



# LIMITLESS<sub>P</sub>POTENTIAL

The Cascade Engineering Industrial Solutions Group is the complete resource for exploring the limitless potential of plastics engineering. From enclosures and seating, to kitchen, bath, and home care products, our team of experts has a proven track record of solving complex challenges. Drawing from our experience and history of innovation, we are capable of entering a project at any phase, from ideation to design to tooling to production. Cascade Engineering prides itself on being second to none when it comes to developing high-quality, innovative solutions and getting our customers' products to market faster than anyone. We accomplish this by understanding our customers' product vision, and by teaming with other plastics industry strategic partners to achieve a unique solution that adds value to the end user. Our overall capabilities and specializations include:

- APLS—Our exclusive six-stage development process
- Comprehensive engineering and design capability
- Finite element analysis
- Mold filling, cooling, and warp analysis (mold flow analysis)
- Material selection and analysis
- Medium to large part molding expertise (500 ton to 3,000 ton)
- Utilization of engineering grade resins, including nanocomposites
- Multiple color capability and formulation
- Cost-saving metal to plastic conversions and part consolidation
- In-mold labeling
- Gas assist, two-shot, and co-injection molding

In addition, we also provide secondary operations as an additional service to our customers. These include:

- Water jet cutting
- Trimming
- Adhesive bonding
- Spin welding
- Hot plate welding
- Vibration welding
- Robotic insertion
- Painting
- Pressure testing
- SPC analysis
- Sub-assembly and product complete manufacturing

## KVH

When KVH, a satellite TV antenna manufacturer, came to Cascade Engineering looking for our injection molded plastics expertise and manufacturing capabilities, our engineers knew they could come up with the solutions to all of their problems. The KVH enclosure required precision and durability, due to both its application and its complex plastic assembly. This enclosure is mounted to the roof rack of SUVs and minivans, for satellite reception. Working in conjunction with KVH and its design firm, Cascade Engineering was able to quickly manufacture a four-component complex enclosure that met their specific needs.

We produced fully functional preproduction prototypes in six weeks and produced full-production components in less than six months.

Our engineers employed an innovative use of plastics processing and materials to come up with a product that met requirements for cost, durability, ease of assembly, and most important, an aggressive timeline.

- Lightweight cosmetic Class A surface
- .300" wall thickness domed cover
- Painted and textured finishes
- Precision tolerances
- 30" x 30" structural base with multiple inserts
- 1,500-ton molding
- Engineering grade resin
- Mold flow analysis



## SOLOCO BRAVO™ MAT

It's not every day that you get the chance to work on a project that stretches from Iowa to the Middle East, and utilizes all core competencies from molding to manufacturing through distribution. The Soloco BRAVO™ Mat project did just that, and is a perfect example of the collaborative relationship Cascade Engineering can create with commercial clients. The Soloco BRAVO Mat is a large, structural, versatile temporary surface ideal for access and staging over soft soils or delicate terrain, perfect for a corporate outing or an industrial operation.

Working in conjunction with suppliers and our strategic partners, Cascade Engineering was able to mold, vibration weld and CNC machine the BRAVO Mat to customer specifications.

The BRAVO Mat was specifically formulated using high-density polypropylene to make it exceptionally durable, providing a dramatic improvement over wood solutions. Each lightweight mat only weighs 50 pounds, yet is strong enough to support compressive loads of up to 450 pounds per square inch. They are designed to be used in virtually any environment, conforming to uneven surfaces and terrain and standing up to a wide range of temperature and weather conditions.

- 48" x 48" structural molded core using a 3,000-ton press
- Vibration welded top and bottom sheets
- Product complete manufacturing
- Multiple-color capability
- Mold flow analysis





## MIRRA CHAIR

Cascade Engineering has worked with several industry leaders on groundbreaking seating products, such as Herman Miller and Knoll. One of our more outstanding accomplishments has been the development of the Herman Miller Mirra Chair back. After co-developing the successful Aeron Chair several years earlier, Herman Miller chose Cascade Engineering to develop a new seating solution for the mid-market seating category. Our challenges were to custom design and manufacture a unique complex ergonomic seat back that would provide structural strength, while maintaining a mid-level price point.

By collaborating with leading material and tooling experts, we were able to produce a lightweight, structural spine and perforated seat back that achieved the design and support requirements.

- Designed for environment (DFE)
- Lightweight structural spine
- Recyclable materials
- Sophisticated tool design
- Multiple colors
- Cost-effective materials
- 850-ton and 1,000-ton molding

Mirra Chair ©2004 Herman Miller, Inc., Zeeland, Michigan



**CASCADE**  
engineering

*shaping ideas in plastics™*

3400 innovation court se  
grand rapids, mi 49512-2085  
p. 616.975.4800  
f. 616.254.4174

[cascadeng.com](http://cascadeng.com)

We provide innovative solutions to the increasingly difficult challenges faced by our customers. We accomplish this through a marriage of technological advancements and strong personal and corporate relationships, both of which are built on a commitment to excellence. Most important, we offer this faster than expected, because speed to market is a crucial factor for all of our clients.

At Cascade Engineering, we are continually shaping ideas in plastics through materials development, engineering and manufacturing of plastics products for the automotive, industrial and solid waste markets. We look forward to the opportunity to create solutions that make sense for you, and for your bottom line.



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INDUSTRIAL SOLUTIONS