the *Master-Series* advantage

you spoke... we delivered

Quick start-ups, consistent part quality, superior uptime and faster cycle times - all from a completely reliable system without the traditional hot runner downtime. We understand your needs - and we’ve delivered on them with the *Master-Series*. It guarantees the unsurpassed performance, reliability and value you’ve been asking for from your hot runner supplier.

the new benchmark in hot runner technology

The *Master-Series* line of hot runner systems offers state-of-the-art performance. Features include CIC Technology combined with our optimized heating system for improved heat profile. Our *Endura* Technology ensures exceptional thermal response and durability. Add to that our patent-pending *Master-Series* and *Visco-Seal* innovations - and you’ve got the industry’s most technologically advanced hot runner system.
Master-Series performance features

Designed from the ground up, the new Master-Series is the result of 40 years of hot runner experience engineered to deliver everything you need from a hot runner.

the top performance features:

- **gate**
  1. *Endura* Technology
  2. *Visco-Seal* (femto-lite, femto, pico, centi)

- **nozzle**
  3. Heat Profile
  4. *CIC* Technology
  5. Thermocouple
  6. Thread Specification

- **flange**
  7. Flange insulation ring
  8. Robust terminal end

- **manifold**
  9. Open pipeline flow channel
**Endura Technology**

The Master-Series product lines are complemented with a completely new suite of Endura Technology tips which maximize the heat transfer from nozzle to tip while minimizing heat loss to the mold. These tips are made from highly conductive materials with multiple surface treatments to ensure superior corrosion and abrasion resistance. Tip gates have three melt exits for improved melt viscosity, reduced weld lines and good color change.

**Visco-Seal**

Visco-Seal technology provides a leak-proof seal between the gate seal and the cavity due to the unique geometry of the nozzle cutout/gate seal. This causes a thin plastic membrane to solidify between the gate seal and the mold during the injection molding cycle, preventing the molten material from flowing back and around the nozzle seal. For you, it reduces the need for inspection, disassembly and cleaning. In addition to easier maintenance and the significant reduction of downtime, the Visco-Seal prevents damage to the hot runner or mold components due to leakage. The Visco-Seal is available for Femto-lite, Femto, Pico and Centi systems.

**industry’s best heat profile**

The Master-Series furthers Mold-Masters long-standing commitment to delivering the industry’s best heat profile. Some of the key features that contribute to the outstanding heat profile are:

- New heater element profiles to compensate for inevitable heat loss from the contact area of the nozzle to the mold base.
- CIC technology over the nozzle body.

Our heater profile has been improved by as much as 70% - bottom to tip. Reduced wattage profiled heater elements use up to 20% less power, thereby improving the longevity of the element.

**CIC Technology**

The CIC technology delivers consistent heat profile over the entire nozzle assembly. Its exceptional wear and corrosion resistant properties will ensure years of trouble-free operation and heater reliability.
CIC Technology benefits:

- Enhanced nozzle heat profile uniformity
- Improves energy efficiency
- Improves nozzle and heater durability

thermocouple installation made easy

The new Master-Series nozzle design facilitates conventional thermocouple installation, with the nozzle acting as its own bending template.

Thermocouple clips are supplied to hold it in place. Made from spring steel with a service temperature of ~700°F, just push them onto the nozzle body and terminal end and snap - you’re done! A front mounted thermocouple design is available that promotes ease of maintenance or replacement.

transfer seal accessibility

The new nozzle thread design facilitates easy installation and removal of gate seals. The redesign also ensures the long term integrity of the threads and seals and optimizes heat transfer from the nozzle to the tip and/or gate area.
cycle time

Master-Series systems have several important inherent design features that directly impact the cycle time performance, particularly in fast cycling applications that require optimal cycle times. The combination of a uniform heat profile, heat transfer management and efficient heater technology provide unsurpassed performance resulting in the fastest cycle times on the market.

open pipeline design

All manifold designs feature open pipeline design, minimizing shear stress and pressure drop.

For example, the Master-Series tip gating method features open pipeline flow through the nozzle, and into the advanced Endura Technology tip design. This rheologically designed tip minimizes the shear and pressure drop experienced by the melt by maintaining open pipeline flow right up to the gate. The result is greatly improved color change capability, and consistent shot to shot repeatability.

gate design

Mold-Masters employs combinations of various alloys having different thermal and mechanical properties to provide the widest range of gate designs to suit your molding requirements. Our new Endura Technology uses multiple conductive materials, which encapsulate the base conductor to transfer heat to the tip while providing excellent corrosion and abrasion resistance.

