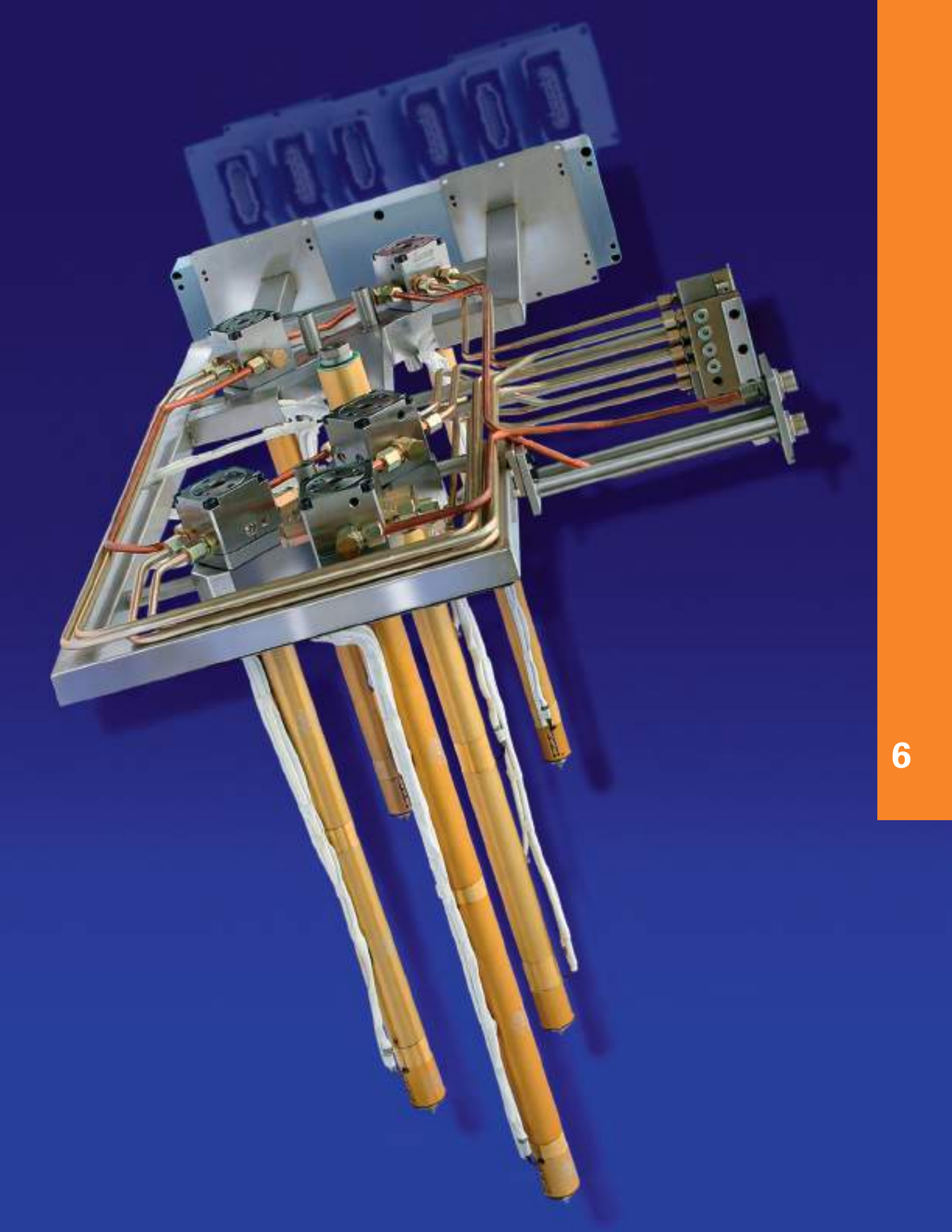


Integrated INCOE® hot runners are optional to complete injection halves (Hot Halves) and have the following advantages:

- Replacement of nozzle gates, nozzle heaters, or exchange of nozzle and manifold thermocouples, the complete mold remains in the machine.
- The mold ejection half and the cavity plate remains in the machine, only the top plate (A) with the system must be removed.
- After removing screws (H), the complete system including electric transition (I) and hydraulic connection (J) is available.
- Complete system with hot half design and manufacturing remains with INCOE®. Particular with exported molds, the risk of mismatch between the hot half to other molds and additional transport cost are eliminated.
- INCOE® supplies the complete hot runner system including electric conduit and hydraulic connection, supports with system assembly and is responsible for system function.

Los canales calientes integrados de INCOE® son opcionales para completar mitades de inyección (Mitades Calientes), y para contar con las siguientes ventajas:

- Reemplazo de entradas de boquillas, calentadores de boquillas, o cambio de boquillas y termopares distribuidores. El molde completo permanece en la máquina.
- La mitad de la eyección del molde y la placa de la cavidad permanecen en la máquina, solo se debe remover la placa superior (A) con el sistema.
- Luego de quitar los tornillos (H), se encuentra disponible el sistema completo incluyendo transición eléctrica (I) y conexión hidráulica (J).
- El sistema completo con diseño y fabricación de mitad caliente permanece con INCOE®. Particularmente con moldes exportados se elimina el riesgo de que la mitad caliente no coincida con otros moldes y se elimina también el costo adicional del transporte.
- INCOE® ofrece el sistema de canal caliente completo, incluyendo el conducto eléctrico y la conexión hidráulica. Ofrece apoyo con el montaje del sistema y es responsable por el funcionamiento del mismo.

