Glass Manufacturing Process

What is Glass?

Glass is a substance that has certain properties, primarily fragility and stiffness, which makes it similar to solids, but a disordered structure gives it a liquid qualification. Glass has no thermal and electrical conductivity and does not react with most of the known chemical compounds.

What is Glass Made Of?

The primary raw materials in glass are sand, soda, limestone, clarifying agents, coloring and glistening glass. Glass sand is about ¾th of the entire glass composition.

How is glass produced?

The so-called float line technique can continuously produce glass 24/7. It is therefore a river of glass that exits the furnace before being cooled as it progresses along its path of around 300 meters and is then cut into
very large sheets, which most frequently measure 3.21x2.25 meters.

**Manufacturing Process**

There are 4 key stages involved in a glass manufacturing process;

- Melting and Refining
- The Float Bath
- Annealing
- Cutting

**Batch Mixing**

The batch must be carefully controlled and mixed in order to generate a glass with a composition which meets the requirements of EN 572-1:2012 and conforms to Saint-Gobain's own internal standards.

All of the raw materials used by Saint-Gobain in the production of float glass are responsibly sourced. Saint-Gobain India is the only Indian glass manufacturer to be awarded BES 6001 [3] accreditation.

Saint-Gobain also utilises, on average, 20% recycled glass (cullet) in the batch, which has the additional benefit of lowering the melting point of the batch, resulting in a more efficient process.

**Melting and Refining**

Within the furnace, a continuous melting process takes place.

The batch is automatically charged into the furnace, and the materials are melted at approximately 1550°C. Whilst in the furnace, the molten glass is homogenized and refined, with bubbles being removed.

The molten glass will exit the furnace at approximately 1000°C

**The Float Bath**

The molten glass is floated onto a bath of molten tin, forming a perfectly flat surface like a ribbon. The width and thickness of the glass ribbon is controlled by the rate at which the glass is pulled through the tin bath.

The ribbon will be cooked as it travels through the tin bath, leaving at approximately 600°C.

**Annealing**

Annealing is the process of heating the glass to a particular temperature, keeping it there for a certain amount of time and cooling it slowly in order to remove internal stresses.

The glass ribbon is continually cooled to approximately 100°C, at a controlled rate, in order to prevent the generation of stresses within the glass. Any excessive stress present in the glass may cause fractures whilst cutting, handling or processing. The annealing process allows the glass to be cut and worked without such
Cutting

The glass is monitored using an online defect detection system, and sheets are cut to optimize, removing any detected defects. The resultant glass is produced in 3 main sizes, plus standard stock sizes;

Cut glass is then stacked for shipping to customers, or sent for further processing such as coating or lamination, based on the requirements.

Coaters

The sheets of float glass can now be directed to another part of the plant where one side undergoes very high-tech treatment: the deposit of a coat in a coater or so-called off-line magnetron line or alternatively pyrolytic techniques are still used on certain float lines. These treatment processes provide the glass with thermal insulation, solar control or easy-clean properties (SGG PLANITHERM, SGG COOL-LITE, SGG TIMELESS, etc. ranges).

Other Facilities

Some sites may be mixed or specialized, with specific production resources to produce laminated glass, double glazed unit, tempered glass, decorative glass, mirrors or fire resistant glass.

To produce mirror with particularly transparent glass, one of the surfaces must be coated with a series of coatings called “silvering” (SGG MIRALITE range).

To lacquer large sized sheets directly with a classic or on-trend color in the SGG PLANILAQUE range, coatings of colored material are deposited on one of the surfaces of the sheet.

Photo Gallery

Saint Gobain Manufacturing Process