Wherever possible, our gate designs incorporate our Visco Seal. This innovative feature uses plastic film which acts as a seal between the front portion of the nozzle and the cavity wall. Even if the gate sealing area or the seal itself is damaged or worn, the nozzle will still not leak. Other designs provide the gate seal as an integral hot runner component. This allows the gate to be manufactured from high speed steel, thus increasing its service life, and also allows the component to be exchanged within the mold, minimizing maintenance and down time.
balanced heat profile

*Mold-Masters* integral heating technology is profiled to provide heat where it’s needed and to compensate for thermal losses.

By comparison, conventional nozzles employ common coil or band-style heaters that provide heat to a relatively isolated portion of the nozzle. To reach the desired melt temperature for the polymer to fill the part, the conventional nozzle (with isolated heaters) must add additional heat energy into the polymer in the area of the heater band to achieve a condition where material will flow in the non-directly heated areas of the nozzle. This added heat energy must be removed during the cooling portion of the cycle and may result in extended cycle times.

The Master-Series nozzle with its uniform heat profile maintains a consistent melt temperature over the entire length of the nozzle. Thus the average melt temperature is lower, resulting in improvements in cycle time. As noted previously, the Master-Series line of nozzles incorporates CIC technology that further equalizes the temperature gradient across the nozzle, delivering the best heat profile in the business.

In order to achieve natural balance, the material must flow through identical geometry from the machine nozzle to each of the gates. This means not just the same flow distance, but the same bore diameters and the same number of turns along the flow path. This ensures that every gate receives the same volume of material that has experienced exactly the same shear history in its path to the gate.

Natural balance provides the greatest flexibility when processing. With natural balance, the balance is inherent in the design, and is not based on material or processing temperature.

The study of rheology shows that the flow properties of a polymer melt are dependent on the temperature and the shear that the melt is subjected to. In addition to rheological balance, it is essential that the system is thermally balanced and that the gate sizes are all dimensionally accurate so that all aspects of the system are balanced.

It is possible to “artificially balance” the flow within a system. This is achieved by selecting bore sizes which provide a flow restriction and create an artificial pressure drop. In order to accurately predict this, the flow properties of the material must be known, along with the flow rate and the anticipated process temperature. Any variation from the criteria on which the design was based will result in an “out of balance” condition. *Mold-Masters* generally avoids artificially balancing for standard multi-cavity molds. Artificial balance may be used when designing a custom system under certain circumstances such as large parts gated with multiple nozzles or family molding.
MasterSOLUTION
advanced molding solutions

You need options! We deliver the widest range of application-specific solutions on the market. Whether you have a multi-material application or you need someone who knows stack mold tooling, Mold-Masters is your partner for success. We also have you covered with a wide range of specialty gating options and manifold configuration options for your most complex hot runner applications.
MasterSPEED

Winning the race to market gives you the competitive edge you need to succeed in today’s demanding markets. The MasterSPEED program, in conjunction with the new Master-Series line of hot runner systems, delivers design and manufacturing automation with same-day drawings and rapid hot runner and hot half system delivery.

The most comprehensive rapid delivery program in the hot runner industry.

your design - in real time
The extensive Master-Series nozzle line can be combined with a single, 2, 4, 8, 12 or 16-drop customizable manifold configuration.

your drawings - in hours
Receive same-day detailed assembly drawings.

your system - in days
The complete system is rapidly produced, assembled and shipped.

your speed - every time
Fast, hassle-free startups. Guaranteed.

designing with speed

Mold-Masters has successfully integrated 4 key business systems - Merlin’s on-line design configurator, sophisticated engineering automation capabilities, and advanced manufacturing automation are all linked to the company’s innovative ERP (Enterprise Resource Planning) platform. You now have the design flexibility you need, when you need it.

You can select from the following 9 MasterSPEED manifolds configurations for the Femto, Pico, Centi, Deci and Hecto product lines.