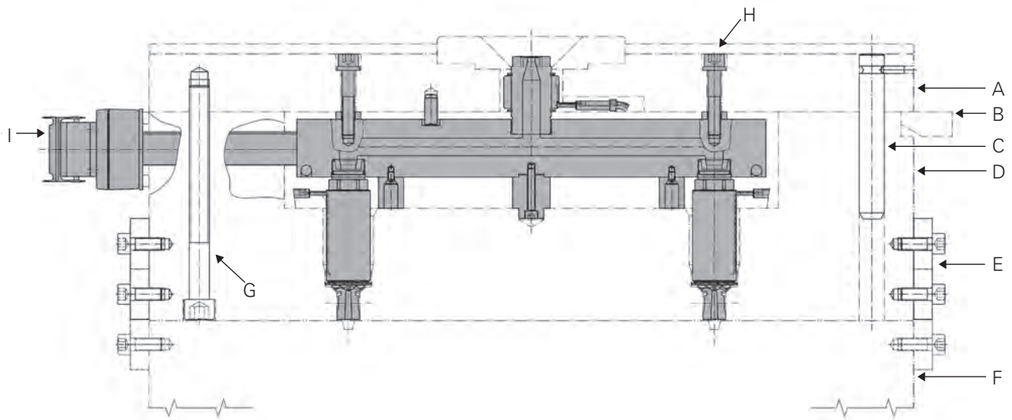
Sistemas de câmara quente integrados INCOE® são alternativas as “hot halves” completas e possuem as seguintes vantagens:

- Troca de ponteiras, resistências de bucha e termopares de manifold sem a necessidade de retirada do molde de maquina.
- O lado da injeção e a placa cavidade podem permanecer na maquina enquanto apenas a placa base (A) com o sistema de câmara quente são removidos.
- Depois da remoção dos parafusos (H), o sistema completo, incluindo as conexões elétricas (I) e conexões hidráulicas (J) ficam expostas.
- O projeto e a manufatura do sistema completo, incluindo o “hot half” continuam com a INCOE®. Particularmente para exportação de moldes, o risco de diferenças entre o “hot half” e outros partes do molde, bem como custos adicionais de transporte são eliminados.
- A INCOE® fornece o sistema de câmara quente completo, incluindo a calha elétrica, conexão hidráulica, suporte na montagem do sistema e responsabilidade sobre seu funcionamento.

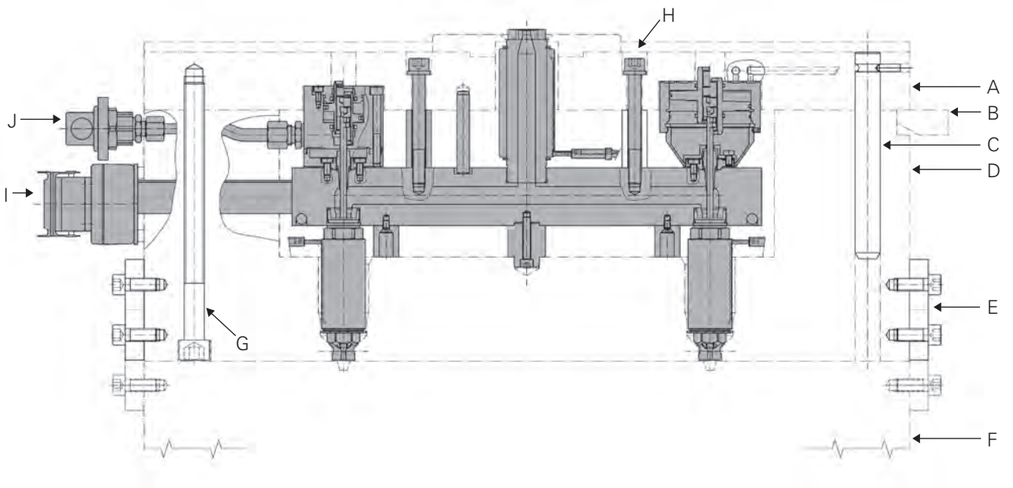
System Disassembly	Desmontaje del Sistema	Desmontagem do sistema
Complete mold remains in the machine:	El molde completo permanece en la máquina:	O molde completo permanece na maquina:
1) Remove screws (G)	1) Quite los tornillos (G)	1) Remova os parafusos (G)
2) Connect plates (D) and (F) with latch (E)	2) Conecte las placas (D) y (F) con el pestillo (E)	2) Conecte as placas (D) e (F) com as travas laterais (E)
3) Open mold	3) Abra o molde	3) Abra o molde
- Complete ejector half and cavity plate remain in machine:	- Toda la mitad del eyector y la placa de cavidad permanecen en la máquina:	- O lado da extração e a placa cavidade permanecem na maquina:
4) Attach crane to top plate (A)	4) Sujete la grúa a la placa superior (A)	4) Coloque a ponte rolante na placa base (A)
5) Remove clamps (B)	5) Quite los sujetadores (B)	5) Remova os grampos (B)
6) Take top plate (A) with system from machine	6) Tome la placa superior (A) con el sistema de la máquina	6) Retire a placa base (A) com o sistema da maquina
7) Remove screws (H) and take system	7) Quite los tornillos (H) y tome el sistema	7) Remova os parafusos (H) e retire o sistema.

