MoldMaking TECHNOLOGY

MANAGE | BUSINESS STRATEGY

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Top Grade Molds Is All About Innovation and Collaboration

Top Grade Molds develops technology solutions with a heavy emphasis on R&D, recyclable material trends and collaboration.

#profile #analysis #medical

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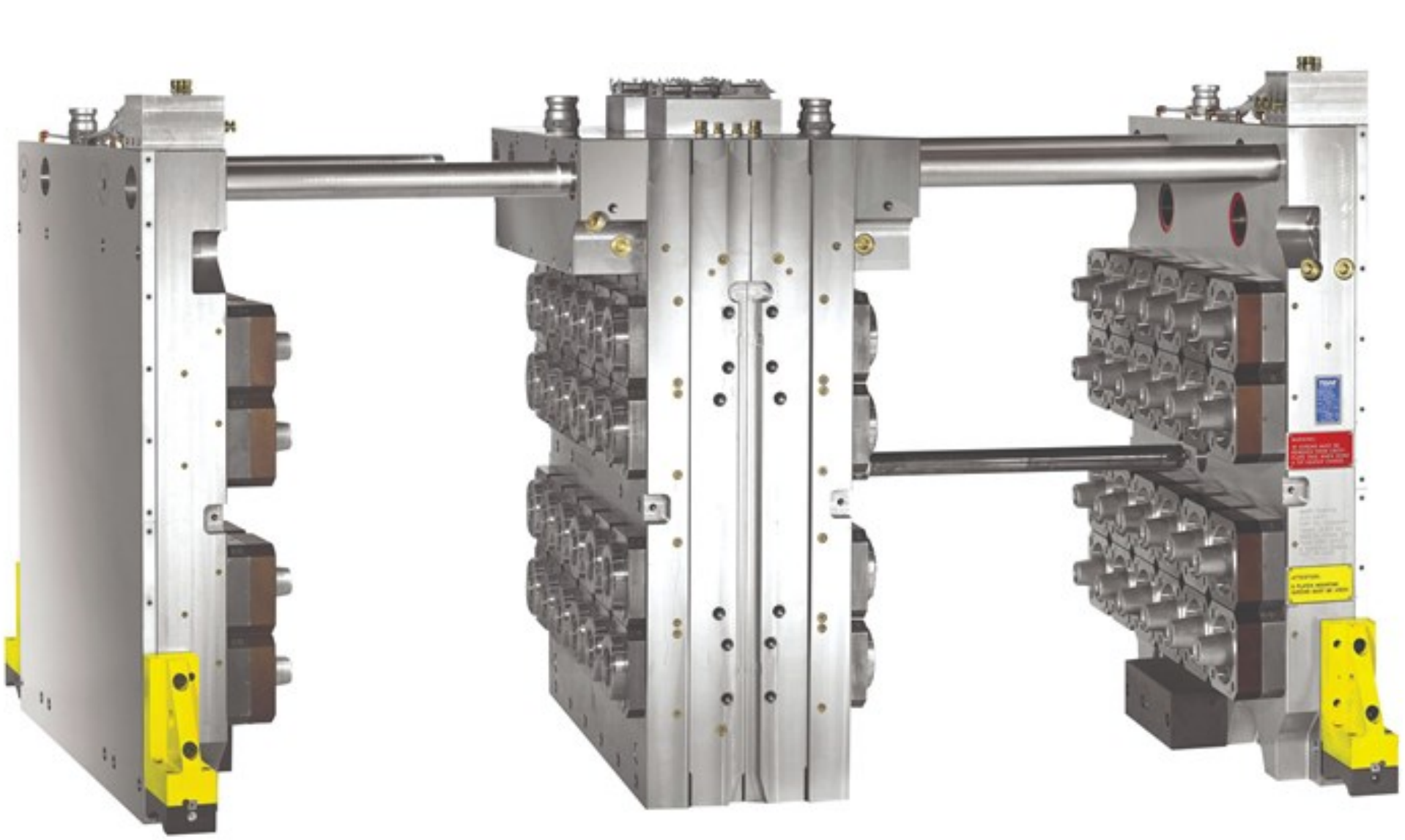

2x24 stack mold for an 8-ounce thin-wall cup. Photo Credit, all images: Top Grade Molds Ltd. (TGM)

Who is Top Grade Molds Ltd. (TGM)?