1 drop offset
2 drop in-line
2 drop “T”
4 drop in-line
4 drop “X”
4 drop “H”
8 drop “XX”
12 drop Matrix*
16 drop Matrix*

* Only available in Femto, Pico and Centi. Hecto systems only include 1-drop offset, 2-drop inline and 4-drop “X” manifolds.
You can select from the following MasterSPEED gating methods:

- E-Type Torpedo
- F-Type Torpedo
- Bi-Met C-Sprue
- Hot Sprue
- Extended Hot Sprue
- Bi-Met C-Valve
- Bi-Met Cylindrical Valve
- Hot Valve

These systems are also available through the MasterSPEED program:

<table>
<thead>
<tr>
<th>Single Nozzle Systems (for Tip/Sprue systems)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accu-Line Systems (for valved systems)</td>
</tr>
</tbody>
</table>

The MasterSPEED program does not currently include the following: Femto-Lite, Edge gating, Multi-Tip, Horizontal Hot tip, Accu-Valve, Melt-Disk and other specialty gating methods, water cooled gate inserts and certain valve actuators.

The “build your system” portion of the Resource Guide outlines how to specify your MasterSPEED system.
hot half plate programs

*Mold-Masters* offers a wide selection of choice for integrating your hot runner system. For quick turn-around, your *MasterSPEED* hot runner can be integrated with a *MasterSPEED* hot half. For your more advanced applications our *MasterSOLUTION* program offers custom hot half plates.

**MasterSPEED hot half plates**

*Mold-Masters* innovative *MasterSPEED* hot runner program gives you the fastest delivery imaginable for a hot runner system manufactured to your specification. To provide customers with a complete turnkey solution, our *MasterSPEED* Hot Half program now delivers a complete hot half package, in record time.

*MasterSPEED* Hot Half Systems are available with custom or standard mold base sizes. Each design provides the flexibility to select nozzle locations. As well, the final gate location is machined to suit the nozzle positions that you specify for your *MasterSPEED* manifold.

Providing standard designs, but retaining the flexibility for the mold designer to specify the final gate position, gives you the best of both worlds. You can design your mold using pre-engineered standards, and still select the final gate position that best suits your application.

In addition, along with your *MasterSPEED* hot runner system, you can easily design and order your *MasterSPEED* hot half all online, using *Merlin* - our online business tool.

To ensure that your system will run with maximum efficiency, *Mold-Masters* completes the package with a range of temperature control options that will get the most out of your investment. Please refer to the *TempMaster-Series* temperature controllers section of this guide for more product information. It's the simplest and most cost effective means of integrating your hot runner with your hot half system to meet your specific requirements. With decades of *Mold-Masters* proven design experience working for you, we can help achieve trouble-free integration and processing with your hot runner system.

**key MasterSPEED Hot Half Benefits**

- Pre-engineered designs reduce mold design time
- Custom or standard mold base sizes available
- Stainless steel plates
- Proven design practices which result in maximum hot half rigidity and robustness
- Efficient cooling in each plate to control heat expansion and ensure correct leader pin alignment
- Configurations with flexibility of final drop position for up to 16 cavities
- Tapped screw-holes positioned to your specification
- *Mold-Masters* electrical box and connectors supplied pre-wired and tested.
- Complete documentation with each hot half, including assembly drawing, parts list and installation instructions
- For valve gate applications hydraulic lines are integrated in the hot half plates

**custom hot half plates**

If you have an application that falls outside of the *MasterSPEED* hot half program, no problem. Our *MasterSOLUTION* program can provide a hot half with your hot runner system for almost any application. Whether your application is multi-material, tight-pitch or high-cavitation, our *MasterSOLUTION* program will deliver the complete package tested and ready to use.

For applications requiring a *MasterSOLUTION*, simply contact your local *Mold-Masters* representative to arrange for an application review. We’ll take it from there and deliver a value-added product designed to maximize your profits.
Merlin - hot runners online
design, order, track, download, share -

Whether you’re a designer, a mold maker or an end-user, Merlin addresses all of your hot runner needs. As an unsurpassed online link to hot runner knowledge, Merlin is a business tool that provides instant access to order information, pricing and lead times. It also provides access to a vast database of technical drawings and 2D/3D CAD files that are up to date and always available.

Merlin offers full flexibility and has three levels of access to address every user's needs. The system can be accessed 24 hours a day, 7 days a week and fully supports the MasterSPEED program.

design your hot runner system
- Design and configure your entire hot runner system online.
- Download custom 2D and 3D system drawings
- Create comprehensive quotes and save your parts lists
- Save and search all of your designs

share your orders and system drawings with your partner companies
- Set-up a detailed e-sharing infrastructure with your partner companies, suppliers, tool shops and mold makers
- Share your order information including complete custom GA system drawings, part numbers and lists
- Pricing and purchasing information is never shared, guaranteeing full privacy with every transaction.
order systems or parts

- Get lead times and confirm pricing as soon as your design is complete.
- Submit your order online immediately, 24 hrs. a day.
- Quickly reference past orders and re-order “identical-to” systems
- Use a variety of search tools to find the parts you need.

instantly track delivery of your order

- Search and review your Mold-Masters order history.
- Review the status of any individual order.
- Reference by Order #, PO #, Customer #, Part # or Part Description.
Master-Series single nozzle program

*Mold-Masters* offers a comprehensive range of single nozzle systems spanning most product lines and gating methods. Whether your application demands a low cavitation, high production mold or you’re building a prototype tool to prove out a high cavitation production mold, chances are we have a single nozzle system for your needs.

