

HISTORY OF GLASS BLOCKS

In the early 1800's, individual glass blocks were used to provide light to cellars and ships' bowels - at first, cut squares of simple conventional glass, then prism-shaped pressed glass which allowed light to be dispersed.



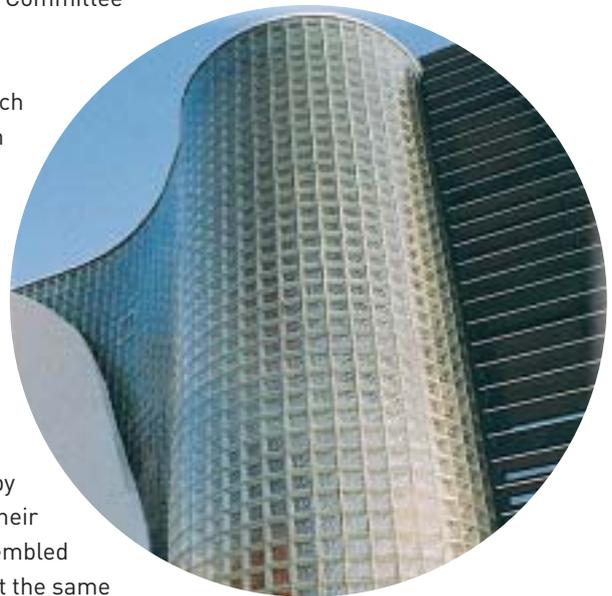
In order to fix this prismatic glass, they were fitted into steel frame structures in the form of intermediate ceilings or skylights which allowed larger surfaces to become translucent.

The invention of reinforced concrete - first used by Monier in 1867 - and the introduction of glass manufacturing by machine which started with the first Lubber machine in 1903 opened up new perspectives for glass as a large-scale spatial element.

In 1904, Joachim, a French architect, built the first dome of concrete and glass. In 1907 Friedrich Keppler, founder and head of the Berlin Luxfer-Prismen-Gesellschaft applied for a patent for solid glass blocks of 4 to 6.5cm thickness, to be fitted into support structures of reinforced concrete. In the following year Joachim applied for the French patent, "Le béton armé translucide".

The development of hollow glass blocks for vertical structures, which offered the advantage of better noise and thermal isolation in comparison to the solid blocks, took place at about the same time. In 1902, the "Technical Military Committee" praised the excellent properties of this new invention.

As early as the 1880's, hexagonal bodies with arched exteriors which could be composed into honeycomb constructions, were mouth blown for partition and exterior walls. The hollow glass forms which were shaped like neckless bottles were initially worked with mortar. Great care was taken to place the open ends into the mortar in such a manner that the hollow area was hermetically sealed off against the outside air. Condensation could however seldom be prevented completely. These first mouth-blown blocks also suffered from such production deficiencies as differing wall thicknesses and thin corners.



Soon however, more robust machine-made blocks were offered by Luxfer-Prismen-Gesellschaft as well as Siemens in Dresden. Their products consisted mainly of open hollow glass blocks which resembled the usual bricks in size and form. Albert Gerrer in Mulhouse was at the same time still manufacturing mouth-blown glass blocks using Falconnier process which however were sealed before the block cooled down with small glass plugs. Their form still resembled that of the hexagonal prototypes.

It was not until the 1930's that the further development of machine production produced more satisfactory types which were easier to work. The Corning-Steuben block, consisting of two halves of heat-proof glass pressed together, as well as the Owen-Illinois block became immediate precursors of the patented block of Pilkington Bros Ltd. (St Helens). Modern glass blocks are still being produced according to this principle, namely that two moulded-glass halves with a hollow interior are melted and fused together under high temperatures.

