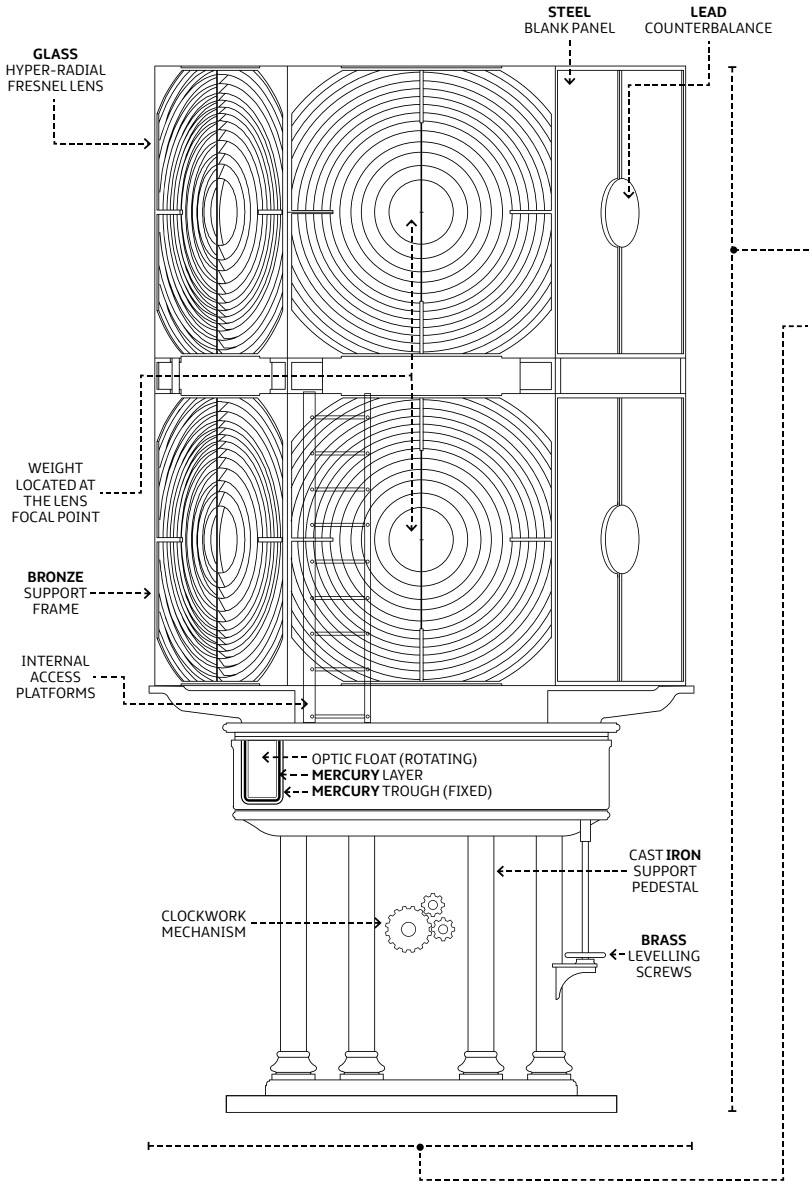
Materials

What is the Great Light made of?

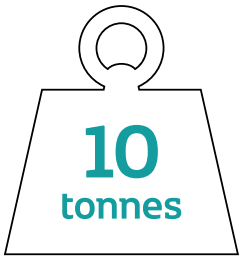
The Great Light is made of many different materials. As it was designed to work in the lantern room at the top of the lighthouse all the materials had to be resistant to the corrosive moist salty air. The materials used are glass, bronze, brass, steel, cast iron, lead and mercury.



The optic is

7m tall, 3m wide

and weighs



The Great Light

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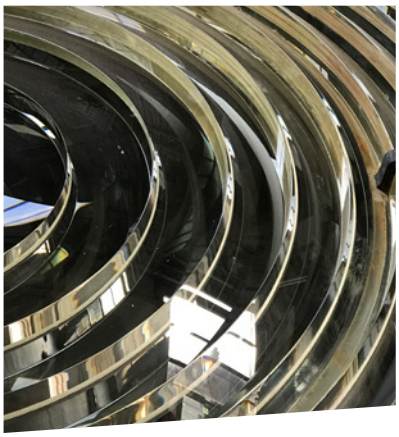
Glass Lenses and Bronze Frame

The eight Fresnel lenses are made of very special glass. They were made at the Saint Gobain factory in France before 1887. The glass was made with 72.1% silica, 12.2% soda, 15.7% lime and alumina and iron oxide traces which were heated together at a very high temperature to form 'crown glass' with few flaws. Each lens is 158cm wide x 73cm high, 7.7cm thick. The high percentage of silica makes the glass hard and resistant to salty air. The greenish colour is due to impurities of iron oxide.

The production of the glass rings was highly complex with workmen casting the rings before working them on turntables. Once complete the lenses were washed and polished. Find out more - **uslhs.org/fresnel-lens-makers**

The bronze frame holds the lenses in place. Bronze is an alloy made of mainly copper with some tin and other metals. This is a hard metal alloy which is very resistance to corrosive sea water. The Great Light's frame is stamped with the maker's name F.Barbier 1887 Paris.



Steel Blank Panel and Lead Weight

There are two blank panels in each tier. They are made of steel, an alloy of iron and about 1% of carbon and other elements. Steel has a high melting point, is very strong and resistant to corrosion. They are used to produce the dark period in the flash sequence.

The weight in the middle of the blank panels is made of lead. Lead is a heavy metal. The lead weight is needed to balance the optic, otherwise the weight of the lenses would tip the optic over. Lead is a poisonous metal.

Cast Iron Pedestal and Mercury Bath

The pedestal is made of cast iron, which is an alloy mainly made of iron with 2-4% carbon. It is easy to cast and mould. It will rust, so the pedestal has been painted to protect the surfaces. The pedestal has to be strong, to resist the compression force of the heavy lenses above.

Within the pedestal is a trough which contained mercury, a very dense and almost frictionless liquid metal. The heavy lenses were 'floated' on mercury making the lenses easy to turn. Mercury is highly toxic and has been removed.

Brass Levelling Screw and Clockwork Mechanism

Brass is an alloy of copper and zinc. It is strong, hard wearing and will not corrode. It is easy to cast. The levelling screw could be adjusted to ensure the pedestal was level.

The clockwork mechanism turned the panels at night. A large 500kg lead weight was wound up to the top of the tower. As the weight dropped it turned a drive shaft which rotated the panels very precisely. At night, the lighthouse keepers would wind the weight up to the top, every 30 minutes.