivity was at an optimum level. With the help of the Valflow ITS, ink temperature during operation was reduced to 26°C. Lowering ink temperature by 7°C saw a reduction in top-up solvent consumption by 35%, while maintaining the same printing performance.

Conclusion

Annualised savings after installation of a Valflow ITS, with associated accessories, water chilling plant, etc. is significant, translating into a payback period of about 9 months!



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