Integrated Hot Runner
Canal Caliente Integrado
Sistema de Câmara Quente Integrado

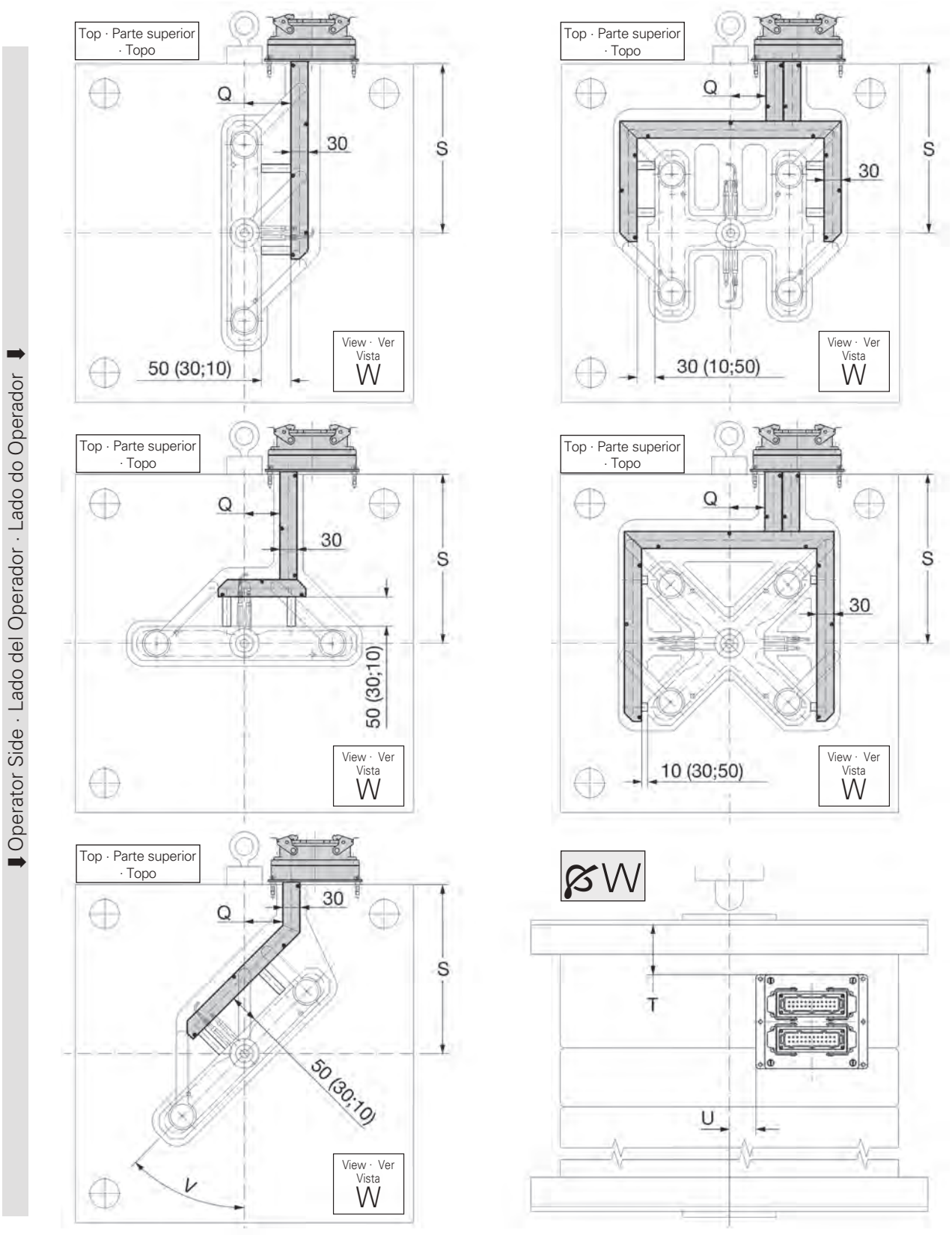
Regular System Including Electric Connection	Sistema Regular Incluye la Conexión Eléctrica	Sistema convencional incluindo a conexão elétrica



Valve Gate System Including Electric and hydraulic/pneumatic connection	Sistema de Válvuladoincluyen la Conexión eléctrica y la Conexión Hidráulica / Neumática	Sistemas Valvulados, incluindo conexões elétricas e conexões hidráulicas/pneumáticas



