



Artisanal Handicraft Glass Blowing



Glass is hard material which is in a typical form. Pure glass is transparent. Its surface is pretty hard and difficult to get eroded. However, it is fragile and breakable. Its fracture is sharp. Its characteristic can be easily changed once mixed with other substance or once heated up. It has a high melting point. It is not melted in any substance and not flammable.





Glass Blowing : Characteristics which reflect the local wisdom and artisan expertise

Glass can be produced into many kinds of appliance. It has been developed in industrial work continuously. Glass blowing, which was discovered in the Middle East, has been also developed along glass production industry.

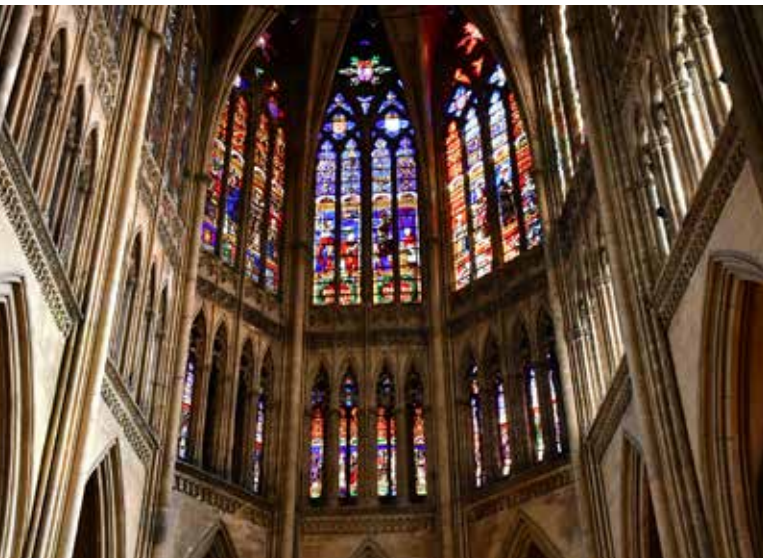
Glass blowing is to bend a glass rod into various shapes by heat. It is considered as high art. A blower has to apply knowledge on both science and art. He/she must keep practicing to become an expert in order to produce good and creative works.

Main components of glass blowing consist of 3 parts, including quality of raw material, knowledge on chemicals and imagination of a blower. Choosing good quality raw material will result in good quality work. Source of good quality glass is from Italy or Europe because of its nice texture, resulting in clear work with no air bubbles.

Theoretical knowledge in chemical is basic skill of a glass blower. He or she is supposed to know how to mix chemicals at what ratios to connect each parts of glass properly.



Finally, it is imagination of a glass blower together with ability to adapt raw material to create the works. A blower is required to have basic knowledge in art with ability to create a work in any shapes. Glass blowing must be done quickly as fire will cause a glass rod to melt very quickly. A glass blower uses his/her imagination to quickly bend, stretch or curve a glass rod into any shape. Thus, only knowledge in theory but lacking imagination, a glass blower cannot perform this kind of work.



Background of glass blowing

Human know and apply glass to use in various forms. This is because mixture and glass production process can be controlled to meet requirements. Hence, it has been used in various aspects, including science, industry, telecommunication, engineering, household appliances and items in daily life or even as small accessories.

It is assumed that glass was originated naturally from melting stone in a volcano that flew out as lava during eruption. When the lava flew along the ground, it melted stone and minerals. Once it was cooled down, it turned as shining hard substance with sharpness attribute. Nowadays, it is called obsidian. Human at that time used it to make a weapon. According to historic evidence, it makes us believe that human knew how to produce glass for the first time in Egypt and Syria around 4,000 years ago. This belief is valid through the discovery of glass beads and utensils.

In the past, glass was in black or dark blue color with opaque attribute. It was commonly used to make utensils or appliances. Later on, it was developed into clear and colorful glass.

During the 17th century, there was a study on glass component. Many new kinds of glass were introduced, such as glasses lenses, microscope lenses, and it was also used to make a prism of a spectroscope. Glass was widely used in Europe. It was made into stained glass to decorate churches.



