



EDI

Advances

News and Concepts from Your Global Partner in Extrusion, Coextrusion & Converting

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We cordially invite you to visit EDI during the show. It will be an opportunity to meet our executive, sales, and engineering staff from around the world and discover our latest technologies. Besides innovations, our exhibit will also feature established systems that customers have come to rely on. Here is a look at what will be on display:

Adjustable Ultraflow® V feedblock.

Being shown for the first time in China, this system eliminates the need for interchangeable flow inserts.

EPC™ extrusion coating die for reduced downtime. Also brand-new at Chinaplas, this die simplifies changes in product width and eliminates much of the deckle disassembly involved in cleaning and maintenance.

Compact 'layer multiplier' for microlayer structures. This system, available to purchasers without licensing or royalties, promises to extend the shelf life of retort, hot fill, and flexible food packaging, while increasing formability in thermoforming.

Contour™ cast film die. Its unique design reduces the downtime for lip adjustment required with each new product run, enhances gauge profiles, and yields a uniform layer structure in coextrusion. The die will be shown with a 5-layer Ultraflow® I-L feedblock.

Bi-axially-oriented triple-manifold coextrusion die. On display will be an 810-mm Autoflex® VI-R short-stroke die system with distribution block.

Sheet die with restrictor bar. This 1,220-mm die will be shown with a three-layer coextrusion feedblock.

Specialized die subsystems. On display will be models of the UltraLip™ scraper for quick removal of buildup from die lips, the FastGap™ single-point adjustment system for changing thickness settings, and the Fast Deckle™ for rapid width adjustment. ♦

Under New Ownership, EDI Enters Its 5th Decade Poised for Rapid Growth

This year EDI celebrates its 40th anniversary by inaugurating a new era of progress. The private equity firm Bertram Capital has purchased EDI and launched a program to expand this already thriving company by investing in new engineering, manufacturing, and customer-support capabilities. As part of the program, EDI will develop more new die systems, expand production and service outside the U.S., and diversify its product offerings through acquisitions.

The commitment by Bertram Capital reflects its core strategy, which is to help profitable companies realize their full potential, increasing their value for equity holders, employees, and

customers, according to Gary Edwards, the new CEO of EDI (see p. 3).

"EDI has a strong, world-class brand and is recognized as the industry's quality leader," Edwards says. "Through its design capabilities, manufacturing expertise, and long-standing customer relationships, the company is positioned for further growth, which Bertram intends to help EDI realize."

John A. Ulcej continues in his role as EDI's president, heading a management team that in recent years has led the company in achieving the highest growth rates in its 40-year history. The company's employees in the U.S., Europe, and Asia will stay in place. *Continued on P. 2.*



CUSTOMER-DRIVEN PRODUCT INNOVATION. The sheet and extrusion coating labs shown here are part of EDI's recently expanded Technology Center, representing a capability unique among die manufacturers. The fully equipped process and analytical laboratories enable the company to conduct research and do cooperative development work with customers.

Continued from P. 1. "The acquisition by Bertram follows a seven-year period in which EDI expanded at home and overseas, developed successful innovations such as our Contour Die, acquired two businesses, and experienced growth in annual sales of more than 125%," says Ulcej. "EDI is now stronger than ever in its 40-year history."

Building on 40 Years of Progress at EDI

EDI started business in 1971 with a staff of four in a small town in the U.S. Midwest. Today EDI's world headquarters remains in the same town, Chippewa Falls, Wisconsin, and the focus of its business continues to be flat die systems. What was once a small machine shop, however, is now a global company with 240 employees, a worldwide sales network, subsidiaries in Germany and China, and a position of leadership in technology, quality, and customer support.



EDI'S HOME FOR 40 YEARS remains the small town of Chippewa Falls, Wisconsin. The company's headquarters facility there is visible at lower center in the photo, against a landscape typical of the U.S. heartland in the Midwest. Other U.S. operations of EDI are located elsewhere in Chippewa Falls. In addition to established production and service facilities in China and Germany, EDI will invest in additional capabilities elsewhere in the world.

