



HITCHINER[®] MANUFACTURING CO., INC.

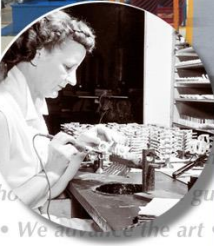
We respect the earth • We embrace responsibility • We act in good faith • We nurture achievement • We deliver quality and value • We advance the art • We are good citizens
We honor the law • We guard our integrity • We respect the earth • We embrace responsibility • We act in good faith • We nurture achievement • We deliver quality and value
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Since 1946



Operations Summary

- **Privately owned US Corporation**
- **Established in 1946**
- **2018 Sales of 252M US Dollars**
- **1800 Employees**
- **Core business: Counter Gravity Investment casting**
- **High Volume Manufacturing Capacity: 150,000 pieces/day**
- **Operations in USA and Mexico**
 - Serving Markets in North America, Europe & Asia
 - 5 Primary Manufacturing Plants
 - 1 Research & Development Center



US Operations

Milford, NH – Gas Turbine Operations (GTO)

- Vacuum melt counter gravity casting
- Cobalt super alloys
- Nickel super alloys
- Fine detail and ultra thin casting capability

Milford, NH - Automated Casting Facility (ACF)

- Air melt counter gravity casting
- Reactive alloy counter gravity casting
- High volume automated casting line

Milford, NH – DS/SX Operations (SXO) – under construction

- Master Melt
- DS/SX counter gravity casting

Milford, NH – Metal Casting Technology (MCT)

- Research and development
- Full mechanical test lab
- Low volume prototyping





Mexico Operations

Santiago, Estado de Mexico

- Air Melt Casting
- Heat treating
- Castings finishing
- Parts machining
- On site tool shop
- Full Laboratory



San Luis Potosi, Estado de S.L.P

- Parts machining
- Heat Treating
- Systems assembly.





Key Customers



Automotive

Aerospace





Performance

Recognized Operational Excellence

- 2017 Supplier of the year award from FCA



- 2017 Nexteer Perfect quality award





Hitchiner Offers

Alloy's Cast:

- Carbon and Alloy Steels – SAE 1010, 4130, 8620, etc.
- Stainless Steels – 300's, 400's, 17-4PH, 15-5PH, etc.
- Cobalt Based – L605, MAR-M509, Co31, etc.
- Nickel Based – IN100, IN625, HAST X, Haynes 230, Rene 80, etc.

Maximum Casting Parameters:

- 22" Diameter
- 27" Height
- 2,000 lbs. Air Melt Capacity
- 400 lbs. Molten Metal Draw

Minimum Thickness Cast:

- .015" (depending on part size)

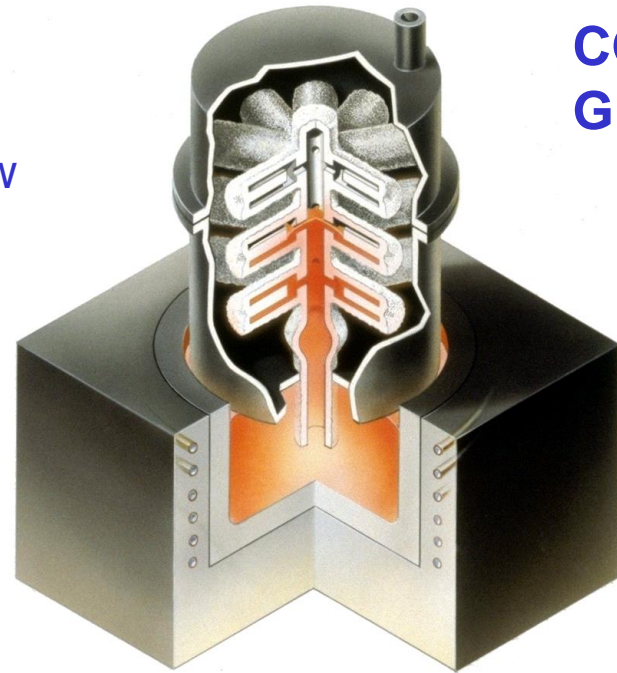


Hitchiner Offers



TRADITIONAL GRAVITY:

Little control of metal flow & temperature, hence variable metallurgy



COUNTER GRAVITY

Hitchiner patented technology:

Alloy is drawn directly from a melting crucible under temperature control and inside melt core, so that clean metal without air fills mold cavities. Metal flow speed is controlled by vacuum profile, and allows to fill very thin walls. Central feeding column is not solidified and returns to the melt.



Technical Advantages of Counter Gravity Casting

- **Uniform mold filling & part cooling temperature**
 - Symmetrical part arrangement around the center sprue
 - Consistent solidification shrinkage from part to part
 - Consistent grain structure
- **High density sprue loading**
 - Higher volumes per mold
 - Better throughput
- **Support sand used to achieve thinner shells**
 - No mold failure
 - Improved shell and casting cleaning throughput
- **Excellent metal cleanliness**
 - The molten metal is cast into the mold directly from the melting furnace
 - Metal is drawn from the middle of the melt
 - With gravity pour the metal flows from the surface where slag floats
- **Constant metal temperature from mold to mold**
 - Furnace power can be adjusted to maintain melt temperature.
 - With gravity pour from a ladle, the metal temperature drops rapidly. The temperature of the first mold cast is hotter than the second
- **Optimized control of mold filling**
 - Mold filling is controlled by the vacuum system and is adjusted based on mold configuration
 - Allows casting of very fine features without voids
 - With gravity pour the same control is not possible
- **Higher melt utilization since sprue and head do not solidify.**



The Hitchiner Advantage

- **Counter Gravity Casting**
 - Cleaner metal with less slag & inclusions
 - Better control of metal flow
 - More efficient use of raw materials
 - Less waste & improved economy
 - Capability for thin walls & fine surface features



Hitchiner Automotive Markets

- **Valve train.**
- **Gasoline Direct Injection.**
- **Transmission.**
- **Steering.**
- **Diesel Clamps.**
- **Drivetrain.**
- **Turbochargers**



CDCA -77176 and CDCA 77177 LS7 Rocker Arms.



- 8620 Alloy, Carburized Cast and Finished.
- More than 420 K of Rocker Arms delivered.
- SOP : 2005



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Transmission and Misc Parts



- 8640 Alloy, Cast and Finished
- More than 700 K of Swivels delivered.
- SOP : 2006.



- 1020 Alloy, Cast and Finished
- More than 3.8 M of Swivels delivered.
- SOP : 2006.



- 8640 Alloy, Cast and Finished
- More than 215 K of Levers delivered.
- SOP : 2011.

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Automotive Fuel Rail Products

BOSCH



HFV6
Mounting
Block



L850
Bracket



Fiat EVO Injector Block



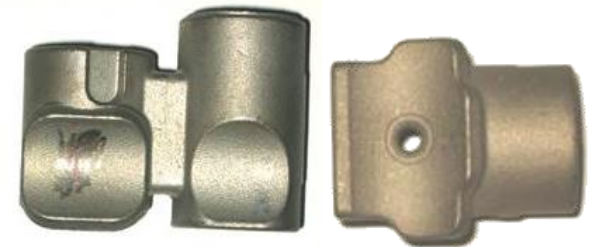
Ferrari Holder



Jaguar
Funktion Block



Jaguar Inlet
Fitting



Ford I4 Connecting /
Halter

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Automotive Steering Products



TK Receiver



FORD P473



CLEVIS 610



GMT900



T1



FORD



TRANSFER



GMT 800



ISUZU

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