

***Beaumont Technologies Gets
Dunlop to "Flip" Over Mold
Optimization Technology!***

**Pro Golfer John Daly a Winner
with New Line of Golf Balls**

DUNLOP "FLIPS" TO MOLD WORLD CLASS GOLF BALLS

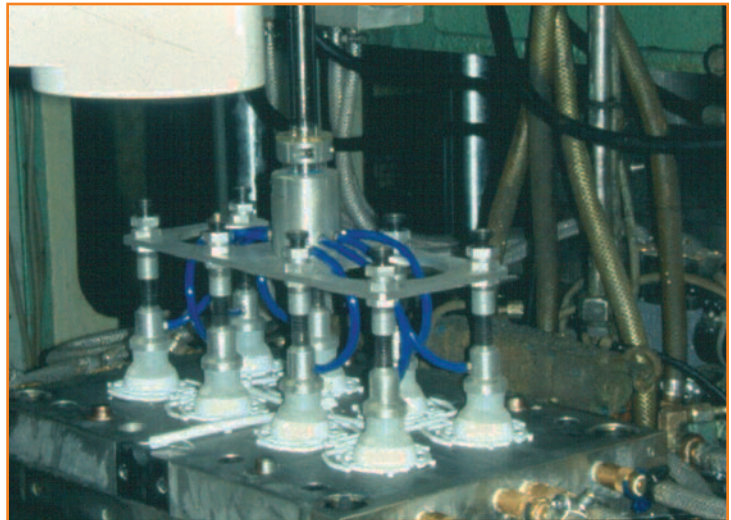
Breakthrough Mold Optimization Technology Contributes to Molding "The Perfect Ball"

Admittedly, minor processing/molding flaws, scrap and waste generated during manufacturing and delays caused by switching products being produced on the same lines don't directly impact a round of golf. But, they are as important as going under par on the last hole of a pro tournament for leading golf ball manufacturer Dunlop Sports Manufacturing (DSM), of Westminster, SC. However, because of a relationship between Dunlop and Beaumont Technologies, Inc., an Erie, PA based firm, these concerns were laid to rest. Why? Economical mold optimization tools that assisted Dunlop to surmount technical challenges on the production floor, resulting in a manufacturing "hole in one".

The Dunlop Story

A long-time player in the golf ball market, Dunlop began producing balls in 1910. The company has made significant technological hurdles over the next century. The Dunlop moniker graced such unforgettable matches as Sir Henry Cotton's record-breaking game in 1934, commemorating the achievement with the Dunlop 65 ball, which became the "ball of choice" for serious golfers. Other top name golf balls over the years – Maxfli, Slazenger, and Taylor Made among others – have been developed and manufactured by Dunlop, including such innovations as the 360 dimpled ball (vs. the conventional 336). Recently, Pro Golfer John Daly won the Buick Invitational with the latest product innovation from Dunlop, the Loco line of golf balls, showing the world that while the brand may occasionally fade from the scene, Dunlop is indeed at the forefront of golf ball technology. Dunlop also strives to win-both on the course, and with next generation of product quality, production technology, and waste reduction in the company's manufacturing processes.

At the newly named Dunlop® Sports, the firm produces 30,000 dozen golf balls per day, on multiple manufacturing lines with several product changeovers per week. Achieving this demanding production schedule while having smooth production changes and without wasting time, material, and machine time, was a driving reason for Dunlop to familiarize themselves with the latest mold optimization products.



The "Drive" is Strong

Company officials report that while most golf ball manufacturers face production challenges noted above, specifically the elimination of visible molding flaws, such standards are totally unacceptable at Dunlop. Competitors making their own brands of golf balls must either tolerate these situations, or they are forced to contend with vast amount of scrap. However, Dunlop's drive to run a lean and high quality product output required them to find efficiencies in their manufacturing process.

"The desire to make a strong comeback in world golf circles and keep quality, productivity and profitability at the highest Six Sigma standards," says Joel Nelson, Process Engineer and newly promoted Junior

Business Unit Manager at Dunlop, "has seen us buy into new and proven licensed process technology."

Nelson goes on to explain that he joined Dunlop in 2001 as part of a new House Rejuvenation and Six Sigma Quality Program where the new standards were and continue to be safety, quality, customer service, production, people, organization and innovation".

A major goal, he recalls, "Was to improve the production quality, thus reducing scrap and waste." Ironically, Nelson continues, "The solution came in the form of education and insight I had received as a student at Penn State University at the Erie/Behrend campus, under Professor John Beaumont. Specifically I'm referring to a melt flow enhancing process called MeltFlipper® melt rotation technologies from Beaumont Technologies, Inc., headquartered in Erie, PA."