This is the foundation on which further investment by EDI will build. One key element in its program to accelerate EDI's growth will be customer-driven product innovation, says Gary D. Oliver, vice president of technology. "Our recently expanded Technology Center in Chippewa Falls, will play a critical role in driving product development," Oliver notes. "The Center represents a substantial investment and has no counterpart among competing die manufacturers."

Housed in a dedicated facility separate from EDI's office and manufacturing complex, the Technology Center contains fully equipped process and analytical laboratories where the company conducts research and does cooperative development work with customers.

Another element in EDI's new growth strategy will be acquisitions that build on EDI's core competency. "The die is the very heart of the production line for sheet, film, or coating," says Gary Edwards. "Acquisitions that EDI is now investigating would be natural extensions of our central

role in the extrusion and converting processes, enabling us to offer additional products that complement our die systems."

Adding New Resources to Serve Customers

Paralleling these growth initiatives will be a series of operational enhancements designed for increasing EDI's production capacity through expansion of facilities and application of lean manufacturing techniques.

Spurred on by rapid sales growth even before the appointment of Gary Edwards as CEO, EDI had already made important additions of skilled workers and production equipment, and this expansion has continued in the year 2011. All told, in the past twelve months the company has hired 24 additional people, including CNC machinists, grinders, polishers, assemblers, and other staff. At the same time it has upgraded its design and manufacturing software, made improvements to machining centers, and purchased new milling machines.

Another way that EDI will increase its resources is through expansion of EDI's overseas capabilities for manufacturing, sales, and technical support. "We will carry on in our evolution as a global supplier by investing in China, Europe, South America, and elsewhere as economies develop," says Gary Edwards. "The global plastics market will continue to expand, and two of the big drivers in this growth will be China and India. We are particularly interested in the potential in the food packaging sector, where the demand for ever more sophisticated packaging will increase."

Expansion by EDI is already under way in China. Besides providing rework services, EDI Precision Dies (Shanghai) Co., Ltd. now manufactures certain types of new dies. "Over the next eighteen months, we will significantly increase our staff and production capacity in Shanghai," says Scott G. Smith, global aftermarket manager. "This will enable us to expand our product offerings, as well as increasing our capability for technical service and customer support after the sale."

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New Era of Opportunity for EDI's Customers

With so many advances being planned or already under way, EDI has begun a transformation on a scale unmatched since the company's founding. What does this mean for extrusion processors and web converters who employ flat die technology? Robert Deitrick, EDI's director of sales for the Americas, foresees new opportunities for customers, along with the continuation of values that have made the EDI brand respected around the world.

"Even as EDI increases investment in developing new die technologies, we will still be guided by the needs and wishes of our customers," Deitrick says. "At the same time, we will increase our capability to serve these customers as a single source for multiple products used in flat die extrusion and coating, providing a systems approach to equipping production lines."

The qualities that have distinguished EDI as a supplier of die systems, notes Deitrick, are technological depth, stringent quality standards, and support for customers long after the sale. "These values will continue to be the bedrock on which EDI is based," he says. "With the expanded capability made possible by new investment, we look forward to making them available to new customers as well." ◆

New CEO Gary Edwards Directs Strategy for EDI's Expansion



Gary Edwards

An experienced chief executive specializing in the strategic development of global industrial companies, Gary Edwards has become CEO of EDI following the company's acquisition by Bertram Capital at the close of 2010.

