

For all your Quality Cast and Machined
Component Needs



HG ARROLL & ASSOCIATES LIMITED

Customers Served Include



JOHN DEERE





Our Product Lines

- Gray, Ductile, & Compacted Graphite Iron Castings
- Aluminum Castings, Sand, Permanent Mold, & Die Cast
- Investment Castings, Ferrous & Non- Ferrous
- Steel & Stainless Steel Castings
- CNC Machining Services
- Rapid Prototype Casting Services
- Gears & Splined Shafts
- Custom Threaded Studs & Turned Parts
- Plastic Parts, Injection & Rotational Molding



Competitive Advantages

- We have decades of hands-on and professional foundry manufacturing, engineering, and technical experience
- We have domestic and offshore sources available to meet all of your unique requirements
- We assist your engineers and our supplier to perform detailed advanced quality planning for the successful launch of your new programs
- We work with you and our supplier to resolve quality issues and insure on-time deliveries for your important parts
- We value your business and provide one stop shopping for all your sourcing and supply chain requirements



Complex Gray, Ductile, & Compacted Graphite Iron Hydraulic Castings

- Gray Iron ASTM A48-76 & A159-77 Grades ranging in tensile strength from 25,000 to 45,000 psi
- Ductile Iron ASTM A536-80 Grades 60-40-18, 65-45-12, 80-55-06, 100-70-03, 120-90-02
- Compacted Graphite Iron ASTM 842-85 Grades 300, 350, 400, 450
- Products: Hydraulic Valves, Pumps, and Other Complex Highly Cored Castings
- Weight Range: 1 lb up to 200 lbs.



Capabilities and Equipment

- ISO 9002 Certified
- Molding: Shell, Green Sand, and Air Set
- Melting: Cupola and Electric Induction Melting
- Core Making: Shell, Oil Sand, and Air Set
- Cleaning: Shot Blast, Grind, Inspection, Borescope
- Quality Assurance Department:
CMM, Spectrometer, Carbon and Sulfur Analyzer,
Mechanical Test, and Microstructure



Hydraulic Pump Castings



Gear Pump Priority Valve



Piston Pump Cover



Piston Pump Port End Cover



Piston Pump Plate

Valve Castings



Eight Spool Valve Body



Two Spool Valve Body



Four Spool Valve Body



Cut Away of 4 Spool Valve Body

Sectional Valve Body Castings

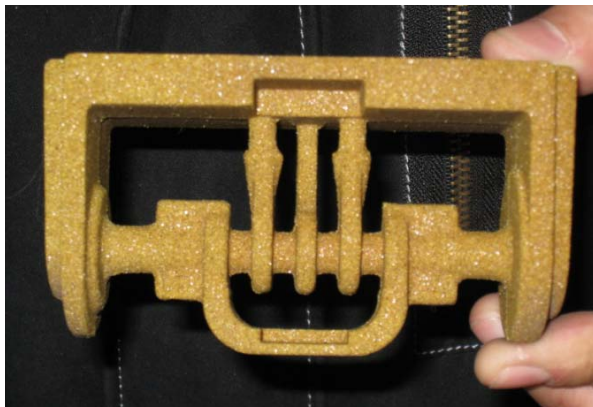


Inlet and Outlet Covers and Spool Section

Industrial Valve Castings



D1VW Pilot Control Valve Raw Casting



Core Assembly for the D1VW Valve



Finished D1VW Valve Casting, Cast and Finished Machined at Foundry



Gray, Ductile, & Compacted Graphite Iron Jobbing Castings

- Gray Iron ASTM A48-76 & A159-77 Grades ranging in tensile strength from 25,000 to 45,000 psi
- Ductile Iron ASTM A536-80 Grades 60-40-18, 65-45-12, 80-55-06, 100-70-03, 120-90-02
- Compacted Graphite Iron ASTM 842-85 Grades 300, 350, 400, 450
- Products: General Industrial Type Castings,
Machined or As Cast
- Weight Range: 1 lb up to 40,000 lbs.