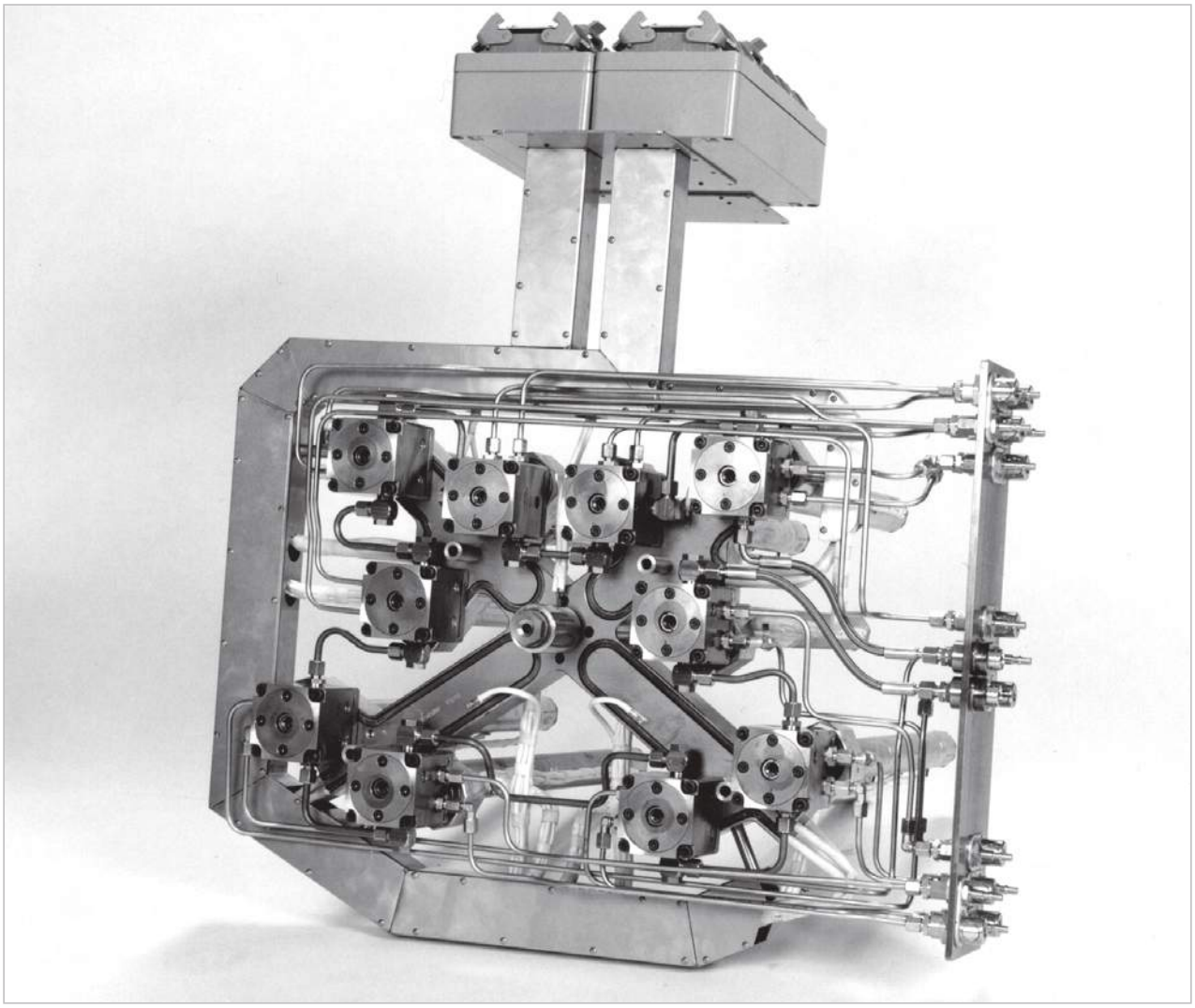
© INCOE 01/2008, 06/2007, 2004, 2001



➡ Operator Side · Lado del Operador · Lado do Operador ➡

Q =	S =	T =	U =	V =

Please specify · Por favor, especifique · Por favor, especificar



The hydraulic connection is designed with consideration given to mold dimensions and is rigidly fixed to the system.

The connection includes the oil and water supply for the cylinder drive. Both the cooling and the mounting plate are fitted with quick connectors according to customer specification.

- Plumbing is inspected and delivered for mold installation
- Design allows for quick assembly and disassembly of complete system
- Hydraulic and Pneumatic systems are customized for the design
- Rigid fittings prevent oil or water leakage
- Service work can be performed outside from the mold

La conexión hidráulica se diseña considerando la dimensión del molde y que este sólidamente asegurada al sistema.

