CONSUMABLES-INK

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The Amazing Shrink Inks

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Shrink substrates are popular for packaging, but they wouldn't be anywhere without the high-performance powers of shrink inks.

by Kate Sharon, Associate Editor

INKS USED FOR shrink applications have to be capable of going above and beyond the call of ordinary ink duties. Shrink inks have to adhere well to film substrates, hold color despite heat, maintain a certain coefficient of friction (COF), and—most importantly—shrink.

"[Shrink inks] need to have superior adhesion, flexibility, be fairly heat resistant because heat is involved in the process, and [be made with] pigments that won't change color or fade with heat application," said Ed Dedman, market development manager for SICPA North America. "They need to be better performers all-around than other inks."

According to Mike Buystedt, Akzo Nobel Inks director of market development, "Currently four chemistries exist for shrink applications—solvent-based, water-based, UV cationic, and UV free radical. Solvent-based technology boasts the highest market demand at this time; next in line would be water-based."

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Furthermore, Buystedt said, "UV cationic ink hasn't been widely used for shrink applications due to its higher price; in addition it is more 'difficult' to run in comparison to UV free radical technologies. Not only is UV free radical cheaper, it is user friendly and doesn't require the extensive prep work of cationic chemistry.

But it's solvent-based ink that remains the leading ink for shrink labels and sleeves, Buystedt said. "Big brands are the main players in shrink applications at this time—creating the need for longer running jobs. Currently, solvent gravure inks perform best for long-run applications, making them the most popular options," he said. "However, as interest in shrink applications continue to grow, smaller brands will show increased interest in shrink, increasing the demand for inks that perform for shorter and variable runs." When that happens, converters will invest in the necessary equipment and there will be increased interest in water-based and UV free radical chemistries, Buystedt said.

What to look for

In shrink applications, as in any other kind of package printing, it's important to choose the right ink for the job at hand. To begin, said Tony Renzi, Sun Chemical director of liquid inks, certain aspects of the job have to be determined.

Will it be printed flexo or rotogravure? Is the shape of the container demanding, needing a higher percentage of shrinkability? What conditions will the container have to undergo before, during, and after hitting the store shelf? What COF is required?

In helping their customers answer these questions, ink manufacturers can better assist their ink users in finding the ink that best suits their needs.

The top three factors that ink suppliers and converters have to think about are shrinkability, adhesion, and the ability to release retained solvents—to dry quickly with low heat.

Shrinkability: The most significant aspect to consider when determining the right ink for shrink labels or sleeves is how well it will shrink, Dedman said. A high-shrink application requires between 60-70 percent shrinkage, while low-shrink jobs require 10-20 percent shrinkage.

According to Dedman, water-based and UV-free radical inks are better suited for medium- to low-shrink jobs since they have a maximum shrinkage of between 50-60 percent. On the other hand, UV cationic and solvent-based inks shrink up to as much as 70-75 percent, making them suitable for high-shrink applications.

Adhesion: Ink-on-ink contact is not uncommon when dealing with

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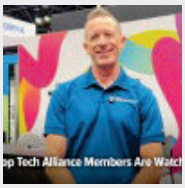

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printed shrink films in the pre-labeling or sleeving phase, said Brendan Maunsell, vice president and commercial director of Coates USA, a division of Sun Chemical. If an ink with poor adhesion is used and then stored for any amount of time with ink touching ink, problems can occur. A common problem that can occur when adhesion is not adequate is blocking or "picking off," when the ink transfers from one side of the pre-shrunk shrink sleeve to the other, said Mark Winheim, R&D project manager at Alcoa Flexible Packaging.

Often when ink won't adhere well to the substrate, a printer will increase the oven temperature, Winheim said. But since shrink substrates are extensible, heat-sensitive materials, he said, "You can't depend on adding heat for improving ink adhesion. Adhesion has to happen earlier on. The formulation that your supplier supplies has to work the first time."

The best options for high-adhesion inks, depending on the print job, are solvent-based and UV cationic inks. According to Dedman, "Water-based and UV free radical inks struggle with adhesion due to limitations in their chemistries. That's something we are constantly trying to improve."

Retained solvents: Frito-Lay is a dominant player in the expansion of shrink use in packaging. However, companies that print for the national brand have to meet its retained-solvent specification, Maunsell said. While turning up the dryer heat would solve the problem by evaporating the solvents faster, the heat would also prematurely shrink the film. "You can't add a lot of heat to the product on press with shrink films," Maunsell said. "But if you don't add any heat, the product won't dry. You need to have a balance of printing conditions and drying conditions to meet certain companies' standards, such as Frito-Lay, and that can be challenging."

Tested and approved

Before a printer even asks for an ink to use with a certain shrink film, chances are the ink vendor has already checked the ink's compatibility with that substrate. "We work very closely with film suppliers. With the changes, the fluidity of the film market, we need to confirm compatibility and check the ink's adhesion and block reaction," Renzi said.

Alcoa, whose R&D group evaluates various shrink film inks, tests all of its inks in a pilot plant before they go to the printing operation. In the test runs, inks are printed on a 14″-wide web, run through a four-color gravure press where Winheim checks for adhesion, water resistance, blocking, COF, and retained solvents, among others. Then, one week later, he rechecks those properties. "Before our printing operation runs its first yard, an intense development program has been done to scale up the new product," he said.

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No matter what ink is selling the best, or how often ink vendors test their products' compatibility with shrink substrates, one thing's for sure: The demand for shrink inks is rising across the board, and it's only going to continue to grow in the next few years. Dedman said, "Right now, shrink inks are a fairly small percentage of our sales, but we expect it to grow about 15-25 percent in the next year or two. We're seeing more and more of it coming on all the time."

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