In the manufacture of golf balls, consistent polymer flow (in this case, DuPont's Surlyn ionomer-class thermoplastic resins) into the molds is paramount. It is this property that molds dimensionally stable—perfectly balanced golf balls, and eliminates unsightly mold blemishes from the final product. Dunlop also has the added challenge of constantly changing lines (4 to 5 times per week on average) to accommodate a variety of products, so even melt

flow is tested to the limit.

The exacting production standards at Dunlop call for close scrutiny of SEW – Speed, Efficiency and Waste – every day during company meetings, and the MeltFlipper melt rotation technology is integral to achieving this goal at Dunlop.

When surface imperfections or unbalanced mandrels are made,

runs are wasted and significant amounts of scrap are generated. Further, acknowledges Dunlop's Nelson, "These are issues during

changeover with mold balance and startup. But once we licensed the MeltFlipper technology used on our Nissei and Newbury 150 ton presses, we don't have to check or open gates to eliminate flow marks on the outside mantle of the balls. Now all flow fronts come to one point and we achieve a well balanced flow in our multicavity molds".



The Right "Club" for the Perfect Drive

Developed by Beaumont Technologies Incorporated, MeltFlipper is an economical alternative to costly new capital expenditures. The Product features a proprietary licensed technology that allows processors to optimize their new or existing molds and manufacturing processes. This processing "tool" provides a mold imbalance solution by rotating the melt, thereby strategically repositioning the various melt regions to ensure balanced filling between cavities. Thus, during production startup, molders like Dunlop can balance mold pressure, temperature, viscosity and material properties in the entire mold. This represents a holistic approach to the process, rather than piecemeal solutions sought by steel balancing or temperature manipulation of hot runner drops.

When Dunlop uses MeltFlipper technology, each cavity gets an equal share of high and low viscosity melt, and the repositioning requires a turning, or "flipping" of the melt flow.

As a result, Dunlop realized faster cycle times, and better fill balancing that produced higher quality golf balls. This was and is accomplished while eliminating typical processing problems such as short shots, dimensional variations, mold marks and core shifts, to name a few. The process yields higher mold efficiencies for lower part prices, and faster



mold commissioning times. With the success of sponsored athlete John Daly, Dunlop is showing the world that their new ball technologies are a winning formula, and likewise that the company is positioned to once again be a leader in the global golf ball market.

Addendum

Beaumont Technologies, Inc., (BTI) headquartered in Erie, PA, offers a unique mix of products designed to optimize the efficiencies of the mold and the injection molding process. These products and services are part and process enhancing tools that help the injection molding industry become more competitive and profitable in world markets. The company's expertise lies within an in-depth understanding of polymer flow and processing technologies which enable molders and moldmakers to decrease lead-times while maintaining a high quality level of process and part control. Products include the patented MeltFlipper® melt rotation technology guaranteed to balance filling in hot and cold runner applications, the 5 Step Process™ mold commissioning software,

CAE by BTI™ flow analysis services and specialized on-site training.

Conclusion / Company Contact Information

For more information on melt rotation technology licenses, sold under the trade name of MeltFlipper, or any of BTI's other products and services, contact: Marketing Department, Beaumont Technologies, Inc. 2103 East 33rd Street, Erie, PA 16510-2529. Tel:814-899-6390. Fax:814-899-7117. E-mail: meltflipper@beaumontinc.com Web Site: www.beaumontinc.com.

MeltFlipper, 5-Step Process and CAE by BTI are either trademarked or are registered trademarks of Beaumont Technologies, Inc.

Profits/Business/Your Competitive Edge Slipping Away?

Is it because:

1. You aren't maximizing your molding capabilities?
2. Scrap and waste are cutting into your profits?
3. Startup is too slow, with mold debugging dragging you down?

Maybe it's time to get back to the basics.... using BTI's Technologies and Training Seminars

- A series of on site-training courses to help your staff understand how to improve the molding process, commission molds faster and know what goes on inside the mold.
- Proven technologies that are guaranteed to help you go from art to part more quickly, and mold higher quality parts at the same time.

BTI...Industry's Source for Mold and Process Optimization Technologies and Training



Beaumont Technologies, Inc.

2103 East 33rd Street • Erie, PA 16510-2529

Tel: (814) 899-6390 • Fax: (814) 899-7117

E-mail: meltflipper@beaumontinc.com

Web Site: www.beaumontinc.com