

Glass is a non-crystalline amorphous solid that is often transparent and has widespread practical, technological, and decorative usage in, for example, window panes, tableware, and optoelectronics.

Firstly the glass was manufactured in Egypt. Ordinary glass is manufactured by the composition of various substances like silica, bleaching powder, oxides of alkaline metals, calcium oxide (lime) etc. Firstly the glass was manufactured in Egypt. Basically glass is the homogenous mixture of the silicates of various alkaline metals of non-crystalline and transparent or less transparent substances.

Ordinary glass is manufactured by the composition of various substances like silica, bleaching powder, oxides of alkaline metals, calcium oxide (lime) etc. These constituents of the glass are transformed into fine micro powder and after fusing these are melted into the furnaces at moderate temperature and ordinary glass is prepared by a suitable cooling mechanism of the molten or liquid glass. Thus ordinary glass is a non-crystalline substance of ultra cooled liquid glass.

## **Types of Glass**

**Water glass:** It is manufactured from the compound of sodium silicate ( $\text{Na}_2\text{SiO}_3$ ) by heating sodium carbonate and silica. It is soluble in water.

**Photo chromatic glass:** This is a special type of glass which turns black in sharp shining light thus such glasses are used as light protector and eyes reliever and thereby utilised in making eye lenses and goggles. The main reason of being black of such glasses is the presence of silver iodide.

**Pyrex glass:** It is also called borosilicate glass. It has some specific characteristics of chemical durability and more thermal inmmalleable resistance power.

**Lead crystal glass:** This is a special type of glass which is used in making various ornamental items by the appropriate decorative, cutting and designing. Infact on cutting such glasses the optical phenomenon of total internal reflection takes place very sharply and thus a pleasureous dazzling light is produced.

**Soda glass:** It is also called soft glass which is brittle and the cheapest and most commonly existing glasses. This can be broken very conveniently and by the alternation of temperature some cracks appear in such glasses.

**Xena Glass:** It is the best form of glass and from it chemical containers and equipments for the scientific purposes are manufactured. This glass is basically composed from zinc and barium borosilicate which produces the soft and good quality of glass.

**Flint Glass:** It is manufactured from sodium, potassium and lead silicates which are used in making idol objects of cultural importance, costly glass equipments or devices. Such glasses are also used in making electric bulbs, lenses of telescopes, microscopes, camera and prisms, etc.

**Crown glass:** Usually this is a soda-lime-silica glass and it is frequently used in making lenses of eye glasses.

**Crookes glass:** In this glass mainly cerium oxide ( $\text{CeO}_2$ ) is present which sharply absorbs the ultraviolet rays from the sunlight so utilised in making lenses of eye glasses.

**Quartz glass:** This is also called silica glass because it is obtained by melting silica and ultraviolet rays emerge out through it. Thus it is used in making bulb of ultraviolet lamp, in making container of chemical reagents, laboratories equipments etc.

## Glasses, composition and uses

Glasses	Composition	Uses
<b>Soda Glasses</b>	Sodium Carbonate, Calcium Carbonate and Silica	In making tube light, bottles, equipments of laboratory, daily useable domestic utensils
<b>Flint Glass</b>	Potassium Carbonate	In making of electric bulbs, lenses of camera and telescope etc.
<b>Crooks Glass</b>	Cerium Oxide and Silica	In making lenses of goggles.

<b>Potash Glass</b>	Potassium Carbonate, Calcium Carbonate and Silica	In making glass container and laboratory equipments, glass utensils which are heated up to very high temperature.
<b>Pyrex Glass</b>	Barium Silicate and Sodium Silicate	In making laboratory equipments and pharmaceutical containers or vessels.



<b>Pyrex Glass</b>	Barium Silicate and Sodium Silicate	In making laboratory equipments and pharmaceutical containers or vessels.
<b>Crown Glass</b>	Potassium Oxide, Barium Oxide and Silica	In making lenses of eyes glass.
<b>Lead crystal glass</b>	Potassium Carbonate, lead Oxide and Silica	In making costly glass containers or vessels etc.

## **How glasses get coloured?**

During the preparation of glasses its various components or constituents in the molten or fused state are sometimes altered (replaced) or more appropriately some extraneous substances like metallic oxides are accessed or added, then glasses become coloured. Also various accessible substances produce different colours in the glasses. For example; On accessing ferric oxide in ordinary fused glass a brown coloured glass produces. Similarly the substances like chromic oxide, manganese dioxide, cobalt oxide etc. on mixing (accessing) in fused glass, green, red and blue coloured glasses are produced. Generally for the fascinating coloured glasses small quantity of metallic compounds are accessed in the molten or fused state with their constituent's component.

<b>Substance used for colouring the glass</b>	<b>Colour of glasses</b>
Cobalt Oxide	Deep Blue
Sodium Chromate or Ferrous Oxide	Green
Selenium Oxide	Orange red
Ferric Salt or Sodium Uranet	Fluorescent Yellow
Gold Chloride or Purple of Cassias	Ruby red
Cuprous Oxide, Cadmium Sulphide	Glitter red

Cupric salt	Peacock Blue
Potassium dichromate	Green and green yellow
Manganese dioxide	Blue to light orange
Cuprous salt	Red
Cadmium sulphide	Yellow like lemon
Carbon	Brownish black