

What is Water Glass Casting?

Water glass casting is also called **sodium silicate casting**. Its casting process is very similar to investment casting (that is the lost wax [investment casing](#) method). It is a technology uses water glass as the binder for the shell to cast. The Water glass casting technology is from of Russia. Now it is one of the most common investment casting processes in China. About 79% foundries focus its business in water glass casting. the rest are silica sol casting factories.

Water Glass Casting technology is mostly used for steel and stainless steel components. It is particularly suited to larger castings. Compared to the sand casting technique. It is BETTER for big size products more . It allows to produce steel castings ranging from 0.5kg-60kg.compared to silica sol castings. However less precise in dimensions. But it is more cost effective.

Water glass cast components are mainly used where heavier or stronger, more complex shapes are required. Applications of this technique are widely presented in the production of trailers, agricultural machinery and in the offshore industry. The process provides a far superior surface finish and dimensional precision to that achieved through sand casting. It also allows for more complex shapes to be achieved. In addition to steels, it is possible to cast alternative materials such as regular iron using this method.

Water Glass Investment Casting Process

Step 1:Wax Injection

For each casting to be made, melted wax is injected into a mold to produce a wax pattern of the casting. The wax molds are constructed of Aluminum and sized to account for shrinkage in the wax and metal that are being used. Wax tooling ranges from simple two piece dies, to multi-cavity automated dies and complex dies featuring water soluble or ceramic cores.

Step 2: Wax Assembly

Once the wax patterns have cooled and settled to a stable size and shape, they are mounted onto a sprue or tree. The sprue, also made of wax, contains all of the necessary gates, runners and supports to adequately feed the part during the casting process.

Step 3: Shell making

The wax sprue is now “invested” in ceramics to create the mold for the metal to be poured into. The ceramic consists of two parts, a liquid slurry covered with a dry sand. Each sprue is covered in multiple layers of slurry and sand until the ceramic shell is thick enough to hold up during the casting process. The shell building process usually takes 24 hours, with anywhere from 2 days to almost 2 weeks for the shells to fully dry.

Step 4: Dewax

Once the shell has fully dried, the wax is melted out using an autoclave to counteract the expansion of the wax. The shells are then fired to remove any remaining wax residue and cure the ceramic shell. Once the shells have been fired, they are now ready for the casting process.

Step 5: Pouring

The processed shells are placed back in the oven to be pre-heated prior to casting. Once the shells are at the proper temperature and the molten metal has been prepared and qualified, the shells are removed from the oven and the metal is poured into the shells.

Step 6: Finishing

The shell is hammered, media blasted, vibrated, waterjetted, or chemically dissolved (sometimes with liquid nitrogen) to release the casting. The spruce is cut off and recycled. The casting may then be cleaned up to remove signs of the casting process, usually by grinding.

Parameters of Water Glass Casting

Applicable Material	cast steel, cast iron, stainless steel, nodular cast iron, high chromium iron, high manganese steel, alloy steel
Material Standard	GB, ASTM, AISI, DIN, BS, JIS, NF, EN, AS, ARR
Weight	0.02kg-25kg
Tolerance	CT 5~7
Surface Roughness	Ra 6.3
Annual Output	1200T
Application	Auto, motorcycle, valve, marine, machine tools, hardware, railway, gear, impeller, pump, reducer, motor, mining machinery, engineering machinery, transmission machinery, forestry machinery, communal facility, etc.
Drawings	Pro/E, Auto CAD, Solidwork, CAXA UG, CAD/CAM/CAE.

software	
Machining	Turning, milling, drilling, grinding, threading ,NC, etc.
Finishing	Sand blasting, polishing, plating, acid treatment, anodizing, painting, etc.

POSSIBLE ALLOYS for water glass castings

- Carbon steel
- Heat-resistant steel
- Stainless steel
- Non-ferrous steel alloy

Surface finishing

- Electrolytic zinc plating
- Hot-dip galvanising
- Blasting

Benefits of Water Glass Casting

Complex design without draft angles
Cheap moulding process, Lower cost process
Higher accuracy in comparison to sand casting with a superior surface finish
Flexible production numbers

Particularly suited to larger parts

There are environmental advantages from using this method vs the others

Reduction of the cost, as expensive processing and welding operations are eliminated

Water glass casting Applications

Water glass casting is widely applied throughout all kinds of departments of the national economy such as automobile castings, engineering machinery castings, agricultural machinery castings, motor castings, elevator castings, fire control, metal castings and ship castings. As for the agricultural machinery castings, there are a lot of machines and accessories made through the water glass casting.