Glass blowing in Thailand

Glass blowing in Thailand started in 1977. After seeing pieces of broken glass, Ajarn Choo Wiyakarn brought them all and had them melt using heat and mold it into animal figures that he liked. He shared this knowledge within the Faculty of Science, Department of Chemistry, Chulalongkorn University. Professor Dr. Thaeb Neelanithi supported to have this glass blowing included in an academic exhibition of the Faculty of Science through Science Association which was held annually. This helped promote glass blowing until it gained popularity. At present, there is teaching for art in glass blowing and scientific tools are produced in many institutions throughout the country. There are also a lot of freelance glass blowers.

Therefore, glass blowing has gained popularity among children and adult as a price is not expensive depending on delicacy of a work. It is commonly made in animal figures. Children often buy it for pleasure. As for the exquisite ones, such as the Royal Barge Suphannahong or 12 zodiac creatures, are mainly for collecting.





Both soft and hard glass can be used for blowing. During practicing, soft glass or soda lime glass are used as they can be weakened easily compared to other kinds of glass. Examples of products that are made of glass include a glass plate and a glass bottle. Strength of soft glass is its choices of color which can be changed easily and beautifully. However, it has a weak point for fragility so it gets broken easily.

Another kind of glass that is commonly used for glass blowing is hard glass or borosilicate glass. It is in a rod shape at various sizes, which is durable to crash and heat. Once it is melted at high temperature, its shape still does not change. It also endures erosion of chemicals. However, disadvantage is its limited choices of color.

Human have been familiar with glass from the past up to the present time. Equipment and tools are also made of glass. It possesses 3 good characteristics, including clarity, strength and durability to chemicals. Moreover, its special features can be adjusted to make into other kinds of glass as required. Even though there has been much progress in polymer technology development, which results in wider use of plastic in all industries, it still cannot completely replace glass.

Researches on glass bring about a lot of new products. Nowadays, glass industry requires specific expertise to control and produce various kinds of glass product. Even the time passes, the main components of glass remain the same. Even though many kinds of glass are available at present, to produce a glass product that is of low demand, with low production capacity, an original way of making glass, such as melting glass in a small oven and molding manually, is still performed.



Glass blowing is categorized by purpose of usage as follows:

Scientific glass blowing refers to glass blowing to create or to fix glass scientific equipment in a laboratory. It is used in chemical or other related experiments or researches. The works are commonly in a consistent form and size under the same standard, such as a glass tube, a dropper, a condenser or a distillation test tube.

Art in glass blowing refers to blowing glass to create beautiful works such as an ornament or a souvenir. The works are typically not in a consistent format, depending on imagination, expertise and a design of a blower. Examples include glass blowing into figures of animal or flowers.



Equipment and tools for glass blowing

A glassblower burner can be divided into 2 types, namely a desk glassblower burner and a handheld glassblower burner. This is considered major equipment to melt glass until it can be blown into shapes. A glassblower burner consists of 2 gas tubes for fuel gas (butane, liquid propane gas or hydrogen) and oxygen. The end of a tube is sent toward a burner. Once it is lighted, it provides more than 1,000-degree-Celsius flame. The second type of a glassblower burner is used to blow Borosilicate glass. To blow soft glass, a glassblower burner that provides only 800-degree-celsius heat must be used. Apparently, usage of each type of a glassblower burner depends on raw material.

Fuel gas that is used with a glassblower burner can be classified as follows:

- Coal gas is originated from combustion of coal at 1,000 degrees Celsius. This gas is used for soft glass blowing. It is not used in hard glass blowing.

- Hydrogen is flammable gas that gives high temperature. If it is used for hard glass blowing, it is difficult to control. Thus, it is not recommended to use much hydrogen. It is suitable for silicate glass blowing.

- Natural gas, its main element is methane and sub-element is ethane, propane and butane. This natural gas is widely used in glass blowing thanks to its low price and provides good result.

- Liquefied petroleum gas consists of propane and butane. It can be used as fuel for glass blowing but must be used with a burner that is specially designed. The fuel consists of liquid propane and liquid butane at different ratio. Other hydrocarbon also exists in small amount. This fuel will be evaporated once it is used at atmospheric pressure. Liquefied petroleum gas is odorless, colorless, harmless but flammable. Use it with caution.

Glassblower burner



Eyeglasses for glass blowing

When to use fuel gas in a glassblower burner, make a proper design that fits with such fuel gas. To set temperature of flame depends on what kind of fuel gas is mixed with air or oxygen.