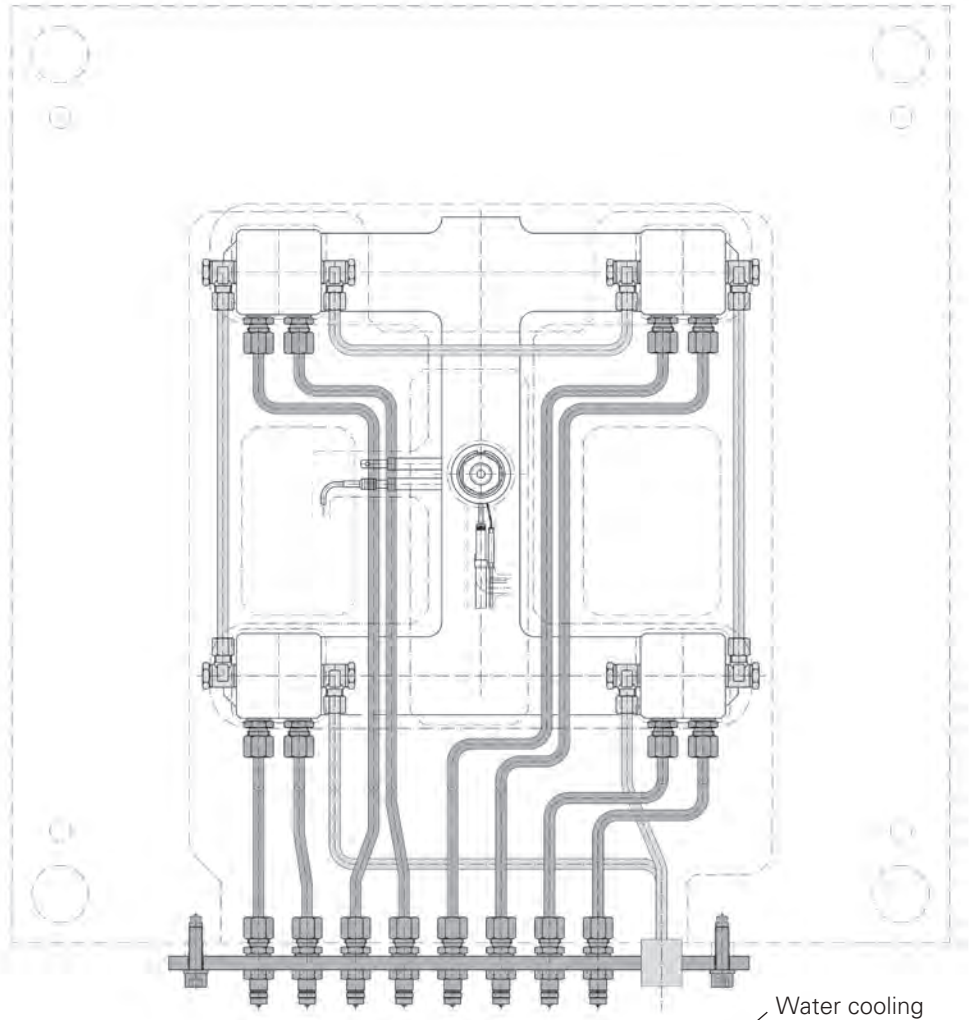
La conexión incluye el abastecimiento de aceite y agua para el manejo del cilindro. Tanto la placa de refrigeración como la placa de montaje se encajan con conectores rápidos, de acuerdo a las especificaciones del cliente.

- La instalación de tuberías se inspecciona y se entrega para la instalación del molde
- El diseño permite un fácil montaje y desmontaje de todo el sistema
- Los sistemas hidráulico y neumático son personalizados para el diseño
- Accesorios sólidos previenen escapes de aceite o de agua
- Se pueden realizar trabajos de servicio fuera del molde

As conexões hidráulicas são projetadas considerando as dimensões do molde e são rigidamente fixadas ao sistema.

As conexões incluem as linhas de óleo e água para refrigeração dos cilindros de acionamento. As entradas de óleo e de refrigeração podem ser equipadas com engates rápidos de acordo com as especificações do cliente.

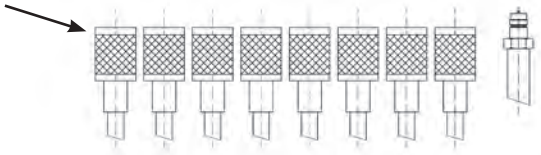
- As conexões são inspecionadas antes da entrega para instalação no molde
- Nosso projeto permite rápidas montagens e desmontagens do sistema
- Sistemas hidráulicos e pneumáticos são adaptados para cada projeto
- Ajustes rígidos previnem vazamento de água ou óleo
- Qualquer reparo pode ser feito fora do molde



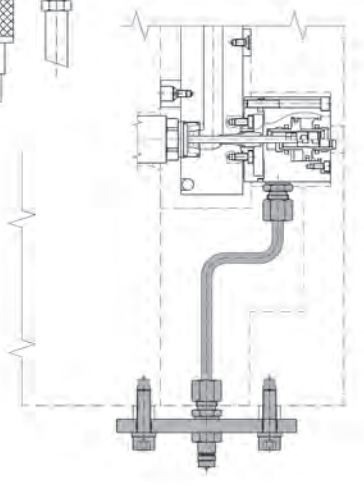
External oil supply from hydraulic unit or machine