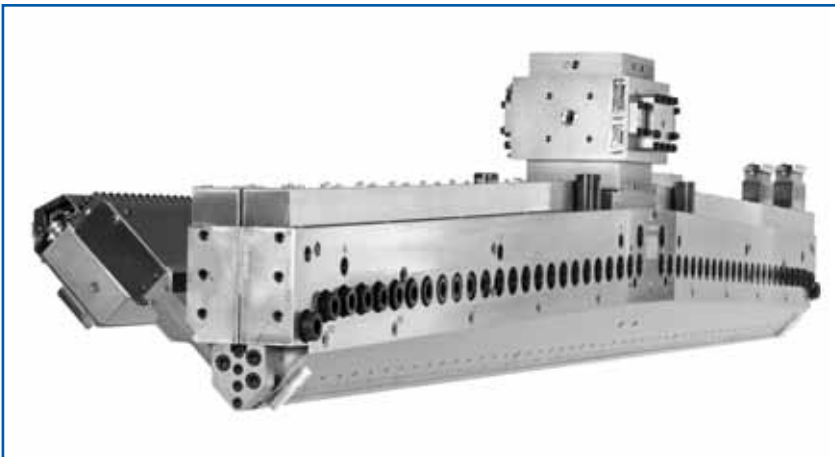
Edwards will lead EDI in a program of growth through investment in innovative technology, acquisitions, and new resources for serving customers (see article on p. 1).

"Gary has extensive experience helping companies that are already profitable to realize their full potential," says Kevin Yamashita, a Bertram Capital partner. "He has special expertise in carrying out strategies for lean manufacturing, successfully integrating acquired businesses, and implementing organic growth initiatives that build

on the company's core competencies."

Before joining EDI, Gary Edwards was CEO of Tyden Group, Inc., a manufacturer of specialized security, identification, traceability, and security products, with plants in North America, Europe, and Asia. Previously he had spent 16 years with Phillips and Temro Industries, a producer of diesel engine and exhaust components. After rising to the position of president and CEO of Phillips and Temro, he doubled revenues through acquisition and market expansion, including the establishment of a manufacturing and distribution presence in China.

Edwards holds an MBA from the University of Manitoba and a BS in engineering from the University of Regina in Saskatchewan.



GROUNDBREAKING INVENTIONS. EDI plans to build on its long history of innovation by investing in new R&D. Shown here are two patented breakthroughs by EDI from the recent past. The unique shape of the Contour Die™ (above) reduces downtime for lip adjustment and enhances product uniformity. The brand-new Ultraflow® V feedblock (right) can operate in self-adjusting mode or be manually adjusted, in both cases without stopping production.

'Active Microlayer' Promises Big Increase in Shelf Life for Barrier Packaging

Researchers at EDI's Technology Center in Chippewa Falls, WI have taken one step further in applying the layer multiplier technology (LMT) previously perfected by the company. Their initial findings promise dramatic increases in the shelf life of retort and hot-fill containers, stand-up pouches, and vacuum skin packaging.

"We asked ourselves why the same technique that transforms a core layer of barrier resin into numerous microlayers cannot be used on other critical layer materials as well," says Gary D. Oliver, vice president of technology. "After demonstrating that LMT dramatically enhances the effect of barrier resin, we set out to

investigate the possible benefits of multiplying layers containing active components such as oxygen scavengers and desiccants."

The result of this work, Oliver says, is a patent-pending technique that adds a new dimension of oxygen and moisture control to food packaging, likely extending barrier properties beyond the limits of standard test procedures. Called "active microlayer" technology, the new technique combines the concepts of active packaging and layer multiplication, yielding film and sheet structures that include microlayers whose active materials absorb oxygen before it even reaches the barrier layer, or absorb moisture before it gets a

chance to degrade barrier material such as ethylene-vinyl alcohol (EVOH).

Essentially, LMT involves using special tooling to divide and recombine one or more layers in a coextruded structure, transforming each layer into many thinner microlayers. In active microlayer techniques, the LMT tooling multiplies not only a barrier-resin core but also other layers containing the active components.

"The combined protection of food contents by multiple—even dozens—of barrier and active layers appears to be greater than standard tests for oxygen and moisture ingress are designed to measure," according to Oliver. "We have already produced samples for a new

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Global Report

CONVERTERS ADOPT DOWNTIME-REDUCING EXTRUSION COATING DIE.

