

# PRINCIPLES OF GRAVITY DIE CASTING (GDC) USING REVERSE TILT



**JOHN HALL**  
President  
CMH MANUFACTURING COMPANY



## ARTICLE TAKEAWAYS:

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



*Let's Have A Beer Static Pour*

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

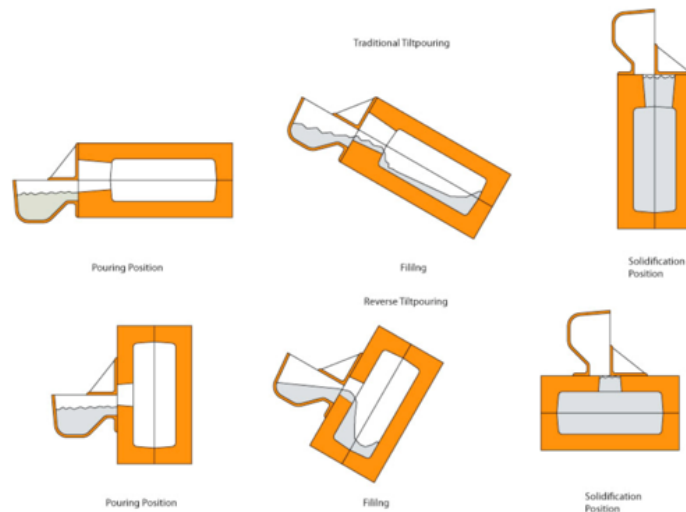


*Let's Have A Beer Tiltpour*



## Advantages of GDC

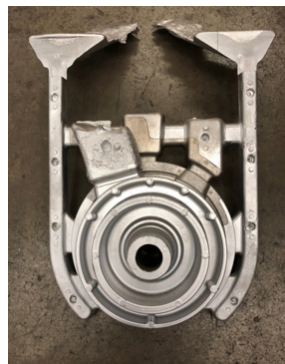
- Better dimensional accuracy
- Less machine stock needed
- Process is machine driven
- Faster heat exchange
- Shorter cycle times
- Chilled casting has denser dendrite structure
- More pressure tightness
- Controllable heat exchange through PLC controlled chillers
- Better surface finish
- Fewer inclusions



*Traditional vs. Reverse Tilt*

## 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



*Casting Made With Traditional Tiltpour Using Parting Line Gating*



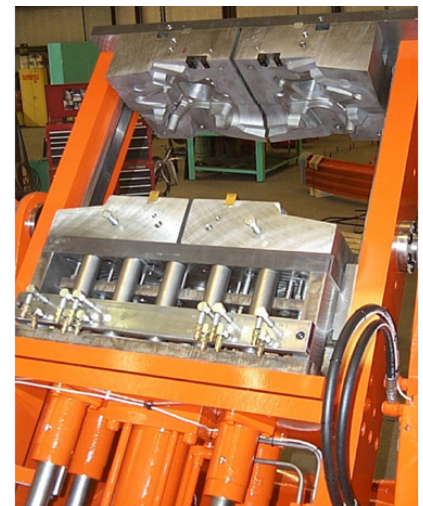
*Castings Made With Reverse Tiltpour Using Riser Pour Gating*

## 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



*High Volume Rotary RT Table*



*Reverse Tilt Die in Machine*

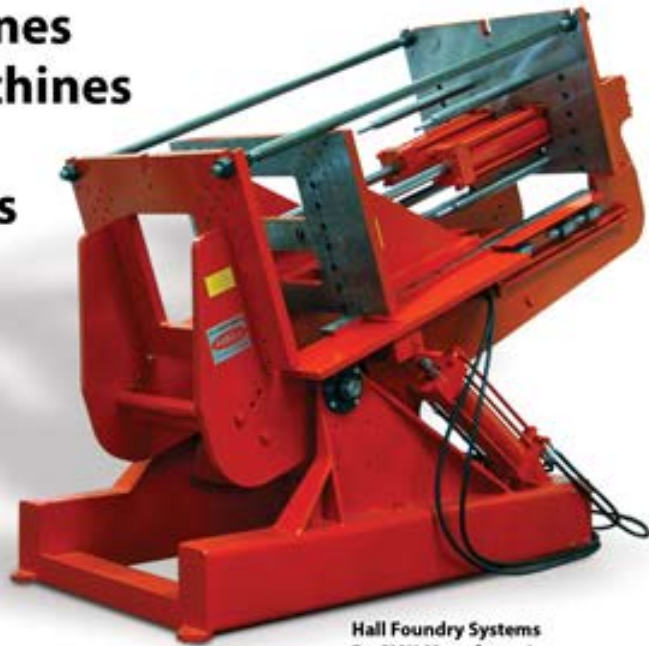


# Hall Foundry Systems

By CMH Manufacturing

Permanent Mold Machines  
Gravity Die Casting Machines  
Tilt Pour Process  
Autocast Style Machines  
Rotary Tables

Automation Work Cells  
Riser Saws  
Casting Coolers  
Casting Catchers  
Foundry Accessories



Hall Foundry Systems  
By CMH Manufacturing

3R & 6R – No tie-bars  
to interfere with  
robotic core placement  
or casting extraction.



APRIL 27-30, 2019

ATLANTA, GEORGIA

**CASTEXPO**  
& METALCASTING CONGRESS  
connecting SUPPLIERS | METALCASTERS | CASTING BUYERS

**VISIT BOOTH #2742**



Tel: 806-744-8003  
sales@cmhmfg.com  
www.cmhmfg.com