Abastecimiento externo de aceite desde la unidad o la máquina hidráulica

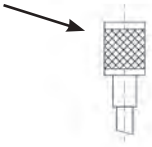
Fonte de Óleo externa da unidade hidráulica ou da maquina

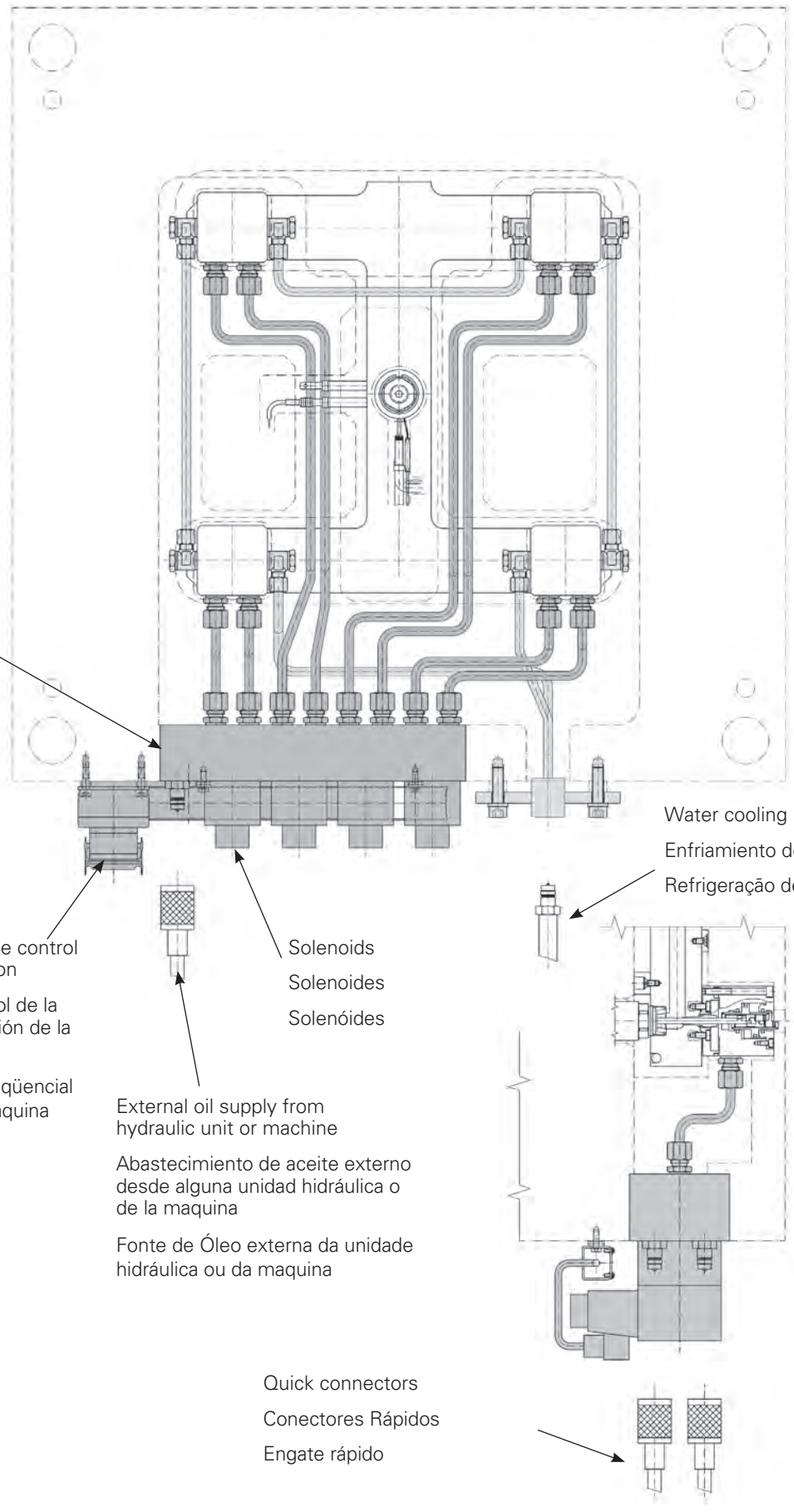


Water cooling
Enfriamiento de Agua
Refrigeração de Água



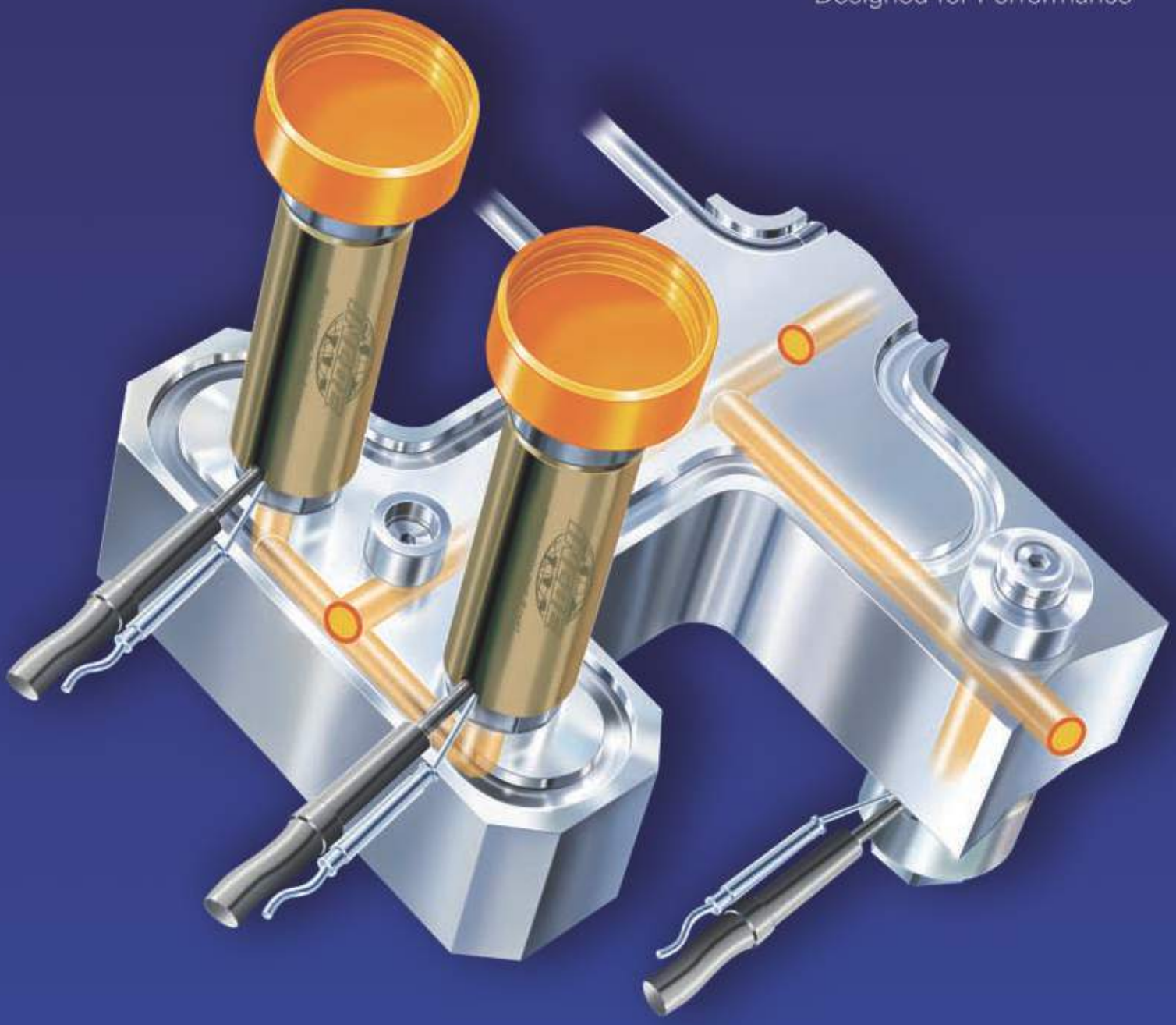
Quick connectors
Conectores Rápidos
Engate rápido





Opti-Flo®

Designed for Performance



FLOW IMBALANCES REDUCE PROCESSING EFFICIENCY

Superior material flow and processing require engineered solutions. The negative effects of flow imbalance and material shear significantly reduce your ability to compete for the reasons that follow. Opti-Flo® systems are engineered to resolve these issues before production begins.

SHEAR INDUCED IMBALANCE

Flow imbalance is a direct result of the shearing effect common to the basic flow properties of molten resin. The rate of shear in a flowing resin is highest near the walls of the passage through which it flows and lowest in the center. High rates of shear induce a phenomenon known as shear thinning, where the highly sheared material becomes less viscous than the remaining melt flow. What results is a ring of shear thinned material and a flow channel where the viscosity is no longer homogeneous.

LOSS OF FLOW HOMOGENEITY

After the material flow enters the hot runner system through the manifold nozzle (Fig.1), it splits left and right at the first intersection (Fig.1A). The symmetry of material viscosity does not remain intact after the split but concentrates the low and high viscosity material at opposite sides of the secondary channel. When the material is eventually split again at the next intersection in the manifold, the low and high viscosity materials become separated into two flow groups (Fig.1B).