The first installation of EDI's new-generation EPC™ die is under way at one customer plant, and nine more units of the system are due to be shipped by the end of July, notes Robert Deitrick, director of sales for the Americas. The new system provides even greater productivity by **simplifying changes in product width** and eliminating much of the disassembly involved in maintenance. As in the past, the EPC die has a deckle system that can be adjusted to minimize edge bead. What is innovative is an enhancement that increases the ease and repeatability of width adjustments, simplifies clean-out of carbonized polymer buildup in the die, and makes

possible rapid removal of the entire deckle assembly for a 'split and clean'.

SAM G. IULIANO IS NOW DIRECTOR OF TECHNICAL SALES. The promotion makes Iuliano responsible for providing **technical support** to customers, supporting EDI's field sales programs. "Sam has worked with EDI customers around the world and has extensive experience with all of the extrusion and coating technologies that we have developed," says EDI president John A. Ulcej. Sam Iuliano joined EDI in 1992 as a sales engineer. His increasingly advancing positions at EDI include manager of sales administration and product manager. He was promoted to technology manager in 2008.



Sam G. Iuliano

COMPLETELY REDESIGNED EDI WEBSITE IS ONLINE. Colorful, clear, and user-friendly, the new site at www.extrusiondies.com gives immediate access to information on every type of EDI die, feedblock, coating system, and auxiliary equipment, plus information on multiple EDI process laboratories available for use by customers. "Registered users can log in to view troubleshooting manuals, videos, and technical documents," notes Kelly Harings-Mrozinski, who is in charge of marketing for EDI. "We invite site visitors to submit information for obtaining a quote on a prospective die system or to contact any of our offices and agents worldwide for a free technical consultation to increase production line efficiency." Readily available media posted on the website include product brochures, press releases, and issues of the EDI Advances newsletter.

Continued from P. 4. battery of tests at our Technology Center and have sent the results to be confirmed by an outside laboratory.”

How the ‘Active Microlayer’ Technique Works

Layer multiplication technology (LMT) yields film or sheet that it is no thicker and contains no more polymer than a conventional coextrusion yet can have many, dozens of, or even a hundred or more microlayers, instead of the usual three to eleven layers of standard thickness. In conventional coextrusion, a feedblock combines different polymers from two or more extruders into a multilayer sandwich. In LMT, a special tool takes the sandwich from a feedblock and divides and recombines the layers, creating multiples of the original multilayer structure.

Here is how a typical active microlayer structure could be produced in the form of polypropylene (PP) sheet of 1.25 mm thickness:

Four extruders produce melt streams of, respectively, 1) the PP outer material, or skin; 2) the same PP skin material, but incorporating an active component such as an oxygen scavenger; 3) an adhesive or “tie” layer material; and 4) a barrier polymer such as EVOH.

Feedblock No. 1 receives the active component-containing skin material, along with the tie and barrier materials, and forms a five-layer sandwich: active

component / tie / barrier / tie / active component. This sandwich will evolve into the inner core of the finished sheet.

Layer multiplier. This special tool built by EDI receives the five-layer sandwich from Feedblock No. 1 and divides and recombines it to form multiple repetitions of the structure—for example, four repetitions, resulting in a 20-layer structure consisting of micro-layers.

Feedblock No. 2 receives the 20-microlayer structure and the melt stream of PP outer material, diverting the PP into two skin layers over the microlayer core.

Extrusion die. In the manifold of the die, the sandwich from Feedblock No. 2 is transformed into sheet of target width.

EDI Builds on Its Success with Barrier Microlayers

Previous work on LMT by EDI has shown that by transforming a single layer of a barrier resin such as EVOH into several microlayers, it is possible to:

Prolong shelf life. Layer multiplication reduces oxygen transmission rate (OTR) by 60 to 80% and substantially reduces total oxygen ingress over an extended period.

