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Technology Report

Making Next-Generation Displays

A unique extrusion coating technology is making flexible active-matrix display technology accessible for appliance and consumer electronics engineers.

The idea of “electronic paper” displays is an emerging concept, but one company has created a manufacturing technology that is bringing this concept to reality. Austin, TX, U.S.–based NexTechFAS (www.mercomcapital.com) has developed coating equipment and processes that are helping companies produce flexible active-matrix displays, enabling what many are calling “the era of digital reading.”

“Our equipment was initially developed primarily for use with the glass panels common to the flat-panel display (FPD) industry, and we have discovered that certain adaptations are necessary to coat the thin plastic substrates common to flexible displays,” explains Scott Snodgrass, vice president of engineering. While the specifics of those adaptations remain proprietary, Snodgrass says they are related to the control of electrostatic discharge and automated substrate handling.

The company’s equipment is based on its patented FASCoat extrusion technology, which is said to only dispense the exact fluid amount needed to cover the desired coating area and, as a result, eliminates waste. “In addition to generating highly uniform thin-film coatings in a single operation, the FASCoat method allows for well-defined coating edges and eliminates the need for the edge-bead removal process required by other techniques,” Snodgrass says. “It has also been demonstrated to produce excellent coverage over substrates with varying surface topography.”

Working in partnership with both materials and equipment developers, NexTechFAS claims to be the only U.S. company to offer integrated coating solutions, which include fully automated work cells, for the manufacture of flexible displays. One partner is UK display maker Plastic Logic, which is using the technology to produce active-matrix backplanes on plastic substrates combined with an electronic-paper front-plane material. The thin plastic displays will be made for commercial portable electronic reader devices. The devices can have flexible screens the size of a piece of paper, or can have up to three times the area of the 6-in. electronic devices on the market already, while remaining virtually weightless.

As more display companies venture into this emerging area, Snodgrass believes the possibilities for industry are endless. “The introduction of flexible active-matrix displays will be a technological milestone in the advancement of the appliance and consumer electronics industries,” he says. “The key to this is in the nature of the displays themselves—flexibility. Engineers and designers will be far less restricted in their ability to seamlessly integrate such displays into their products, and the spectrum of products that incorporate such displays will broaden significantly as a result.”

While some appliance companies may want to consider leading the charge in flexible-display production, it might be best to leave it to pioneers like Plastic Logic, which is reportedly building the first facility in the world dedicated to the development of backplanes for these flexible displays. “Cost of manufacturing will be one of the primary determinants in an appliance OEM’s decision to bring such manufacturing in-house,” Snodgrass says. “This cost will be largely influenced by coating technology.”

According to Snodgrass, the manufacturing of flexible active-matrix displays is nearing the end of the developmental growth phase, and a variety of manufacturing techniques have been tested by a number of companies. “Extrusion coating has established itself as a highly cost-effective, production-ready process,” he says. “This means that current display manufacturers will be able to introduce flexible displays to the market at a competitive price. As the technology advances and the market expands, display prices may drop to the point that appliance OEMs prefer to simply purchase flexible displays from dedicated display manufacturers rather than manufacture the devices themselves.”

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