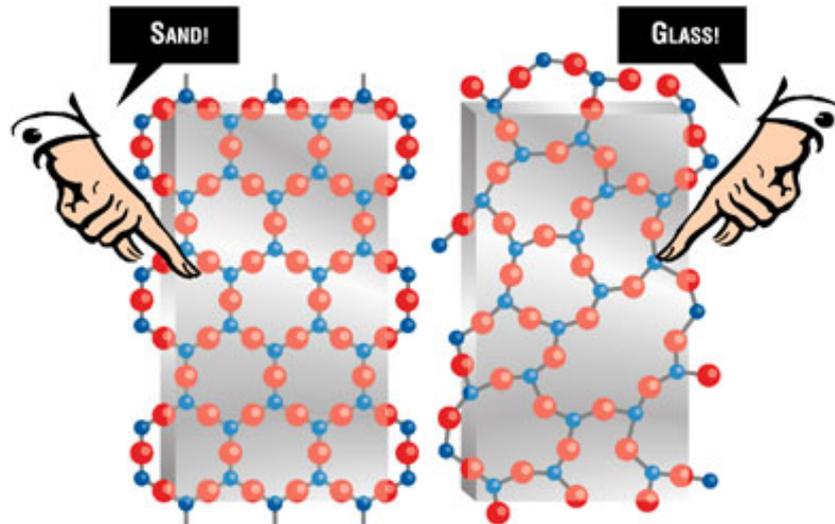


Coloured Glass

Glass is a magical medium characterized by dichotomies – transparent and opaque, crystal clear and rainbow coloured, ancient and contemporary, timeless and beautiful.

Glass is an amorphous material and, as shown below, its molecules are arranged in a random pattern, unlike those of a crystalline material.



Because of its molecular configuration, glass reacts to heat differently. When heated metals change from a solid to a liquid at their melting point. Glass goes through a very gradual transformation—from a material that behaves like a solid to a material that behaves like a liquid. This unique characteristic allows glass to be worked in a kiln either as hot (blown) or warm (fused) glass.

Glass is often called a liquid or more correctly a 'super cooled' liquid. As glass is heated in the kiln its molecules are 'excited' and it behaves more and more like a liquid. Usually glass is worked between 538 – 927°C and at temperatures over 1093°C it is liquid enough to flow like toffee or honey. This behavior means that it is an extremely versatile medium for art glass and there are a variety of techniques.

Glass can be coloured by the addition of metal and metal oxides during the manufacturing process. Even 'clear' glass can have a greenish tint caused by iron oxide impurities. Transparent art glass is available in about sixty different colours. Learning to overlap and overlay these colours can produce over 600 shades and hues – an extraordinary palette for any artist.

The two largest glass manufacturers, Bullseye and Spectrum, both offer a large range of opaque, transparent, clear, textured and specialty glass. Bullseye also offers limited runs of 'designer' glass that are unique and exciting to use.

The table below illustrates the range of additives used and the resulting glass colour.

Metal/Metal Oxide	Combined with	Colour
Iron Oxide		Bluish - Green
Iron Oxide	Chromium	Rich (Wine bottle) Green
Iron Salts	Sulphur/Carbon	Yellow – Amber - Black
Sulphur	Boron Silicates	Blue
Sulphur	Calcium	Deep Yellow
Manganese		Violet - Amethyst
Manganese	As Sodium Permanganate	Deep Purple
Cobalt		Blue
Copper Oxide		Turquoise
Nickel		Blue – Violet - Black
Nickel	Cobalt	Clear
Chromium		Dark Green - Black
Chromium	Tin Oxide, Arsenic	Emerald Green
Cadmium Sulphide		Deep Yellow
Cadmium	Sulphur, Selenium	Bright Red - Orange
Titanium		Yellow - Brown
Selenium	Manganese	Pink - Red
Pure Copper		Dark Red
Gold		Ruby Red - Cranberry
Silver salts		Orange – Red - Yellow

So, with that range of colours and the flexibility of glass as a medium it is not surprising that there are almost 50 different techniques and that is not counting hot (blown) glass techniques. It is also not surprising that glass working is so addictive. It satisfies the creative passion but glass also requires a sound technical understanding of the medium.

Next time some thoughts on how to use the chemical composition of coloured glass to create unique effects and stunning one-off pieces.