Single nozzle systems are available for tip and sprue gate styles and valve gate applications (*Accu-Line*).

The chart below references available single nozzle systems for tip and sprue systems.

<table>
<thead>
<tr>
<th>Master-Series Single Nozzle Systems</th>
<th>Femto-Lite</th>
<th>Femto</th>
<th>Pico</th>
<th>Centi</th>
<th>Deci</th>
<th>Hecto</th>
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</thead>
<tbody>
<tr>
<td>Tip &amp; Sprue Systems</td>
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<tr>
<td>E-Type Torpedo</td>
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<tr>
<td>F-Type Torpedo</td>
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<tr>
<td>C-Sprue</td>
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<tr>
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<tr>
<td>Hot Sprue</td>
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<tr>
<td>Extended Hot Sprue</td>
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</tr>
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</table>

**tip and sprue gate systems**

Sprue systems are available with unheated or heated backplates (or machine nozzle pads). The backplate facilitates the interface of the machine nozzle to the hot runner nozzle and the nozzle to the locating ring.

**when to use an unheated or heated backplate**

For commodity materials, the unheated backplate will be sufficient for materials that are more temperature sensitive, heated backplates are advisable. As the temperature profile of machine nozzles can be somewhat questionable, particularly at the machine nozzle tip, a heated backplate puts the control in your hands.

**a typical single nozzle tip or sprue system consists of:**

1. nozzle
2. nozzle thermocouple
3. Tip or gate seal package
4. backplate (machine nozzle pad)
5. backplate thermocouple (heated backplates only)
6. locating ring (optional)
Accu-Line single nozzle valve gate solution

Available with our superior Master-Series line of nozzles and a variety of valve gating options, the Accu-Line Single Nozzle System boasts an industry-best heat profile and optimal gate longevity resulting in perfect part quality. The inline actuator unit is fully integrated within the stationary machine platen. This greatly reduces stack height and required mold plate material, reduces total mold cost.

**Performance:**
- Robust design is based on over 1-year of rigorous site application testing and life cycle testing of over 1 million cycles.
- Worry-free mechanical reliability as the direction of motion is inline with the valve pin stroke.
- Experienced design in valve bushings ensures full leak-proof protection promoting maximum up-time.

**Hydraulic and pneumatic actuation options:**
- No heat expansion adjustment required for sealing calibration.
- Fewer components required compared to conventional designs.
- Shipped fully assembled, reducing installation time.
- High temperature seal used.
- Rated for 1000psi, well above the required actuation pressure.
- Optional diamond coated running surface valve pins available for PC and other demanding resins.
- All components are fully standard with reduced lead times and are covered by Mold-Masters industry leading warranty.

<table>
<thead>
<tr>
<th>Valve System</th>
<th>Femto</th>
<th>Pico</th>
<th>Centi</th>
<th>Deci</th>
<th>Hecto</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-Valve</td>
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<tr>
<td>B C-Valve</td>
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<tr>
<td>Hot Valve</td>
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<tr>
<td>EX</td>
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<td>✓</td>
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</tr>
<tr>
<td>Hot EX</td>
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</tbody>
</table>
**TempMaster-Series temperature controllers**

*Mold-Masters* manufactures a series of advanced temperature control systems for all your hot runner requirements. Our product line delivers precise temperature control, complete diagnostics and system protection in an easy-to-use format. Whether your temperature control requirements call for modular type systems or advanced graphics capabilities with SPC data collection, *Mold-Masters* has a system that’s right for you.

From competitively priced, module-based systems to sophisticated multi-zone controllers that serve up to 240 control zones, all *TempMaster-Series* controllers are CE certified and come with proprietary PID² control algorithm for consistent control you can count on regardless of your application.

**XL/XL-2/XL-4 (3 models)**

- Competitively priced, module-based hot runner control systems available in 2 to 48 zone configurations.
- Provides superior temperature control with complete diagnostics and ease of operation. Its user interface has been developed specifically for global applications.
- The XL-II utilizes dual zone per card technology, increasing the number of control zones while decreasing the overall size of the unit.

