

The Original
***Bristol* blue Glass**
TOUR GUIDE

Keeping Bristol's Heritage alive!

Welcome to Bristol Blue Glass, we hope you enjoy your visit. Please feel free to ask any questions. However, please be aware the glassmakers may be concentrating upon their work to answer immediately.



As you enter the Studio/Glass blowing workshop, we politely ask you to be aware of the fire exit in the far left hand corner. In case of emergency, please leave via the nearest fire exit and assemble at the rear of the building in the parking area. Please do not pick up any glass from the floor, it may still be very hot, and most certainly will be sharp. Please also refrain from touching any tools and glass. Please help yourself to the filtered water from the fountain at the base of the stairs, beakers are provided.

The Tools and Equipment

There are two furnaces which are the larger brick built units in front of you. They are constantly hot and get even hotter at night when we are melting tomorrow's glass. Their working temperature is 1100 degrees centigrade, which is as hot as a volcano. Inside is a crucible (a large pot) which holds up to 150kg of molten glass. One furnace contains the world famous Blue Glass, the other contains clear crystal glass. This enables us to make the wide variety of wares you can find in our shop.



There are two round pieces of equipment which are worked very hot. These are called 'glory holes' and are purely there so the glass makers can re-heat their pieces keeping them at working temperature during the making process.

If you look to your right you will see some blowing irons in a flame. So that the molten glass can stick to the irons they have to be pre heated – without hot irons the production stops, hence we need many “Irons in the fire”.

The blowing irons are steel tubes which the glass maker can 'gather' glass upon and blow through into the glass to make the many different forms you see around you. There are also two other types of irons, the first is a solid length of iron called a 'bit iron'. The glass maker's assistant gathers bits of glass from the furnace with the bit iron and delivers it to the maker who then uses it to create handles, stems, etc. Secondly, the 'pontil' iron (often shortened to punty) is used to hold the piece after the glass maker has finished on the blowing iron, this enables them to finish the piece. The word “pontil” is of Latin origin meaning bridging iron.

The benches the glass makers use are of a traditional style, with pictures of similar going all the way back to Roman times. They are quite comfortable to use and each maker will get used to their own.



The hand tools, as you can see, are very basic. The 'jacks' are the long pointy tools that the glass maker uses as a finger to shape and mark the hot glass. Jacks as in “Jack of all Trades” are very useful tools. You will notice some shears, these are diamond shears, named due to the shape of the blades.

The glass maker uses these to cut the molten glass when it is delivered from the assistant. The only other glass specific tools are the large tweezers, these are used to pinch out bits of glass during the forming of some pieces.



Most of the other tools are either adapted from normal hand tools – such as long nosed pliers, files, knives, bits of wood etc. Hand made by the makers themselves. One of the most interesting tool is the simple wet pad of paper, most often made from old newspaper. This protects the glass maker's hand from the intense heat whilst shaping the red hot molten glass.

Making a piece of glass

The glass maker picks up a hot iron from the warmer, cleans the head then approaches the furnace. They open the door and rake the surface of the glass inside the furnace. Glass is a very heavy liquid, and even stones will float on it, so the rake pulls any impurities to the edge and allows the glass maker to *gather* clean glass.



Once the glass maker has a gather they return to their bench, constantly turning the iron as they go, to keep the glass central and not letting it run all over the floor. The glass is then shaped by hand using the wad of paper, before the blowing starts.



Depending upon the shape required the blower can blow the glass up, down or straight, you will see they are turning constantly all the time they are working it. You will also see the maker going to the glory hole to reheat the glass keeping it within working temperature several times during the making process.

You will notice the glass maker using their jacks to cut in at the neck at the point where the glass meets the iron, this is where the piece will be cut away from the blowing iron when being transferred to the pontil. If the maker is making a goblet the assistant will, at the right time, deliver bits of glass to make the stem and the foot. For vases the maker will shape the bubble putting the base in to allow the vase/jug to stand.

When the piece is ready, the assistant will make the pontil and the glass maker will attach it to the base of the piece and crack it off at the neck.