Capabilities and Equipment

- ISO 9002 Certified
- Molding: Green Sand, Automated, Squeezer, Cope & Drag, Shell, No Bake
- Melting: Cupola and Electric Induction
- Core Making: Shell, Green Sand, Oil Sand, Air Set
- Cleaning: Shot Blast, Grind, Inspection,
- Quality Assurance Department:
Spectrometer, Carbon and Sulfur Analyzer,
Mechanical Test, and Microstructure

Jobbing Castings



Machined G.I. Pillow Block Bearing



Machined D.I. Steering Parts



Machined D.I. Steering Cover



Machined G.I. Pump Cover

Large Jobbing Castings



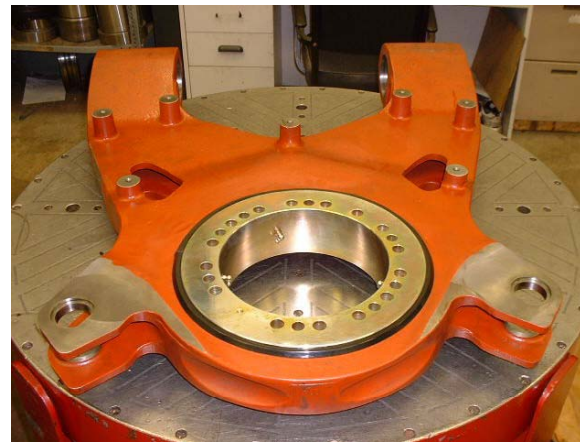
6400 lb. D.I. Inlet Casting



28000 lb. Diesel Engine Casting



4000 lb. D.I. Wheel Hub



500 lb. Machined D.I. Casting w/Bearing Assembly

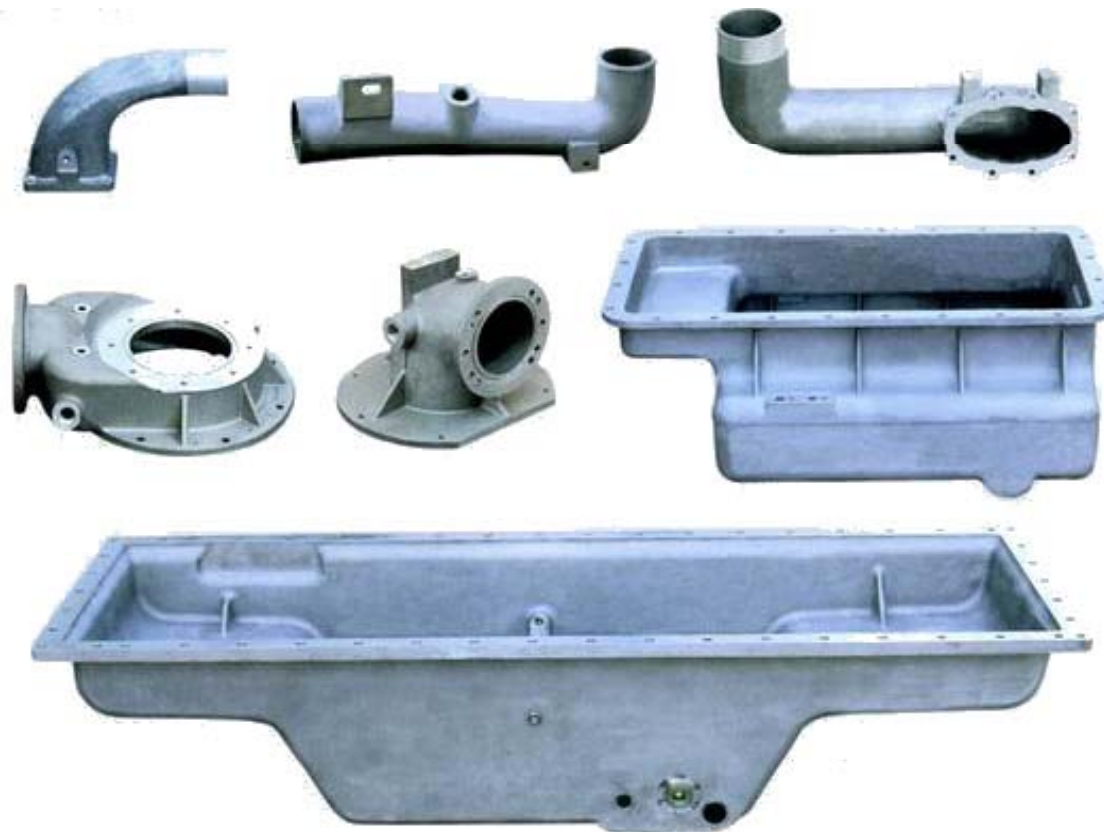


Aluminum Castings

- Green Sand Castings – Material Grades 319, 356, A356, 355, C355, A206
- Permanent Mold – Material Grades 319, 356, A356, 355, C355
- Die Castings – Material Grades 360, 380, 383, 413, 535, ZA-12, ZA-27
- Machining
- Weight Range: 1 to 440 lbs.
- ISO/TS 16949-2002 Certified