**MZ (5 models)**

- Multi-zone temperature controllers from 4 to 240 control zones.
- Optimized temperature control algorithm for best performances on small-mass, high-watt density probes.
- Settings are very user-friendly in both LCD or touch-screen consoles.

These models are highlighted below.

<table>
<thead>
<tr>
<th>comparison chart</th>
<th>XL</th>
<th>XL-2</th>
<th>XL-4</th>
<th>MZ-LT</th>
<th>MZ-MG</th>
<th>MZ-G</th>
</tr>
</thead>
<tbody>
<tr>
<td>zone range</td>
<td>1-9</td>
<td>2-18</td>
<td>4-48</td>
<td>4-60</td>
<td>24-60</td>
<td>24-240</td>
</tr>
<tr>
<td>display</td>
<td>LED</td>
<td>LED</td>
<td>LED</td>
<td>touch screen 5.2” color</td>
<td>touch screen 8.4” color</td>
<td>touch screen 12.1” color</td>
</tr>
<tr>
<td>mounting options</td>
<td>heavy duty stand, table top</td>
<td>heavy duty stand, table top</td>
<td>heavy duty stand,</td>
<td>heavy duty stand, slim stand, direct mount, table top, integrated stand</td>
<td>integrated stand</td>
<td>integrated stand</td>
</tr>
</tbody>
</table>

Refer to the “Build your System” section for more information on how to select the right temperature controller for your application.
Fusion-Series hot runner systems

Mold-Masters introduces the Fusion-Series hot runners that meet these demands for the automotive and large part industries. Fusion-Series systems are built using our modular approach, to meet your molding requirements. The Fusion-Series enhances the Mold-Masters line-up of industry leading hot runners by utilizing the drop-in “connect-and-go” approach for quicker start-ups and easier operation.

benefits
The Fusion-Series line is available with a variety of gating methods – hot tip, sprue or valve gate. The various gating methods provide direct or indirect gating for virtually any type of material.

The heater plates mounted on the manifold provide “even” heat while using a minimum number of zones. This “even” heat helps eliminate the potential for cold and hot spots and achieves a more consistent plastic melt temperature.

The Fusion-Series unique “Shadowed” fluid (water & oil) and electrical distribution system helps simplify mold plate machining:

• The slim profile means less mold cut out an more mold steel for support and a stronger mold.
• Single point connection reduces connection errors and assures quick “connect-and-go” set-ups, better cooling and quicker start-ups.
• The modular design significantly reduces replacement inventory requirements.

available with
* nozzle lengths up to 1000mm
* shot weight 50g and up
* gate sizes: 2.0mm - 8.0mm
warranty programs

*Mold-Masters* delivers exceptional warranty coverage for all of its products worldwide. The following outlines specific warranty items and years of coverage.

**10 years**

*Master-Series* nozzles and H13 manifolds when purchased and used with an originally supplied *Mold-Masters*’ hot half and *TempMaster-Series* hot runner controller.

**3 years**

*Master-Series*, *Dura* and *Fusion* nozzles and manifolds.

**2 years**

*TempMaster-Series* Temperature Controllers.

**1 year**

Valve pins for *Accu-Valve CX* hot half’s when purchased with a *TempMaster-Series* hot runner controller.

All other non-wear *Mold-Masters*’ components.

**60 days**

Wear items including O-rings, hydraulic seals, liners, torpedoes, thermocouples, valve pins, transfer seals and other items classified as wear items.

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**MasterCARE**

Keep your business running smoothly with *MasterCARE*- our unsurpassed new customer support program that covers more than just the industry’s best warranties.

From system delivery and spare parts to warranty administration and onsite service, we’re committed to providing you with the most comprehensive customer service in the industry.

**MasterCARE team**

A dedicated team, specially trained to know what you need to get your job done.

**spare parts**

Online or by phone, access parts from our global facilities.

**technical support**

Industry experts around the globe draw on 40 years of hot runner expertise.

**onsite service**

Routine service, troubleshooting or just answering questions, your *MasterCARE* team is ready to assist.

**MasterCARE warranty**

The best in the business has just got better - easier, customer-focused and the most comprehensive.

Contact the *MasterCARE* team

Tel: (1) 905-877-0185

Email: mastercare@moldmasters.com

or visit [www.moldmasters.com](http://www.moldmasters.com)