IMARC™ - Adjustable Inserts
SRC™ - Static Inserts
MeltFlipper® - Design Services
Opti-Flo® - Hot Runner Systems
Dear Valued Customer,

Since our establishment in 1998, Beaumont Technologies, Inc. has dedicated its business to the advancement of the plastics industry and encouraged an environment of innovation driven by customer needs. In fact, our original Melt-Flipper® melt-rotation technology was invented while consulting on a project to solve manufacturing and part quality issues related to uneven mold filling. The resultant technology was the beginning of a revolutionary method of improving the molding process and enhancing product quality. For the first time, higher cavitation molds were providing the same degree of quality previously found only in low cavitation molds.

Our engineering and R&D teams have an unparalleled passion for success and the ability to think outside the box. This passion, along with an in-depth knowledge of polymer flow and its effect on the molded part, have allowed us to quickly expand on the original capabilities of melt-rotation technologies. In the year 2000, the need to further control rheological properties with the cavity led to the development of MeltFlipper® MAX™. This breakthrough was initially developed for stack molds but we quickly found numerous other advantages, including: the ability to change filling patterns; enhance part cosmetics; reduce and control warp; and improve a host of other filling and part quality characteristics. In particular, this new technology opened up markets for molds with fewer than eight cavities, and yes, including single cavity molds.

By 2003, the hot runner industry recognized the value of our technologies. As a result, the first manifolds with Rheological Control technologies were designed, manufactured, and tested by BTI and Incoe and the Opti-Flo® line of hot runner systems were born. The Opti-Flo® hot runners have proven valuable in direct gated systems and hot-to-cold applications, and within manifolds containing as few as two drops.

We are proud to continue our expansion of melt-rotation technologies into a complete line of Rheological Control Systems. RCS’s have been classified into four main categories: iMARC™ adjustable rheological control inserts, SRC™ static rheological control inserts, MeltFlipper® license & design consulting services, and Opti-Flo® hot runner systems.

Each RCS™ category can provide either Single-Axis or Multi-Axis control based on the requirements for a given application. Ultimately, RCS’s provide the ability to optimize material properties and flow to and within each cavity of a mold by controlling the viscosity variations that naturally develop as the material flows through the melt delivery system. By harnessing the power of the plastic’s rheology, our customers are able to significantly reduce processing and part quality variations while reducing cycle times and improving efficiencies.

We appreciate your interest in BTI, and look forward to being your single-source supplier for cold and hot runner Rheological Control Systems.

Sincerely,

John P. Beaumont, President
Beaumont Technologies, Inc.
WHAT ARE SHEAR-INDUCED IMBALANCES?

As material flows through a melt delivery system, the laminates nearest the flow channel experience the highest shear rate relative to the other laminates. This shear causes a localized increase in shear thinning and shear heating, both of which reduce the viscosity and affect the overall rheology of the material in these laminates.

As the material continues to flow through the runner system, the high sheared material will bias the filling within a cavity and to various groups of cavities.

In a single cavity mold, the resultant placement of these laminates can lead to molding problems such as back-filling, gas traps, cosmetic blemishes, weld line location and strength issues, dimensional instability, and warp.

In a multi-cavity mold, these problems are compounded as the laminates are distributed unevenly through the entire mold, thus creating multiple “Flow Groups”. This non-uniform material distribution will lead to variations in temperature and pressure to and within the cavities of the various Flow Groups. This results in common molding problems such as over-packing, short shots, flash, and an overall small process window.

ABOUT RHEOLOGICAL CONTROL

Beaumont Technologies’ patented Rheological Control Systems (RCS™) strategically reposition the high sheared laminates within the runner system and parts to resolve the many molding problems caused by shear imbalances. These systems provide users with the ability to optimize material conditions and flow to-and-within each cavity of a mold, regardless of whether it is a single cavity or multi-cavity mold. The result is an unprecedented level of cavity-to-cavity balance with the ability to alter and optimize filling patterns to meet a specific part quality goal.

The RCS™ solutions are available for most types of runner systems and materials, and are offered in a variety of options to fit your needs. Each RCS™ solution can provide either Single-Axis or Multi-Axis control for a given application.

SINGLE-AXIS CONTROL

Single-Axis systems provide symmetrical material properties about one axis. The Single-Axis solutions are primarily utilized for balancing material properties across the runner system and parts by rotating the high sheared material around the perimeter of the flow channel. The result is an intra-cavity and cavity-to-cavity balance of filling and process conditions within each cavity.

MULTI-AXIS CONTROL

Multi-Axis systems offer a higher level of intra-cavity flow control over Single-Axis solutions. Multi-Axis solutions strategically reorient the high sheared material throughout the cross-section of the runner system and part cavity. These systems are primarily utilized to optimize or enhance filling patterns, improve cosmetics, reduce core-shift, eliminate gas traps, and improve weld-line strength or position.
Our cold runner Rheological Control System solutions offer both Single-Axis and Multi-Axis control, and benefit both single and multi-cavity molds. These solutions are based on our patented MeltFlipper® technologies, which are the flagship product of our company. Global corporations have standardized on these solutions to improve mold filling, reduce cycle time, balance filling, widen process windows, and increase part quality.