The neck is now quite cool so it has to be softened with heat at the Glory hole bringing it back to working temperature. Then returning to their bench with the piece, the maker uses his jacks to open

and shape the neck of the piece. If the piece is a jug or beer mug, the assistant will gather and bring the handle to the maker. You will notice that glass is just joined by bringing the two pieces together. The temperatures the glass is worked at it is still quite liquid and if you introduce two identical liquids together they mix readily, therefore the joints on the glass are very strong.



A pair of Gin Glasses

When the piece is finished the glass maker hands it over to the assistant to remove from the pontil. This leaves a rough and sometimes sharp mark at the base of the piece. The assistant uses a torch to fire polish the 'pontil mark' as to render it smooth and safe. The piece now has to be placed in an Annealing oven to bake the piece at 420 degrees C before it is cooled over 14 hours to room temperature. This process removes all the stresses from the glass. As something is heated it will expand and as it cools it will contract. If glass is allowed to cool too quickly, part will cool quicker than others thus contracting quicker, this will result in the glass tearing itself apart. This process is called Annealing.

FAQs

How do we make the glass blue? We colour the glass by adding metal oxides to the melt, in the case of the blue we use Cobalt Oxide.

Do the Irons get hot? Yes they do, glass maker's hands tend to become hardened to the heat, but you will notice sometimes the assistant trying to cool the irons with water whilst they are working.

Do they ever get burnt? Yes without doubt they do, but being professional the glass makers try to keep all burns to a minimum. The most dangerous time is within the first 6 months of starting work in a hot shop as this is when the worst accidents tend to happen.



Why Blue? This is quite a long story, it goes all the way back to 1672 when in London a chap named George Ravenscroft experimented with the addition of Lead oxide to glass, eventually creating clear crystal for the first time in human history. This had been the holy grail of glass makers for millennia, prior to this all 'clear' glass was noticeably green, no matter how pale but defiantly green.

Your window glass is green, just look down the thick edge and see - its dark green!

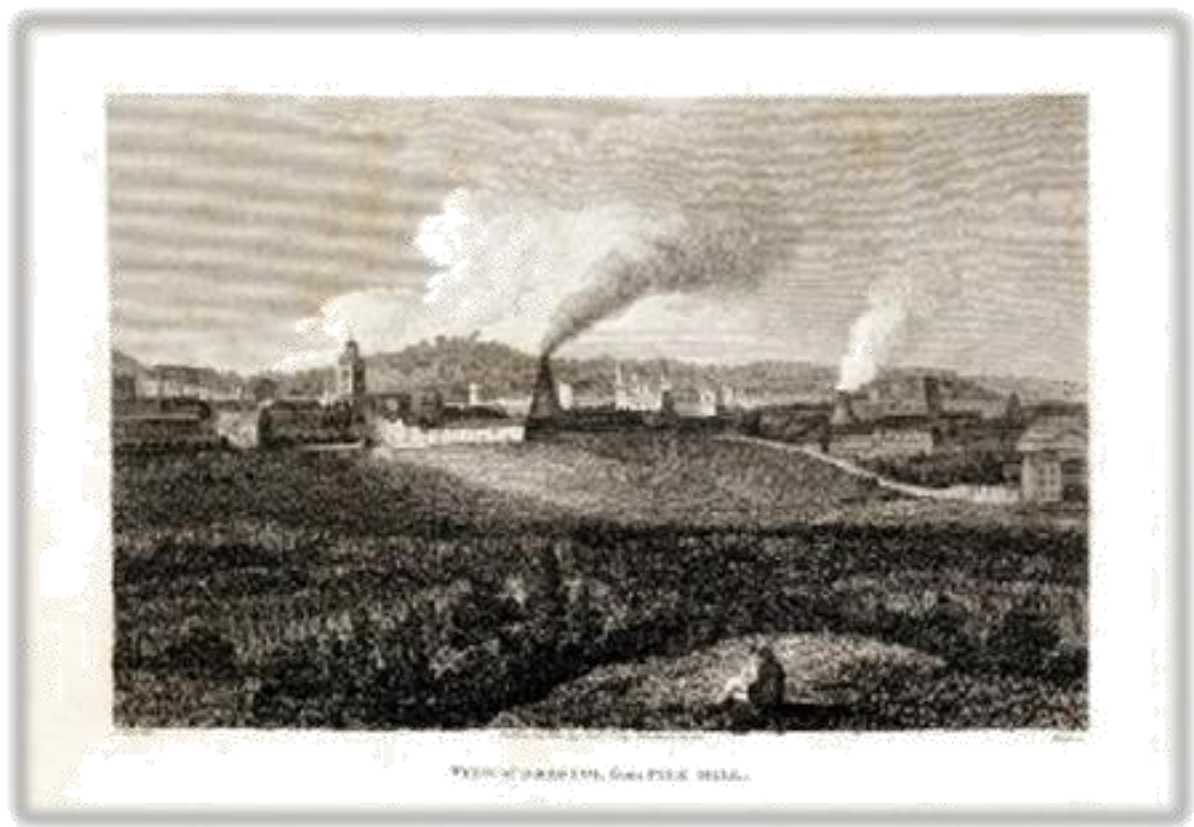
At the time Britain was considered just a back water for glass making against the excellence of the Venetian artists and all glass makers in other countries. The invention of this new clear glass however pushed us into the forefront and all coloured glass became very unfashionable, so much so that to be considered to be anyone at the table glass wares had to all be Crystal glass. Thus the invention of the decanter, bottles were made using cheap sand which made green glass, so the wine had to be de-canted into a clear bottle to be served on the table. In Britain virtually all coloured glass production ceased, except for in Bristol where a large part of the European Bottle