Enhance formability. While EVOH is a crystalline, relatively brittle material, replacing a single thick layer with multiple microlayers *Continued on P. 6.*



LAYERS OF FUNCTIONAL MATERIALS ARE MULTIPLIED. Shown here is microlayer structure before outer or skin layers are added. Brown areas at top and bottom represent metal of flow channels. Blue, yellow, and orange microlayers represent, respectively, material with active component such as oxygen scavenger; adhesive; and barrier polymer.

EDI Will Be There...

Multilayer Packaging Films USA
(Jun. 21-22, Newark, NJ, USA):
EDI tabletop exhibit.

BOPP Film (Jun. 28-30, Vienna):
EDI tabletop exhibit.

Koplas
(Sep. 28-Oct. 1, Gyeonggi-do, Korea):
EDI to exhibit with agent Daejoo Ind. Co.

Plastimagen (Oct. 4-7, Mexico City):
EDI to exhibit with agent ABC Plasticos.

Multilayer Packaging Films Europe (Oct. 25-27, Cologne, Germany):
EDI tabletop exhibit.

IPF International Plastics Fair
(Oct. 25-29, Tokyo): EDI to exhibit with agent Kodama.Chemical Industry Co.

Stretch & Shrink Film
(Oct. 11-12, Atlanta): EDI tabletop exhibit.

Agricultural Film
(Nov. 7-9, Barcelona): EDI tabletop exhibit.

ICE Europe (Nov. 8-11, Munich):
EDI will exhibit.

SPE EUROTEC (Nov. 14-15, Barcelona):
EDI to make presentation on the EPC die.

Equiplast (Nov. 14-18, Barcelona):
EDI to exhibit with agent Mircan 1979.

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Facebook: www.facebook.com/EDIGlobal
Twitter: www.twitter.com/EDIGlobal

Continued from P. 5. increases formability or flexibility, enhancing operations like thermoforming, shrink-wrapping, and gusseting. This may be most beneficial in the case of deep-draw containers where corner-thinning has been a problem with less formable materials.

One series of tests involving selective multiplication of the EVOH core layer focused on sheet used for thermoforming single-portion retort cups, such as those for packaging fruit cocktail and diced peaches. EDI extruded the sheet and used a