Vince Ciccone, President & CEO at Top Grade Molds and Co-Owner: Top Grade Molds Ltd. started in 1964 and is still a privately/employee-owned company with 150 employees. There are two facilities in Mississauga, Ontario, Canada, totaling 120,000 square feet of space. The main facility designs and manufactures injection molds for the industrial packaging, thin-wall food packaging, caps/closures, medical and technical industries.

The second facility is our TG Tech Advanced Technical Center, which houses our assembly and injection molding machines for mold testing and qualification, mold repair/refurbishiment, turnkey system integrations, small lot customer production runs and R&D testing of our newest innovative technologies.

Top Grade Molds Ltd. (TGM)

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- Founded in 1964, TGM has built a reputation of quality, integrity and technology.
- With over 150 employees and 120,000 square feet of facility space, TGM designs and produces high-quality plastic injection molds for industrial and thin-wall packaging manufacturers.
- Located in Mississauga, Ontario, Canada, TGM exports to more than 33 countries worldwide.
- TGM provides product development, mold design and engineering, complete in-house manufacturing, quality and testing, mold inspection and repairs and spare parts.
- Designs molds with balanced cooling, balanced hot runners and ease of maintenance and longevity in mind.
- Machining capabilities include but are not limited to CNC turning, large four- and five-axis machining, high-speed milling, surface grinding, out-of-round universal grinding, jig grinding, jig boring, EDM and mold testing.
- Manufactures highly complex parts within the tolerance of ±.0002 inch (5 µm) in reduced time.
- Innovations include Modular Mold Change (MMC), Interchangeable Spout System (ISS), Dyna-Loc two-stage ejection, X-Tri-Seal technology and TGM hot runner systems.
- Adheres to lean manufacturing and just-in-time (JIT) principles.
- Invested in ERP systems for more visibility and to prevent costly downtime while increasing manufacturing efficiency and quality.

Top Grade Mold's Advanced Technical Center houses technology and talent for customers' small production runs, dimensional analysis and non-destructive testing. Photo Credit: Top Grade Molds Ltd.

What do you view as your chief competitive advantage(s)?

Ciccone: Our chief competitive advantage is the ability to address market demands by developing new technologies to help our customers stay ahead in their business. We specialize in packaging or commodity-style molds—strictly plastic injection molds, multi-cavity, stack molds, etc. We're talking about molds that need to produce a lot of pieces over a lot of years. That's where we remain competitive.

We also do upfront developmental work with our customers, whether it's unique packaging solutions or re-inventing the packaging. We develop and design solutions for our customers before we build the mold.

The TG Tech Advanced Technical Center is key to this mission as it allows us to offer small production runs for our customers, dimensional analysis and even non-destructive testing (NDT). We also have a lot of experience in hot runner development and manufacturing, too.

What are some of the critical moldmaking-related technologies in TGM's arsenal?

Ciccone: Our five-axis machining centers. Although not the solution for everything, these machines allow us to perform much more creative yet cost-effective machining practices without sacrificing time. We also developed a universal fixturing system that enables us to handle parts safely and accurately, yielding more efficient machining.

In addition to providing polymer 3D printing in the product developmental stage to help bring our customers' ambitions to life, we have recently been experimenting with additive metal manufacturing to determine the benefits this technology offers us.

Five-axis machining centers and universal fixturing systems permit creative, cost-effective solutions for customers.

Share the story behind the opening of the TG Tech Advanced Technical Center.

Ciccone: Eight years ago, we were frustrated with using outside sources to develop and prove new technology solutions for our customers. Four years later (2017), we opened our TG Tech Advanced Technical Center and installed highly sophisticated testing equipment to ensure we could deliver a perfectly functional, innovative and efficient product.

We equipped the facility with seven custom machines—from 160 tons to 1,000 tons of high-speed packaging equipment. The latest is our Engel co-injection machine for developing and commercializing new co-injection technology.

The impetus for the Tech Center is our development work. It became very difficult to develop technology and solutions for customers in the field, and we lost control of the intellectual property (IP) of the technology. We knew there had to be a better way. So, we wanted to bring that work in-house to develop it, run it, learn it and perfect it. Eventually we filed for IP because our internal work allows us to capture essential data; experimentin

leads to proper IP. Basically, we created a better system of working, which in the end allows us to export our technology. Having this capability enables us to run experimental molds for long periods under actual real-life production settings.

The TG Tech facility serves as an innovative laboratory for product testing.