Eyeglasses have lenses that are different from general glasses or sun glasses. This kind of eyeglasses has didymium lenses which are special glass that consists of neodymium oxide and praseodymium oxide. Special attribute is that it can absorb up to 90% of yellow light that is caused by glass burning through flames of various fuel gas and oxygen.

The reason why this yellow light in the flame should be eliminated is because it is the light that was caused by sodium in burning glass. Then, it releases power or emits the yellow light range which is so bright that it obstructs working of a blower. This yellow light also consists of ultraviolet ray which is dangerous to eyes. The eyeglasses also protect any accident that might happen from glass cutting, glass extension which might cause any cullet to bounce into the eyes. Thus, these eyeglasses must be worn at all time while working on glass blowing.



A pair of flat nose pliers and a pair of long nose pliers are used to squeeze or pinch glass.

A file to cut glass to make a scratch before breaking with hands.

A triangle to core glass. It is used to core inside a glass tube to be hollow or to expand.

Emery grain in a triangle form

An igniter for gas fire

A spike to drill glass

A steel ruler

Fireproof asbestos sheet

Carborundum to cut glass

A glass rod and stained glass in different colors

Air compressor at strength of 5

Apart from aforementioned knowledge, glass blowing also requires other necessary basic techniques, including flame control, turning glass while working, blowing in a glass tube, shortening and stretching glass.

Blowing art glass is to adapt glass which might be hollow or full into various shapes as desired. It can be made as household appliances, such as a candlestick, a bowl or other decoration stuff in a shape of animal, fruit, construction like a tower, the Royal Barge Suphannahong. All these things have artistic value. It can be used to develop concentration and imagination of a blower. Imagination is deemed important to create works. If a blower does not have any imagination, the work will look unrealistic. Thus, a blower is required to keep practicing to increase experience, boost better concentration and create more imagination from what is seen in daily life.



Different types of pliers



Glass rod and stained glass



How to do glass blowing

Art glass blowing is a work that requires delicacy and beauty according to expertise and experience. The following should be taken into account:

Materials to be used include both soft and hard glass, it can be hollow or full in different colors.

Tools, such as a glassblower burner, a flat nose pliers and a long nose pliers

Understanding the nature of glass on how and when to work on it to get beautiful work quickly.

Proportion of a replica between an actual object and a work to be created. It must be in a right proportion and at proper size.

Sequence on how to mold an object in a proper order. For example, to make a four-feet-animal from a full glass, steps to do are all the same, except for different postures.

Steps of glass blowing

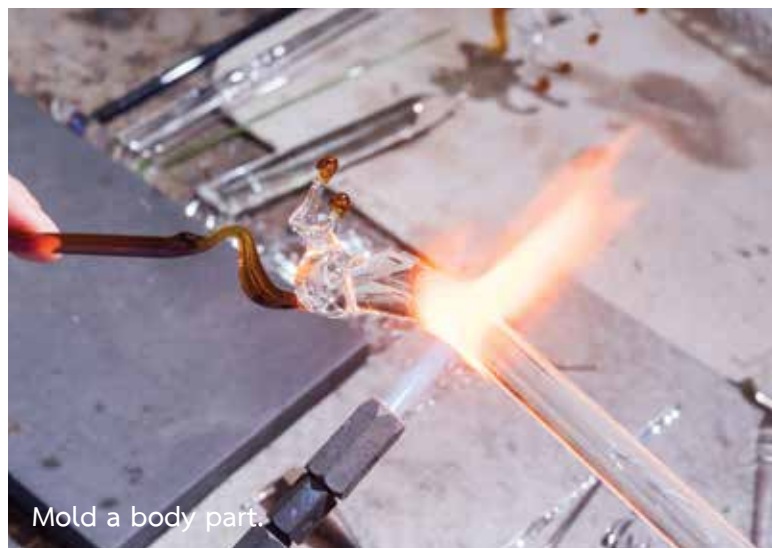
Choose glass at a desired size. Blow the fire and stretch the glass into 2-3 small rods.

Bring stained glass and full glass to pass through the fire. Once it is softened, touch the full glass rod horizontally at both sides and stretch it together until getting a desired length. Important tips for molding, start from molding a body part first.