RCS™ Mold Inserts are classified into the following categories: iMARC™ insert sets (adjustable rheological control), and SRC™ insert sets (static rheological control). Standard inserts are manufactured based on common runner sizes. Custom inserts may also be quoted to fit your specific mold design needs.

BTI also offers a MeltFlipper® Design & Consulting Service to provide custom design solutions for your specific application.

**IMARC™ INSERTS**

What injection molder wouldn’t like to balance a multi-cavity mold more quickly and precisely without having to take the mold out of the press? And who wouldn’t want to be able to change a cavity filling pattern without having to move or add gates or modify the part design?

These are not wishful dreams anymore. Using BTI’s iMARC™ mold inserts, molders now have dynamic control over plastic flow which allows the mold balance and cavity filling pattern to be optimized in real-time to meet a specific part quality goal... independent of whether it is a single cavity or a multi-cavity mold. This is extremely beneficial for compensating for various changes to the process, such as machine settings, material lot variations, and nozzle variations from machine to machine. iMARC™ insert sets are available as both Single-Axis and Multi-Axis solutions.

**SRC™ INSERTS**

SRC™ mold inserts provide static control over the melt flow to help balance mold filling and material properties while optimizing cavity fill patterns for both single and multi-cavity molds.

SRC™ inserts are are more compact than the adjustable iMARC™ systems, which allows SRC™ inserts to fit more easily into molds with tight runner spacing. SRC™ inserts may also be used in conjunction with iMARC inserts to provide a complete rheological control solution. SRC™ insert sets are available as both Single-Axis and Multi-Axis solutions.

**MELTFLIPPER® DESIGN SERVICES**

When the RCS™ mold inserts are not an option due to space limitations, various mold design features, or when specialty solutions are required, BTI also offers a MeltFlipper® Design and Consulting Service. The service provides custom static design solutions engineered for a specific project. BTI analyzes each application and provides the MeltFlipper® design details in 2D and 3D formats, which are then machined by our customers directly into their molds. Each design comes with a patent license and a 100% money back satisfaction guarantee!*

* Subject to terms and conditions of a license agreement
HOT RUNNER SOLUTIONS

The industry has asked for hot runner manifolds with MeltFlipper® inside and we have responded. BTI partnered with INCOE® Corporation to produce the industry’s next generation of hot runner manifolds designed to eliminate shear-induced filling imbalances experienced with traditional hot runner systems while avoiding invasive and restrictive mixers. The new line of hot runner systems are mechanically designed to work as a lasting solution without the need for adjustment or recalibration. Additional control systems are not required. Available in 2-drop systems up through complex multi-cavity stack molds, each hot runner system utilizes both Single-Axis and Multi-Axis solutions as needed.

OPTI-FLO® MANIFOLDS

Opti-Flo® manifolds are the first scientifically and rheologically designed hot runner manifolds designed to provide a more homogeneous material property distribution through the entire melt delivery system. This results in balanced filling to and within all cavities of the mold.

Opti-Flo® manifolds reduce the need for nozzle temperature variations typically used to balance filling, thereby improving cavity-to-cavity consistency and overall product quality with the ability to run faster cycle times! For hot-to-cold systems, Opti-Flo® manifolds may be used with BTI’s cold runner RCS™ solutions for a fully optimized melt delivery solution.

DF (DIRECT-FLO™) & QF (QUICK-FLO™) SYSTEMS

INCOE® provides two unique and market-specific nozzle designs: DF (Direct-Flo™) is designed to be used for the processing of engineering grade materials and QF (Quick-Flo™) for processing of commodity materials. Opti-Flo® manifolds are available on both DF and QF nozzle systems. QF systems are packaged in standard cavity layouts and are sold as complete injection halves. Whether your requirements are focused on the high demand output common in the closure markets, or the rigors of high dimensional stability found in the electrical connector business there is a hot runner rheological control solution offered by the Beaumont / INCOE partnership.

MORE THAN JUST A FILL BALANCE

It is easy to understand how controlling rheology can help reduce common processing headaches, but what if you are already “getting by” without it? What is the cost of not controlling rheology? The benefits of this technology extend beyond simple fill balance:

- Faster Cycle Times
- Improved Dimensional Stability
- Wider Process Window
- Scrap Reduction
- Faster Mold Qualification / Debug
- Higher Cpk’s

- Lower Mold Maintenance Costs
- Improved Cosmetics
- Consistent Mechanical Properties
- Higher Weld-line Strength
- Achieve 0 PPM
- No Blocked Cavities

Other Products & Services Offered by Beaumont Technologies:

- Systematic Mold Balance Analysis Software
- CAE Mold Filling Simulation
- Pro-Series Training Seminars
- Consulting & Troubleshooting
- Product Development