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Machinery Makeover

Ink-Jet Technology Reinvents Itself Via Upgrades & Marketing Promise

Lynn J. Deiro, Sr. Sales Manager

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Ink-jet printers caused a stir when they first appeared on the packaging scene years ago—if for all the wrong reasons.

However, a popular quote states: “Today's opportunities erase yesterday's failures.”

So it is with today’s state-of-the-art ink-jet technology, which now is prompting positive reactions due to steady improvements achieved during roughly the past decade, including: better fluid recirculation to reduce evaporation; automatic print head-cleaning function at shutdown; and enhanced ink-density monitoring.

The faults once hampering ink-jet acceptance now are a thing of the past. No more are these printers consuming gargantuan amounts of solvents nor are their print-head charge plates rapidly gunking up and causing faults and line stops.

In fact, today’s ink-jet technology offers numerous advantages, not only versus its previous incarnations, but against other methods available to today’s packagers. Ink jets can print on almost any surface; offer a broad range of inks for varied applications; and provide unparalleled familiarity (as the method is the most widely used printing technology used in production environments).

While laser represents a growing alternative, it’s limited in its applications due to the surfaces on which it can print. Not only are ink-jet printers ideally suited for high-speed bottling and canning operations, but they excel in situations involving irregular surfaces.

The big two

Two major factors have moved ink-jet technology ahead: an auto-clean feature extending the time between print head-cleaning; and a fluid-pulsing function—located in the return line—that drastically reduces evaporation and decreases operating costs.

To realize how this has impacted operating costs, one quart of make-up once yielded five, maybe six, hours of operating time. Today’s printers can easily achieve more than 250 hours.

But just as vast differences exist between today’s and yesterday’s ink-jet technology, so it is with today’s printers. Some are top-of-heap while others struggle to reach state-of-the-art standards.

A testament to the virtual elimination of evaporation can be supplied by a quick visual inspection of today’s state-of-the-art printer return lines. Those of most printers appear as a solid color, while the top-end-printers’ lines—their liquid pulsing with interim moments of clear line views—mimic a heartbeat.

Speaking of fluid, a high-end printer should consume roughly 4.5 mL per hour of make-up (using general-purpose ink). Compare that with most printers with their 10 mL to 20 mL per hour rates. Acetone ink uses about 15 mL per hour in today’s top gear, while less-efficient systems will consume twice or even thrice that amount.

Deity in the details

To even better appreciate the advantages offered by today's state-of-the-art continuous ink-jet printers, it's vital to delve into some details.

Low-cost operation, of course, doesn't just mean today's costs or even next month's, but the true lifetime financial impact. While the initial cost of an ink-jet system might appear high, that price must be taken into the context of an accurate accounting of overall costs and savings.

A four-chamber pump system is typically advertised as offering 10,000 hours of operation before failure. But, in reality, that duration is considerably higher, probably in the neighborhood of 30,000 hours.

Unfortunately, some printers utilize abrasive fluids that translate to drastic decreases in pump lifetime. Seek printers that feature systems with fluid bypassing the pump and instead travel against the diaphragm. This method cuts costs by decreasing fluid use and extending service intervals. In other words: a clean environment extends equipment life.

To understand more fully the decrease in fluid use and consequent improvement in up-time performance, it's important to remember that the major culprit in ink-jet printer downtime is the inability to form, charge or deflect ink droplets so characters can be formed properly.

Moving at a rate of 69,000 drops per second, ink within a state-of-the-art printer's nozzle travels through deflection plates and most of it is recovered in a gutter. This means that very little of the ink being run is actually used.

Plus, an auto-clean function prevents deflection plates from getting dirty quickly, hampers splatter and maintains proper ink density (thereby preserving print quality). With lesser printers, employees must clean print heads more often to thwart print-quality deterioration. This 5-minute timeout to stop the printer, remove and clean the head, and put the printer back on-line, multiplied by … well, every company knows how much a minute of downtime costs them.

Real-world results

One prominent beverage bottler has achieved dramatic results utilizing state-of-the-art ink-jet technology, running 12.5 million units of product during a roughly six-week period before a cleaning was needed. Less sophisticated printers might only run for eight hours before requiring a similar cleaning.

Sure, no one thinks of ink-jet printers as a value-added item. Instead, they're seen as a necessary response to legislative initiatives requiring products to carry expiration dates, lot codes, etc. But ink-jet technology not only can keep companies legally compliant, it's able to enhance their products' market appeal.

Take the example of an egg company. Now, traditionally egg producers utilize rollers for printing on the carton. One company, however, realized it could boost production times

by using ink-jet technology. Not only that, but the ink-jet-created image on the carton boosted consumer acceptance of its products.

Couple that experience with a current push to place eggs in clear-pack cartons—which require ink-jet technology for printing—to gain increased consumer appeal, and it's obvious that ink-jet printing can offer value-added function. Even catchy slogans, such as "born on date," can easily be placed on products via ink-jet technology.

With so many advantages offered by ink-jet technology, company leaders need to reconsider any previous negative experiences they might have had and look ahead to the operational benefits and consumer-marketing promise offered by this revamped and potential-packed technology.

For more information, contact:
By Lynn J. Deiro
Sr. Sales Manager
Hitachi America Ltd
50 Prospect Ave.
Tarrytown, NY 10591
914/524-6615
www.hitachi-america.us/ijp