CURING OF DIRECT-TO-FILM ADHESIVES

Mark Vasilantone, President of Vastex International, outlines the cost-effectiveness and increased productivity of conveyor belt dryers for DTF heat transfer printing

Mark Vasilantone

Direct-to-film (DTF) is a recent decorating technology in which artwork is inkjet printed onto an intermediate film that can be heat transferred onto fabrics such as cotton and polyester, as well as treated leather. Once prepared, the transfers can be used immediately, stored for later use or sold as a final product.

DTF PROCESS

In the simplest terms, transfers are printed with the colour layer first, followed by the white base. After printing – while the ink is still wet – the graphic is coated in a powdered adhesive which must be heated to cure. A critical step in the DTF process is the thorough

"A correctly-cured transfer will have a glossy, orange-peel texture"

and uniform curing of the adhesive. A correctly cured transfer will have a glossy, orange-peel texture. Printed transfers are generally cured using one of four types of equipment.

HEAT PRESSES

To cure the transfer on a clam-shell heat press, the bottom platen needs be heated. For presses without a bottom-heating element, the press can be closed for 30 seconds to produce the same outcome. The transfer is then laid, adhesive side up, on the bottom platen. Next, the top platen is hovered above the transfer as closely as possible without touching. The same process can be used for swing-away models.

Dwell time and temperature will depend on the make of heat press used, but each transfer should be between 1–5 mins/transfer at 135–177°C.

Since most direct-to-garment (DTG) and DTF printing shops own a heat press, this option is probably already available. However, using a heat press to cure DTF adhesives requires operator time and attention, preventing the heat press from being used for other tasks. This can potentially create a bottleneck in production. Most heat presses operate on 120V and should be operated below a separate powered exhaust hood to evacuate fumes. Average costs range from €190–€1,800 depending on the brand and its features.

"Most heat presses operate on 120V and should be operated below a separate powered exhaust hood to evacuate fumes"

CURING OVENS

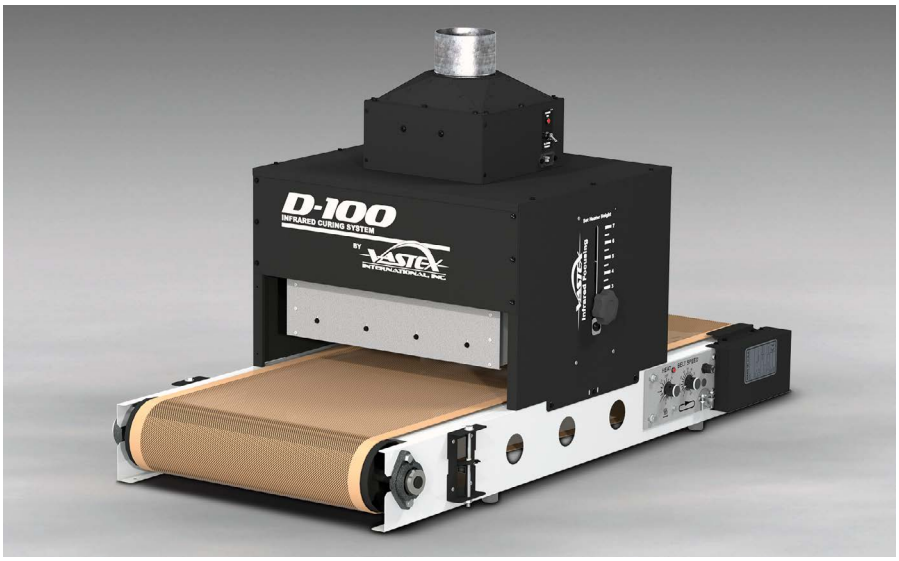
Designed to cure individual sheets of DTF film up to 460x610mm, curing ovens are single-function devices that provide uniform heating at temperatures up to 150°C. Once the oven is heated to the desired temperature, the transfer sheet is inserted into a tray that slides in and out to retain the heat inside the body of the device. An automatic timer and alarm alerts the operator to remove the transfer. A typical setting is 127°C at 120 seconds. Again, a fume extractor or separately-powered exhaust hood is strongly recommended. Most operate on 120V and fit on a tabletop or counter, freeing up heat presses for other uses. Average costs range from €190–€950.

FLASH-CURE UNITS

With flash-cure units, the transfer is placed on a vented platen over which a high-wattage heater is swivelled for uniform curing. Models with dual rotary platens can double productivity. Head levelling achieves edge-to-edge consistency. For shops that also offer manual screen printing, flash-cure units are likely to already be in place. This offers relatively hands-free results in about a minute. As with heat presses, flash-cure units require a separately-powered exhaust system to evacuate fumes. Entry-level units operate on 120V at costs ranging from €140–€1,300.

CONVEYOR DRYERS

The most efficient option is a small tabletop infrared conveyor dryer. Easy to operate, the freshly-powdered transfer is placed on the belt. The transfer travels through the heating chamber to cure, hands-free. The height-adjustable heating element and digitally-controlled temperature and belt speed, allow precision settings for repeatable results. A catch bin at the end of the conveyor



Vastex D-100 tabletop conveyor dryer with optional exhaust hood

Vastex F-100 Flash Cure Unit with dual rotary platens

allows multiple transfers to be placed on the belt in succession. With no operator required, productivity is improved. Infrared conveyor dryers can also be used to cure pre-treatment, as well as DTG-printed garments.

For commercial shops requiring high-production rates, larger conveyor dryers allow

"With an entry-level Vastex D-100 tabletop conveyor dryer, transfers need only be placed onto the belt"

for multiple rows of transfers in addition to DTG and screen-printed garments.

Unlike heat presses, curing ovens and flash-cure units, conveyor dryers are available with an integrated, powered exhaust to remove fumes and moisture from the work area. Consequently, the need for a separate exhaust hood is eliminated. Tabletop units operate on 120V and 240V with costs starting around €1,500–€2,500, including a powered exhaust.

TIME VERSUS EQUIPMENT COST

Because curing equipment will probably last many years, its one-time cost is typically insignificant, relative to the time it takes away from profit-making activities. Heat presses, flash-cure units and curing ovens can burn transfers if not removed in time. As a result, constant attention is required, taking time away from production, pre-press and even sales activities that generate income. For example, curing each transfer using a heat press takes 1–5 minutes and requires the operator's attention to remove each one. However, with an entry-level Vastex D-100 tabletop conveyor dryer, transfers need only be placed onto the belt. As transfers fall into the bin at the discharge end – at rates of up to 50 transfers/hr at 70–90 seconds – attention to the process is unnecessary.

Geo Knight & Co model DK14S 12x14 swing-away heat press

"Curing ovens are single-function devices that provide uniform heating at temperatures up to 150°C"

CONCLUSION

For a new business, the automation process may not yet be required. However, once a business begins to grow, replacing time-consuming manual equipment will end up costing more than purchasing time-saving, automated equipment at the outset. ■

Mark Vasilantone is President of Vastex International, Inc

Further information:
Vastex International, Inc, Bethlehem, Pennsylvania, USA
tel: +1 610 625-2702
email: sales@vastex.com
web: www.vastex.com