Green Sand Aluminum Castings



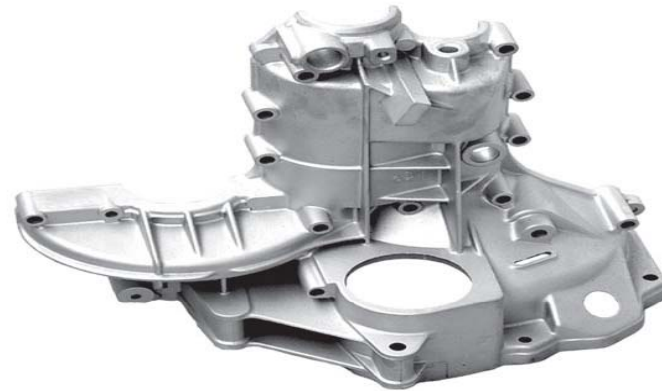


Permanent Mold Aluminum Castings





Aluminum Die Castings





Investment Castings

- Carbon Steel and Low Alloy Steel:
Grades: ASTM 1015, 1045, 1055, 15CrMo, 35CrMoV(ASTM 4135), 42 CrMo ASTM4140), 20 CrNiMo (ASTM 8620), 12 CrNi2 (ASTM 3415)
- Stainless Steel and High Alloy Steel
Grades: ASTM 303, 304, 304L, 316, 316L, 17-4 PH, CD4MCu,
- Tool Steel
Grades: T8 (ASTM W1A-8), 9CrWmn (ASTM 01)
- Weight Range- Ounces to 220 lbs.



Investment Castings



Variety of Small Carbon Steel Castings



Stainless Steel Pump Housings



Alloyed Carbon Steel Valves



Stainless Steel Impellers



Steel & Stainless Steel Castings

- Carbon Steels & Alloy Steels
Grades: 1010 – 1060, 4130, 4140, 4150, 4340, 8620, 8630, 8640, WCB
- Stainless Steels
Grades: 304 – 316, Hastelloys, & Inconel
- Tool Steels
Grades: D2 – D5, H11 – 14, ASTM Grade A597-82
- Weight Range: 1 – 9000 Lbs.
- Volumes: Short Run to High Volume Production
- Products : General Industrial Type Castings, Machined or As-Cast



Capabilities and Equipment

- ISO 9002 Certified
- Molding: Green Sand , No-bake, & Shell
- Melting: Electric
- Core Making: Shell. Oil Sand, Air Set,
- Cleaning: Shotblast, Grinding, Inspection, Heat Treat, & Welding
- Machining
- Quality Assurance Department
CMM, Spectrometer, Carbon Analyzer, Mechanical Test, Microstructure, Magnetic Particle, Dye Penetrant , & X-Ray



CNC Machining Services

- Prototype, Short Run & Production Volumes
- ISO 9001-2000 Certified
- Engineering Support With Your Engineers
CAD/CAM Software including Pro Engineer
FTP site for secure data transfer
- Casting Sources

Complete responsibility for procurement of casting requirements

Non- Ferrous: Aluminum, Zinc, Magnesium, & Bronze Castings

Ferrous: Gray Iron, Ductile Iron, & Steel Castings

- CNC Machining of Castings & Bar Stock
CNC & Swiss Lathes , CNC Horizontal & Vertical Machining Centers
Grinding, ID, OD between centers, Centerless, & Profile
Gear Hobbing & Gear Shaper
- Value Added Services: Sub- Assembly, Paint, Plating, Heat Treat, Bar Code