Once a body part is acquired, proceed with other parts as desired, such as a leg, a tail, a fin. Use a pair of pliers to squeeze as desired.

Once a structure is set up as desired, proceed with other details. Keep the heat up constantly. While connecting each part together, make sure to calculate to get the proper heat. If connecting is not done properly, this would result in a crack.

Check on details and fix any defects of a work. Once a work is cooled down, cut it from a glass rod. Once done, leave it until it cools down, which must be 2 times longer than the length of working.





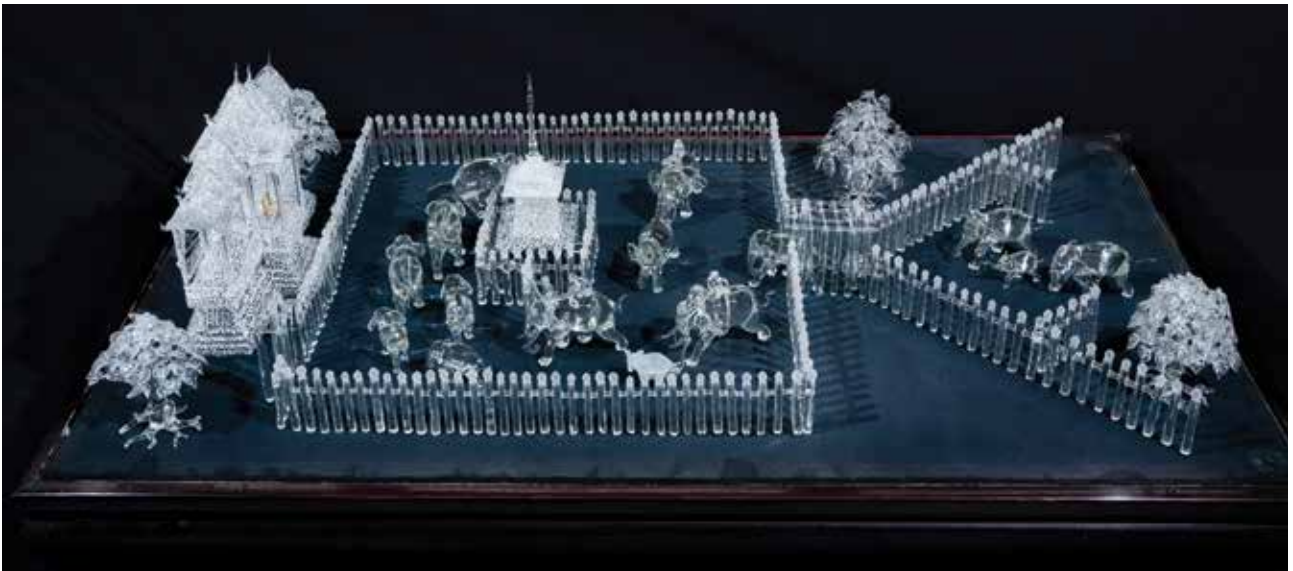
Transforming a shape of glass as desired can be done through burning glass until it is melt and then change a shape by stretching, shortening, bending and blowing.

To decorate a glass rod, a blower must do it quickly, precisely with confidence. This can be done through practicing only. To make each work, it has to be done before the glass becomes hard. In case the glass becomes hard ahead of time, melt it again and repeat the process until acquiring a complete work.

Nowadays, there has been much progress in art glass blowing development. Many tactics are introduced, such as sand blasting to make a surface turbid, gilding with gold leaves, coating with flaxseed oil and gilding with gold leaves. This is to create a value-added product, to make it more beautiful which is deserved for collection. The work that is commonly gilded with gold leaves is mostly a figure of the Royal Barge Suphannahong that clearly represents Thai identity.

Nowadays, there are not many skilled glass blowers. However, it is the pride that young generation expresses much interest in this glass blowing. This can be seen from training courses of art in glass blowing that is organized by Bang Sai Royal Folk Arts and Crafts Center. This allows us to see works of young generation which can be their occupation and source of income. This is a good sign that this glass blowing work will not fade out from Thai society.





References

Interview with Mr. Sumit Ketchom

Basic Glass Blowing Book

www.glasswarechemical.com