THE MANUFACTURING OF GLASS BLOCKS

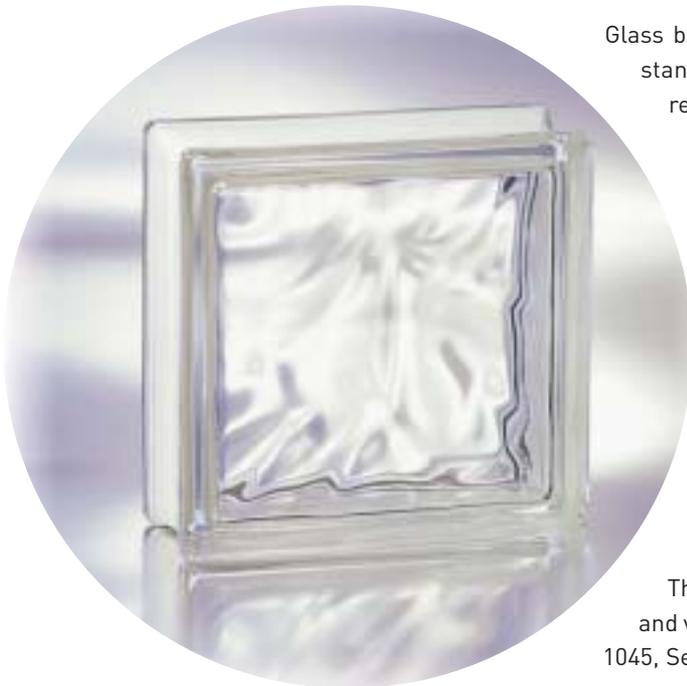
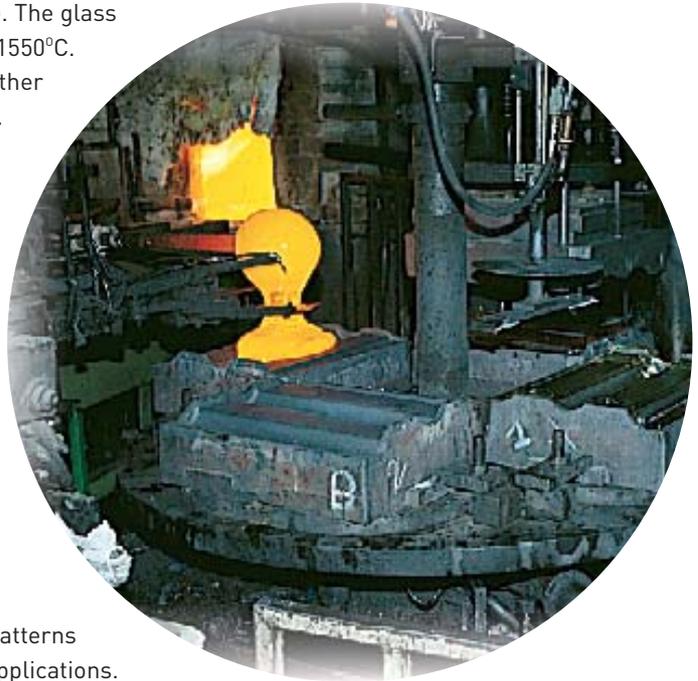
In modern glass production, various additives are used in addition to basic raw materials of glass sand, soda and limestone. The glass batch is melted at a temperature of approximately 1550°C. The resulting viscous vitreous mass is processed further after planing, i.e. degasifying at approximately 1200°C.

Glass blocks as well as pavers are nowadays moulded between a female mould and a male mould. Hollow glass blocks are composed of two halves. The webs of the two halves are heated to approximately 800°C and then pressed together under slight pressure.

During the following annealing process a vacuum of approximately 70% is formed in the block interior thus preventing the formation of condensation. The lateral surfaces of the glass block are provided with a web paint.

Glass blocks are manufactured in different sizes and patterns in accordance with the various requirements and applications.

The present commercial method of manufacturing allow glass blocks with a maximum surface of 30cm x 30cm to be produced. They are used to produce straight and curved interior and exterior walls.



Glass blocks produced in the Federal Republic of Germany are standardized building materials and must meet the requirements of DIN 18 175 (Glass Blocks, Requirements and Testing). Their production is monitored externally by the State Material Research Laboratory of North Rhine Westphalia in Dortmund.

Glass for floors of reinforced concrete are manufactured similarly to glass blocks either in one piece or two pieces joined by melting as solid or hollow blocks with smooth or structured surfaces.

Glass for floors of reinforced concrete fulfill the requirements of DIN 4243 and are manufactured in different sizes.

They are used in manufacturing flat components for live and vehicle loads and supporting structures of glasscrete (DIN 1045, Section 20.3 Reinforced Concrete with Glass Tile Fillers).