For example, we're testing the locking system of an injection-compression process that can cycle 3.5 million times. This allows us to learn all the faults, make changes and perfect the locking system to go to market with it.

TG Tech also allows us to offer customers small-scale production runs to perform mold trials, R&D testing of innovations/technologies and provide initial system integration to accommodate high-speed robots and automation systems for rigid packaging like IML.

TG Tech is also the home of our complete innovative laboratory, which is capable of conducting many different types of product testing, such as:

- Environmental conditioning test
- Multi-positional drop test
- Hydrostatic pressure test
- Pressure differential test
- Vibration leakproof test
- Dynamic top load compression test
- Stacking (static top load) test

Sixty-four-cavity ring mold.

Describe the most interesting/notable mold project your company was awarded.

Ciccone: The most notable project is our collaboration with M&M Industries and Engel to develop co-injection technology. In this case, the co-injection development addresses the market requirement to add PCR material to the new product. The middle PCR material is sandwiched between inner and outer layers of virgin material.

For example, this new co-injection process uses more than 30% of recycled material in the core during the production of five-gallon pails. Co-injection makes it possible to concentrate the recycled material in the component's core and encapsulate it in a layer of virgin material. The virgin and recycled materials are of the same type to ensure that the sandwich-molded parts can also be recycled at their end of life. This process can be used for a variety of applications.

To achieve high recycled content without compromising product quality, the system switches from recycled to virgin material close to the cavity, directly at the injection nozzle, combining the two molten plastics. The new system also uses a needle shut-off hot runner.

What has been the most significant change you've seen in the company in 35 years?

Ciccone: The evolution of our organizational, manufacturing and moldmaking innovation has been an integral part of TGM's growth and success.

A 2x4 cavity stack mold with a modular mold change system.

What are the most significant ways you expect your business to evolve in the next three to five years regarding technology, business strategies, place in the market, etc.?

Ciccone: We see continuing collaboration with various industry leaders to address consumers' adverse perceptions of plastics to help address sustainability concerns.

More Proven TGM Technologies

Two-Stage Ejection (patented):

- Allows for reverse gating through the core side without compromising cooling/cycle
- Positive ejection specific for in-mold labeling applications
- Ideal for tamper-evident features
- Unique patented design allows for minimized mold shut height, ideal for back-to-back mold configurations

X-Tri Seal (patented):

- Three seals provide the ultimate barrier protection
- Replaceable nozzle seal for easy maintenance
- Replaceable seals available with extra stock for easy gate insert repairs
- Seals are stocked and ready for next-day shipping
- The secondary replaceable seal protects the primary seal to provide a longer seal life
- Microwell allows for faster color change

Dynamic Nozzle Seal (patented):

- Uses a locking nut to apply downward force to ensure the nozzle is constantly sealed against the manifold
- Prevents cold start-up leakage
- Prevents over-loading of plate pre-load due to thermal expansions

Modular Mold Change MMC (patented)

- Changeover time from stop to start in as little as 20-30 minutes for large stack molds
- Quick-connect coupling and positive locating systems for ease of module installation
- Roller-guided module assembly for safe and effective changeover
- Quick-disconnect coupling option to automatically disconnect water and air services (no draining of water required)

Interchangeable Spout System ISS (patented):

Patented interchangeable spout system.

- Quick insert change for various pour spout standards while in the press
- Commonly used for cavity-engraving inserts that can be changed out, allowing packaging customization
- Minimizes downtime from hours to minutes
- Flexible, customized production runs minimize inventory storage

“Dyna-Loc” Dynamic Mold Locking (patented):

- Enhanced wedge locking system
- Wedges are in constant contact upon mold closing with “zero” degrees; the mold is centered before it’s fully closed
- Allows for aggressive wall reduction
- Reduces and optimizes wall stock concentricity shot after shot

- Controls thermal expansions, preventing binding or galling of the wedges
- Provides mold protection in the event of part hang-up

Pails With an Integrated Handle:

- Gives you two parts with one mold
- Eliminates additional downstream assembly of handle installation with pail
- Design uses a single-injection valve-gated hot runner system (for single-color application)
- Designs for dual-injection valve-gated hot runner systems (for dual-color application)

Double-Lock, Gasket-Less Packaging:

- Round and non-round gasket-less containers
- Zero leakage up to 24 hours
- Design allows for very durable retention during transportation
- Tamper-evident and tamper-resistant designs
- Thirty to forty-five percent better pail nesting than industry standards
- Sleek design

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