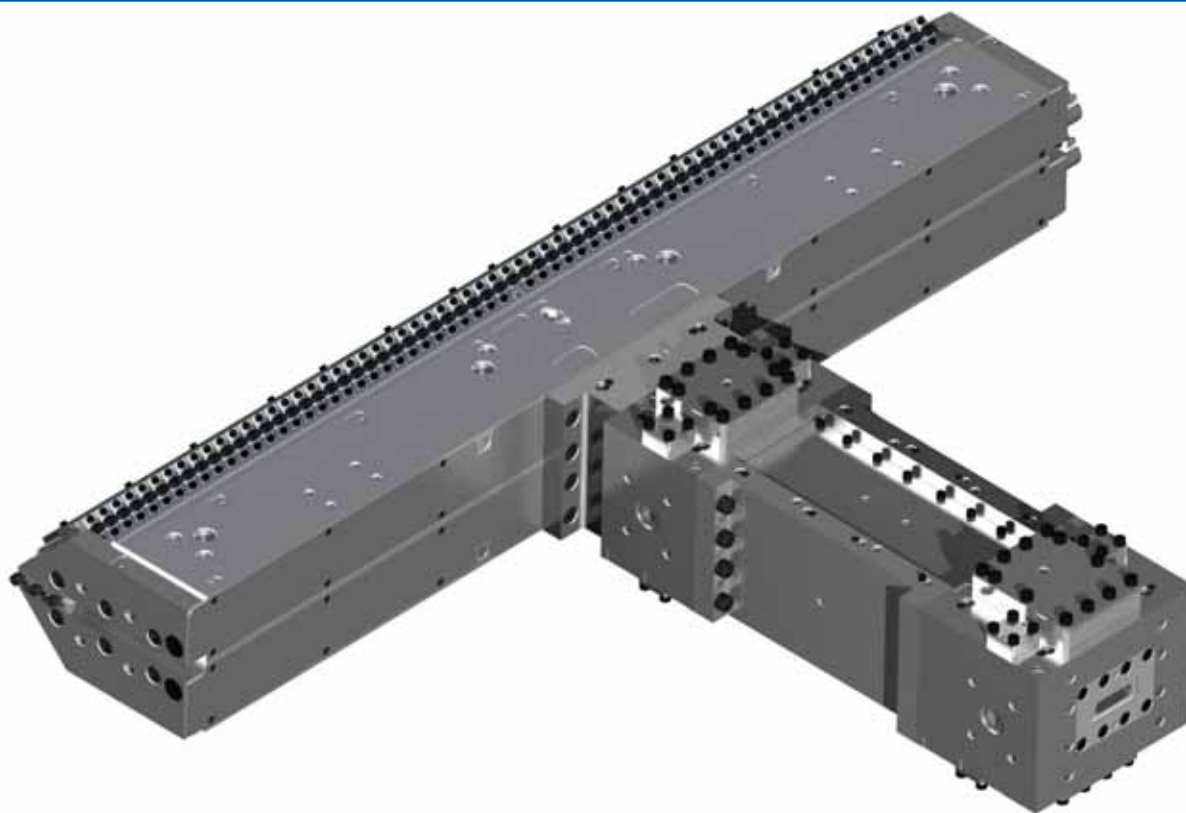
commercial cup mold to solid-phase pressure form sheet with one, four, eight, and sixteen EVOH layers.

All sheet structures were 50 mils in thickness, with thick (41 to 43%) skin layers of polypropylene and tie layers between the skins and the EVOH core. Barrier resins included a standard general-purpose EVOH and a "retort" grade of EVOH.

Thirty days after retort, cups made from sheet in which the "retort" grade of EVOH had been multiplied into

microlayers exhibited three to six times the barrier of cups with a single EVOH layer, and their total oxygen ingress was three to six times less than for the single-layer cups.

"We look forward to working with customers to identify which packaging applications will benefit most from active microlayer techniques," says Gary Oliver. "Even at this early stage, we feel confident that this new technology will significantly extend the shelf life of food contents." ♦



DIE SYSTEM FOR ACTIVE MICROLAYER SHEET starts with Feedblock No. 1 (lower right), which form a multilayer sandwich of barrier, adhesive, and active-component materials from three extruders. The sandwich, which will ultimately form the core of the finished sheet, is received by a "layer multiplier" tool (shown between Feedblocks No. 1 and No. 2) that carries out multiple repetitions of the layer structure. The resulting microlayer core next enters Feedblock No. 2, which combines it with two outer or skin layers of material from a fourth extruder. This final structure is then transformed by a die (shown with exit lips facing upper left) into sheet of target width.

INSTANT ACCESS TO EDI www.extrusiondies.com

For more information, readers of EDI ADVANCES are invited to visit our web site at the address above. We also welcome your e-mail, which you can post from the web site or by keying in our sales@extrusiondies.com address. The web site is your resource for information on:

- EDI dies, feedblocks, decking systems, vacuum boxes, die carts, and related equipment.
- Sales, technical service, customer service, spare parts, and other departments.

- Agents in our worldwide sales & service network.
- Remanufacturing facilities in the U.S.A., Germany, and Japan.
- Visiting EDI headquarters.

Extrusion Dies Industries, LLC is a leading international supplier of flat dies for sheet and film, coating, and pelletizing. We draw on extensive engineering capabilities to design systems that are highly tailored to specific customer needs. Headquartered in Chippewa Falls, Wisconsin, U.S.A., we sell our dies to customers throughout the world.

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