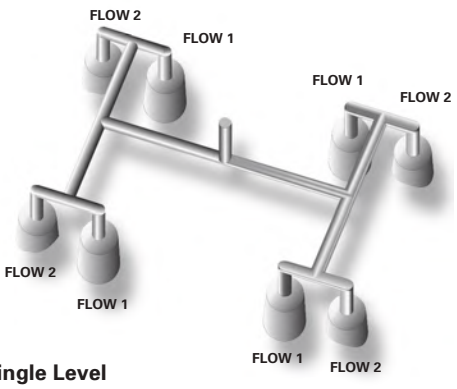
Fig. 1

Fig. 1A

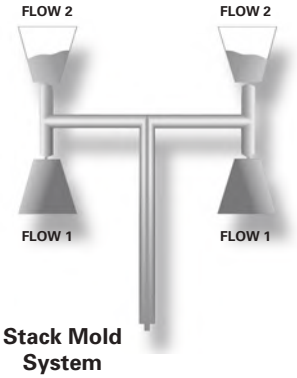
Fig. 1B

FLOW GROUPS

In single level 8 drop systems, the flow is eventually split into 2 flow groups; Flow 1 is highly sheared material, and Flow 2 is non-sheared material. The shear built up in the primary runner and subsequently split up at the primary and secondary intersections causes the inside cavities (Flow 1) to fill first. Subsequently increased cavitation also increases the number of flow groups. Likewise, stack-molding applications exhibit the same shear imbalance characteristics. Sheared material is typically directed toward the inside parting line cavities (Flow 1), which fill first.



Single Level System



Stack Mold System

EFFECTS OF SHEAR IN SIMPLE APPLICATIONS

A simple example of shear induced imbalance is shown here (Fig.2). Sheared material is created in the machine nozzle and the extension nozzle of the manifold. At the first and only intersection, an imbalance will already be created. In this example, the sheared material will flow to the outer portion of each cavity, creating an intra-cavity imbalance. This can easily lead to core shift as well as a number of other part defects. With an INCOE® Opti-Flo® hot runner system (Fig.3), the melt is rotated at the intersection, and the sheared and non-sheared materials are manipulated to achieve uniform cavity filling.

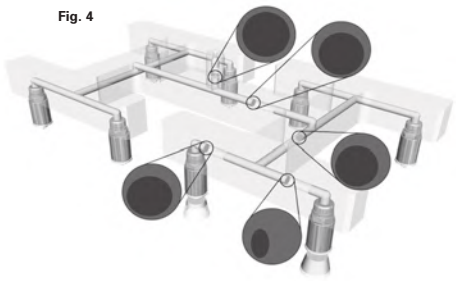
Fig. 2

Fig. 3

INCREASED COMPLEXITY

More complex systems with more than one intersection are common, and amplify shear induced imbalances. Before the concept of the shear induced imbalance phenomenon was understood, hot runners were typically designed with level changes attempting to eliminate the imbalance. As depicted to the right (Fig.4) what results is over-rotation, shifting the imbalance from the inside cavities (which would have resulted with a traditional, single level manifold design), to the outside cavities. While improving the imbalance condition, research indicates this method still results in varying degrees of imbalance.

Fig. 4



THE OPTI-FLO® SOLUTION

Utilizing Opti-Flo® technology, INCOE® hot runner systems can significantly reduce the shear induced imbalance (Fig.5). Extensive testing has been completed demonstrating the outstanding performance of the Opti-Flo® system. A design of experiments was performed using a variety of resins. Testing was conducted utilizing an industry standard hot runner design and an INCOE® Opti-Flo® hot runner system. The results demonstrated shear induced flow imbalances reduced to less than 4% with the Opti-Flo® hot runner system. Other benefits realized are reduction of fill and pack pressure, a wider processing window, and consistent dimensional properties.

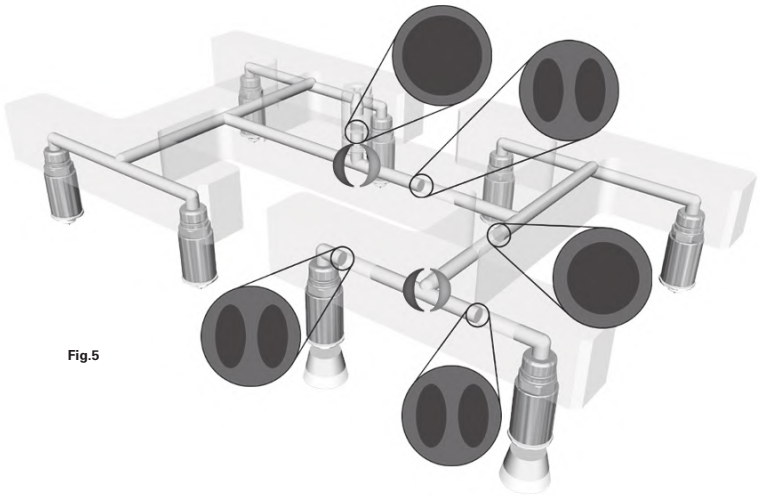


Fig.5

OPTI-FLO® Benefits include:

- Uniform Part Weights
- Uniform Part Dimensions
- Uniform Mechanical Properties
- Scrap Reduction
- Cycle Time Reduction
- Setup Time Reduction
- Simplified Processing Requirements
- Improved Part Quality to Customers
- Faster Part Qualification Process

Opti-Flo® Designed for Performance with MELTFLIPPER® Technology