Precision Turned Components



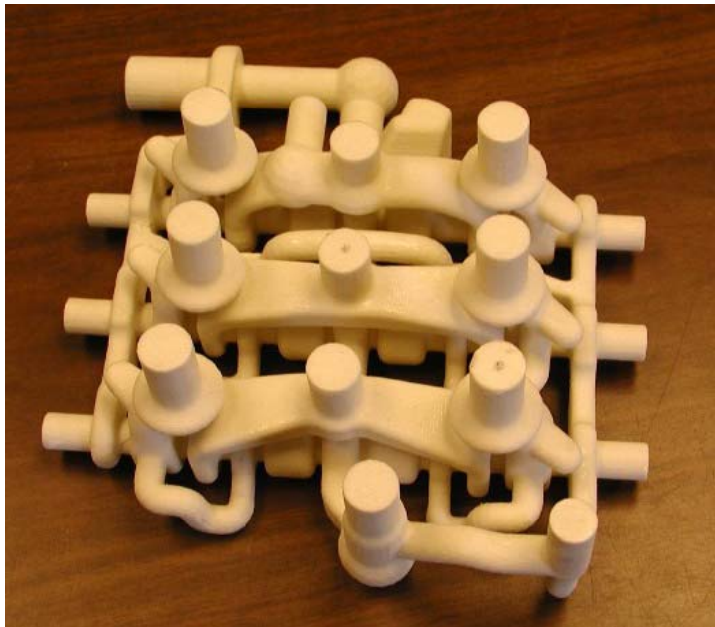


Rapid Prototype Casting Service

- Complete Casting Engineering & Development Service
- Specialists In Short Delivery Leadtimes
Prototype castings delivered in as short as 7-10 days
- Engineering Support With Your Engineers
CAD/CAM Software including Pro Engineer & FTP site for secure data transfer
- Experienced Patternmakers & Machinists
Complete responsibility for all tooling & machining requirements
- ZCORP Z-810 Rapid 3D Printing System
3D printed sand molds & cores direct from your 3D CAD models
3D printed models are also available within days from receipt of CAD model
- Casting Sources
Complete responsibility for procurement of casting requirements
Non- Ferrous: Aluminum, Zinc, Magnesium, & bronze castings
Ferrous: Gray Iron, Ductile Iron, & Steel castings
- CNC Machining of Prototypes from Castings or Bar Stock



Rapid Prototype Casting Service



3D Model of Hydraulic Valve
Body Core Passages Printed
from Customer 3D CAD Model



Aluminum Pump Housing
Rapid Prototype Casting



Gears & Splined Shafts

- Products
 - Gears
 - Splined Shafts
 - Sprockets
 - Assemblies





Custom Threaded Studs & Turned Parts

- Short Delivery Leadtime
- Volumes From Short- Run To High Volume
- Complete Line Of Sizes & Alloys Of Raw Bar Stock In Inventory
 - Sizes From 1/4" – 2" Diameters
 - Low Carbon Steel , A307 Gr. A, 1018, 1117,1141,& 4140
 - Stainless Steel, 303,304,& 316
 - Brass, Silicon Bronze, & Monel
 - Stressproof & Fatigueproof
- Common Threads
 - UNC,UNF,2a,3a,5a,5hf,5cfs,5onf,NPT,Metric6g,& Left Hand Threads
- Heat Treatment, Case Hardening, Plating, Black Oxide

HG ARROLL & ASSOCIATES LIMITED

Custom Threaded Studs





Injection Molded Plastic Products

- **Markets**
Computer, Hardware, Automotive, Machinery, Houseware, Water Purifier, & Others
- **ISO 9001-2000 Certified**
- **In - House Tooling Shop**
CNC Machining – Milling & Turning, CNC EDM, Grinding
Software, UG, Pro - E, AutoCad
- **Injection Molding Machines from 50 to 650 Tons**
- **Plastic Materials**
ABS, PC, PPS, POM, PVC, PE, PP, HIPS, GPS, PC+ABS, NY6, NY12, NY12+GF, NY66, NY+GF, PBT, PET, Teflon, etc.
- **Value Added Services**
Assembly, Paint, Pad Print, Screen Print, Hot Stamp, Spin Weld, Heat Plate Weld

HG ARROLL & ASSOCIATES LIMITED

Injection Molded Plastic Products





Rotational Molding Plastic Parts

- **Markets**
Food Equipment, Playground Equipment, Toys, Display Equipment, etc.
- **Small To Medium Size Parts**
- **Wide Variety Of Plastic Materials**
- **Tooling Capabilities**
- **Requirements**
- **Value Added Services**
Machining, Inserts, Logos , etc.





Thank You

Send Inquiries to:
H G Carroll & Associates Limited
146 Sunset Dr.
Sandusky, OH 44870
Phone: 419-351-0349
Fax: 419-625-3528

E-mail: hgcassoc@aol.com

Website: www.hgcarroll.com