

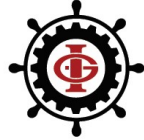
# Indo German Industries

An ISO 9001 certified Company

**The Best  
Casting Process  
for Your Needs**



Casting is a manufacturing process by which a molten material such as metal or plastic is introduced into a mold, allowed to solidify within the mold, and then ejected or broken out to make a fabricated part.



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Casting may be used to form hot, liquid metals or melt-able plastics (called thermoplastics), or various materials that cold set after mixing of components such as certain plastic resins such as epoxy, water setting materials.

## **Fundamentals of Casting**

Six basic factors involved in the casting process:

- Mold cavity
- Melting process
- Pouring technique
- Solidification process
- Part removal process
- Post processing



# DUCTILE IRON (NODULAR IRON)

## Strong and Break Resistant

Ductile Iron piston rings and seals can withstand a lot of bending and are very resistant to breaking. Ductile Iron piston rings and seals are roughly twice as strong as Gray Cast Iron piston rings & seals.



### BENEFITS

- ✓ Can Withstand Heavy Pounding
- ✓ High Bending Strength
- ✓ Very Resistant to Breaking
- ✓ Able to Withstand High RPMs
- ✓ Able to Withstand High Stress
- ✓ Roughly 2x Stronger than Gray Cast Iron

### PROPERTIES

- ✓ Microstructure contains rounded (or nodular) shaped grains.
- ✓ Does not have the microstructure matrix of piston ring iron and will induce higher wear on the bore.



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# CAST IRON

## When Cost Efficiency Is Paramount

IGI specializes in producing cast iron piston rings. We offer various chemistries to meet a wide range of temperature, speed and size requirements.



### BENEFITS

- ✓ Lower cost
- ✓ IGI specially-formulated 200 series of iron meets SAE-J1236 specifications.

### PROPERTIES

- ✓ Low Friction
- ✓ Wear resistant
- ✓ Produces consistent pressure against the bore



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## Advantages of the Centrifugal Casting Process

**Greater strength.** The greater strength of parts produced using centrifugal casting is a result of higher density grain structures. As the process allows for more control over directional solidification, the grain structure is more uniform and its mechanical properties are almost equal in all directions. This higher structural density increases the life span of the component and allows for higher stress tolerances.

**Increased product purity.** During the casting process, the spinning of the mold places extreme pressures on the molten material. This pressure causes lighter contaminants and impurities to separate from the denser metal. These impurities gather in the bore of the component, minimizing the risk of formation of weak points or areas of porosity within the metal structure.

**Better production cost-efficiency.** Increased product purity also affects production cost-efficiency. The lack of porosity produced through the centrifugal casting process also allows manufacturers to use less metal and produce less material waste. In addition, faster setup and shorter production cycle times lead to improved production cost-efficiency.



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## Advantages of the Individual Casting Process

Die casting is an efficient, economical process offering a broader range of shapes and components than any other manufacturing technique. Parts have long service life and may be designed to complement the visual appeal of the surrounding part. Designers can gain a number of advantages and benefits by specifying die cast parts.

**High-speed production** – Die casting provides complex shapes within closer tolerances than many other mass production processes. Little or no machining is required and thousands of identical castings can be produced before additional tooling is required.

**Dimensional accuracy and stability** – Die casting produces parts that are durable and dimensionally stable, while maintaining close tolerances. They are also heat resistant.

**Strength and weight** – Die cast parts are stronger than plastic injection moldings having the same dimensions. Thin wall castings are stronger and lighter than those possible with other casting methods. Plus, because die castings do not consist of separate parts welded or fastened together, the strength is that of the alloy rather than the joining process.

**Multiple finishing techniques** – Die cast parts can be produced with smooth or textured surfaces, and they are easily plated or finished with a minimum of surface preparation. Die castings provide integral fastening elements, such as bosses and studs. Holes can be cored and made to tap drill sizes, or external threads can be cast.



## **Advantages of the Sand Casting Process**

Sand castings can be readily produced in nearly any ferrous or non-ferrous alloy. Some other casting processes will melt and pour super-alloys in a vacuum, but that is not typically done as a sand casting. Some materials cannot be “worked”, and must be produced as a casting.

The relatively low cost of tooling makes sand casting a process of choice for lower volume needs. Patterns do wear so the material selected for the pattern (typically wood, plastic, or metal) will depend on the expected usage quantity of the part being produced. Though not necessarily cheaper in the short run, the use of machined (or “patternless”) molds may be a cost-effective option for components with expected lower usage over a longer period of time.

Because the tooling cost can be minimal, sand casting may be appropriate for a single piece run. Alternatively, there are automotive components that are produced using this process, so it may also be used in high volume applications. Other elements of design and tolerance are often more important than quantity when selecting this as the preferred casting process.

The casting process itself may be quicker than some others, but it is important to consider the post-casting processes like machining that may be required when computing total lead times.