



# INVESTMENT CASTING SOLUTIONS

DESIGN | ENGINEERING | INNOVATION



ForceBeyond, headquartered in Chadds Ford, PA, is an engineering design and development company, partners with world class manufacturers to deliver to our customers engineered parts and components.

We pride ourselves on cutting edge technology, superior quality assurance, proactive customer service and Just In Time delivery.

Our engineers work with our customers to assure that parts and components can be manufactured with the desired characteristics in the most cost effective manner. By using simulation software to provide a “virtual prototype” we can begin to optimize the design prior to supplying components for design validation. We strive to be our customers’ best manufacturing supplier.



Forcebeyond provides high quality custom ferrous and non-ferrous investment casting parts for a wide range of industries, including Automotive, Medical, Plumbing, Petrochemical, Mining, and Construction etc.

Investment casting is a very versatile process which is ideal for simple or complex and low or high volume production. We produce castings between 0.1 in and 18 in, and from a few grams to more than 40 pounds. For casting parts with special surface finish requirements, we also provide a broad range of secondary service including machining, surface finishing, and inspection.







#### DESIGN

Engineering Design Collaboration  
Drawing & Model Review  
Process Validation Support  
PPAP Management

#### LOGISTOCS

Packing Design and Planning  
JIT Delivery  
International Distribution Expertise

#### QUALITY

TS16949/ISO14001 Manufacturers  
Trace-ability & Containment Process  
APQP Responsibility

#### CUSTOMER CARE

Capacity Planning  
Contingency Planning  
Product Life Cycle Planning  
EDI Capacity



## INVESTMENT CASTING MATERIALS

Materials	Type and Grades	Common Application
Stainless Steels	304	Food grade steel, housings, bodies. 304 is widely used in the food industry as the standard for cleanliness as well as corrosion resistance.
	316	Housings, gears, plates. Superior corrosion resistance makes it ideal for many applications including marine environments.
	304L/316L	Similar to other 300 series steel, low carbon makes it softer but more corrosion resistant.
	410 & 416	Housings, bushings, handles, brackets. 400 series steels are high strength and very machinable. They will tend to break rather than bend under intense pressure.
	17-4	Rods, pins, links, arms. The strongest of the stainless steel family and is used on parts that cannot bend.
Carbon Steels	1000 series	Softest of common carbon steels. More likely to bend rather than break under intense pressure. Commonly used to make cranks, handles, and braces.
	4100 series	High strength material that is used when deformation of a part is not allowed. Commonly used to cast firearm components and ratchets.
	8600 series	8600 series is stronger than 1000 series but will bend prior to breakage. Commonly used to cast firearm components, housings, and nozzles.
Tool Steels	A2, S7, D2	Used when parts will be under higher heat due to less distortion. Not corrosion resistant like stainless steel.
Aluminum alloys	A356	Housing, covers, plates. Aluminum is lightweight and extremely corrosion resistant like stainless steel.

## SECONDARY OPERATIONS

For those casting parts that need secondary machining or special abrasion/corrosion resistance, Forcebeyond Inc. can provide some value-added services, including:

Polished Zinc Plating

Anodizing

Broaching

Surface Grinding

Nickel Plating

Phosphating

Milling

Sand Blasting

Electroplating

Acid Treatment

Drilling

Powder Coating

Chrome Plating

Polishing

Tapping

# INVESTMENT CASTING PARTS

Sizes: 0.1 in to 18 in

Weights: a few grams to more than 40 pounds

Complex internal cavities

Typical tolerances of  $\pm .005''$  per inch

Provides Reliable Process Controls and Repeatability

Design and Casting Versatility

Amortization lower Tooling Cost

Highly efficient and cost effective

Better for the Environment





## INVESTMENT CASTING EQUIPMENTS LIST

Name	Model Specification		Quantity
Wax Pressure System	China		2
Medium-frequency Induction Furnace	China	100kg, 250kg, 500kg	1 each
Shot Blasting Machine	China		2
Resistance Heat Treatment Equipment	China		1
Runner Roasting Furnace	China		3
Abrasive Blast Equipment	China		2



## CNC MACHINING EQUIPMENTS LIST

Name	Model Specification		Quantity
CNC Machining Center	Wintec (Taiwan)	MV-45	14
	HAAS (USA)	VF-3	10
	Integrated with 4 axial	VX380TD	35
	KIA (Korea)	VX400	30
		VX500	10
		KH-40G (HMC)	3
	AKIRA SEIKI (USA)	V4 XP	10
	TAIQUN (Taiwan)	T-V8	12
	Brother (Japan)	S2DNZ	13
	Fanuc (Japan)	T14i-Ee	18
CNC Lathe	Bao Ji	Ti40/50	4
	KIA (Korea)	KIT-450	10
	Miyano (Japan)	BNC42C3	4
CNC Milling Machines	China	XK5325	

## INSPECTION EQUIPMENTS LIST

Name	Manufacturer	Model	Quantity
Optical Projector	China		1
CMM	USA	Hexagon	1
	Italy	HERA sp	3
	Korea	HERA sp	1
	Germany	WENZEL	1
X Ray Analyzing Machine	China	EDX3000B	1
Metallographic Microscope	China	NJF-1	1
Brinell Hardness Tester	China	HBRVU-187.5	1
Surface Roughness Tester	Mitutoyo (Japan)	178-923D	1
Height Gauge	Switzerland	V300+/600+	4
Spectrometer	Germany	GS1000	1
X Ray NDT Tester	Switzerland	XG-1504T	2