industry existed.

At Redcliffe by the docks there are the most extensive caves in an urban setting globally. These fantastic caves were dug by hand by Bristol people mining sand for the bottle industry. There was also a few glass houses in the 18th century in Bristol that had gone into the production of fine 'Flint' glass which is what the Bristolian's called 'Lead Crystal'.



Inside Redcliffe Caves



Also at this time in Bristol there was a thriving ceramics industry, alongside the port where products were shipped all over the world. Apart from the exporting there was a lot of imports, some of which came from privateers, Ships that attacked Spanish merchant ships returning from the Orient and Americas, plundering their wares bringing them back to Bristol for their sponsors namely the 'Merchant Ventures'. Amongst their spoils were some pottery from China, vases, plates and the like in the willow pattern with the Cobalt Blue glaze. Their value was said to be that of two Bristol houses per vase, a lot of money. Some of the Merchant Ventures' thought it might be a good idea to replicate these vases and sell them on (knock offs?). So they commissioned a metallurgist from the ceramics industry, to find some cobalt oxide to make the glaze. This man's name was William Cookworthy and he discovered cobalt in Cornwall in one of the Tin mines. He bought the rights to mine the metal for the Bristol Merchant Ventures', and the cobalt was brought to Bristol. The attempts at replicating the Ming Vases did not work satisfactory (The Chinese has several thousand years practice before) and the venture was dropped.

In Redcliffe at the time there was a glass works called the 'Non Such Glass Company' this was run by a Jewish glass maker who had come to Bristol from Germany called Lazarus Jacobs. He had set up the 'Flint Glass works' and was making fine crystal. He had a son, who was also a glass maker, named Isaac. It was Isaac who approached the Merchant Ventures' and asked them if he might have some of their Cobalt. They duly gave him some and he went back to his works and added some to the Crystal Glass. The next day he had the rich coloured blue glass which you see before you now.

At this time there was absolutely no demand for anything but clear glass, but Isaac was an entrepreneur of his time. As stated before all glass was green before the lead crystal was invented and people had added Cobalt to glass before but the base glass was always green.

Isaac had created the purest Blue ever made by adding the metal to a clear base. He was also the son of a German Jew therefore it was normal to for him to speak German. At the time George I was our King, he was German and he did not speak English. Isaac made a table service of Blue Glass and took it via a ship to London and St James Palace, where he presented it to the King. The King was greatly amused by this kind gift and probably thrilled to converse in his own language with this bright Glass maker from Bristol. He used the Blue Glass on his table and if it was good enough for the King it was good enough for everyone. King George I has been attributed with coining the term 'Bristol Blue Glass' though I do not know how that would work in German.



The blue glass from Bristol became sort after and famous, Isaac became rich for a while and the rest as this, is history.

Thank you & I hope you have enjoyed your tour, remember we make our glass in exactly the same fashion that Isaac used today without moulds or formers 'Bristol style' so each piece is an individual.



Do not forget to take a piece of glass away with you, as a reminder of your visit here today.

James Adlington – Maker, Director, Bristolian

