

PRINCIPLES OF GRAVITY DIE CASTING (GDC) USING REVERSE TILT



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ARTICLE TAKEAWAYS:

- Understanding the difference between reverse tiltpour and traditional tiltpour
- Advantages of reverse tilt versus low pressure die casting

Aluminum permanent mold casting or gravity die-casting is the casting of molten aluminum in a reusable metal mold or die. The die material is most commonly cast iron or steel. The tilt pour process is one variation of the permanent mold process. Simply put, the tiltpour casting process is the pouring of molten aluminum into a mold by tilting the mold to fill it in a controlled fashion. In traditional tiltpouring the mold parting line is perpendicular to the floor during the solidification phase, while in reverse tilting the parting line is parallel to the floor. Turning the parting line allows the casting to be center fed similar to the way a casting produced in the low pressure process is fed. This feature makes reverse tilting a cost effective alternative to capital-intensive low-pressure casting. In many cases the casting can be direct poured, eliminating costly runner bars and increasing yield.

WHAT IS TILT POUR GDC

- The tiltpour casting process is the pouring of liquid aluminum into a metal mold and tilting the mold to fill it in a controlled fashion
- Filling the mold cavity by tilting, allows the liquid metal to flow down the side of the mold with little or no turbulence, filling the mold with little to no oxides



Let's Have A Beer **STATIC POUR**



TILTPOUR

ADVANTAGES OF GDC

- **Better dimensional accuracy**
- **Less machine stock needed**
- **Process is machine driven**
- **Faster heat exchange**
 - Shorter cycle times
 - Chilled casting has denser dendrite structure
 - More pressure tightness
- **Controllable heat exchange through PLC controlled chilles**
- **Better surface finish**
- **Fewer inclusions**

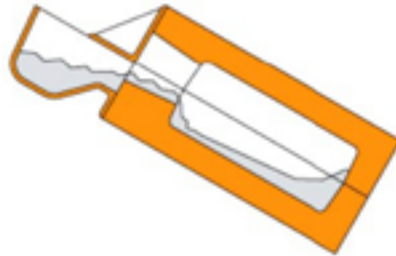
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SIMPLE SOLUTIONS THAT WORK!

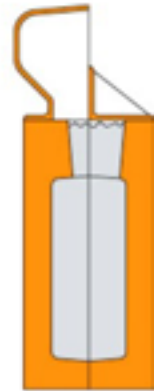
TRADITIONAL VS. REVERSE TILT



Pouring Position



Filling



Solidification Position

Traditional Tiltpouring



Pouring Position



Filling



Solidification Position

Reverse Tiltpouring



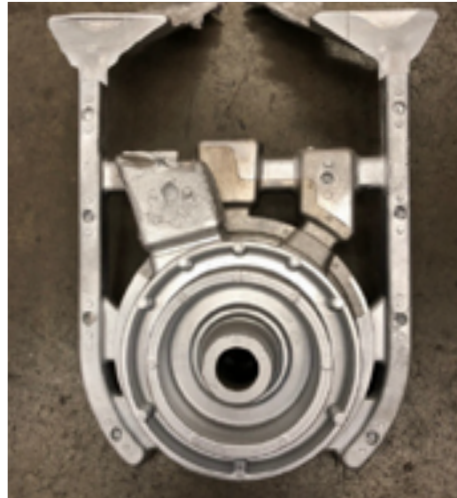
High Volume Rotary RT Table



Reverse Tilt Die in Machine

WHAT IS TRADITIONAL TILTPOUR?

- Parting line is parallel to floor for pouring cup filling
- Parting line gating
 - Uses runners and ingates
 - Direct pour
 - Complex gating removal
- Die filling from bottom to top
 - Natural venting
 - Static oxide skin in runner allows clean metal to enter die



Traditional Tilt-pour Casting Using Parting Line Gating

SEE IT IN ACTION



RT3 Reverse Tilt-Pour Permanent Mold Casting Machine animation



3HS Tilt-Pour Permanent Mold Casting Machine animation

WHY REVERSE TILT POUR

- Can be used to feed castings with isolated heavy sections
- Can be used to feed castings with center symmetry
- Cookware
- Wheels
- Sheaves, sprockets, gear blanks
- Steering knuckles
- Engine components
- Impellers



Castings: Made With Reverse Tilt-pour Using Riser Pour Gating



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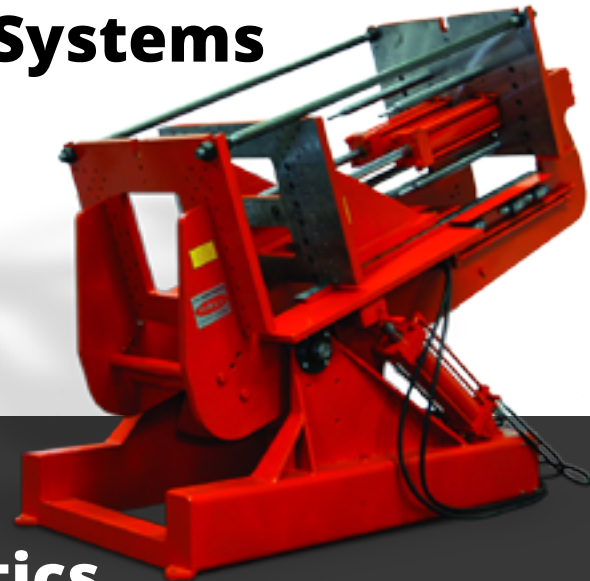
Hall Foundry Systems

By CMH Manufacturing

GRAVITY DIE CASTING MACHINES

Tilt-Pour Permanent Mold Casting Machines & Foundry Systems

- | | |
|------------------------------|-----------------------|
| Permanent Mold Machines | Automation Work Cells |
| Gravity Die Casting Machines | Riser Saws |
| Tilt-Pour Process | Casting Coolers |
| Autocast Style Machines | Casting Catchers |
| Rotary Tables | Foundry Accessories |



ROBOTIC PLACEMENT & EXTRACTION

Automate 3R & 6R with Robotics

No tie-bars to interfere with robotic core placement or casting extraction.

Additional machine customizations available, such as front ejector and swing in casting catcher and more.



Official System Partner



Authorized System Integrator

As a KUKA System Partner and FANUC System Integrator, we can assist you with your automation needs, be it updating current system with integrated robotics and automation or a new project.



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