

# Pressed Glass

Richard Edlund

**Kalmar läns museum**  
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# Pressed Glass

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Examples of pressed glass from the Målerås catalogue 2019.

# Introduction

Pressed glass is still manufactured today in the Kingdom of Crystal but only to a very limited extent. Pressed glass has been described as the single greatest invention in glass manufacturing during the 1800s. However, this development never achieved the status it deserved. On the contrary, pressed glass was long seen as a cheap, mass-produced product that had little to do with glass art and high level craftsmanship. The typical example of pressed glass is manufactured exactly as the name suggests, in a press. With pressing technology, the glass factory was able to produce large quantities of glass, even with detailed patterning, in a cost-effective way. This way, from the middle of the 1800s, glass could be purchased by a larger part of society. Pressed glass began to have its own discernible types of expressive qualities and the manufacturing technology was continually refined. The art of cold-working and polishing pressed glass was also developed. In Sweden, the Gullaskröv glass factory became the leader in the field. The available literature on the topic of pressed glass technology is not extensive. Today, in 2019, pressed glass continues to be manufactured at Kosta glass factory, Reijmyre glass factory and Målerås glass factory, but production is limited.

Over the years, Kalmar County Museum has worked with various types of cultural heritage traditions and historical sites within the Kingdom of Crystal. In this report, we focus on pressed glass. In other words, it is a semi-mechanical manufactured type of glass that is our focus. The starting point for the report is documentation in connection with the manufacture of two glass objects at Målerås glassworks in September 2019.

As a supplement, there is also a description and reflections on experiences with a glass press that has been preserved at Bergdala Glass Technology Museum. At a workshop at The Glass Factory in Boda, September 2019, various pressed glass objects were presented to the public. Participants in this event were provided further knowledge about the technology, as well as an understanding of the conditions that apply to pressed glass production. In an introductory chapter, there are descriptions of other glass processing techniques that are technologically similar to pressed glass or that can be considered as a further expansion on the subject. As resources for the work, several experts were contacted and literature on the subject has been consulted.

The report was fact-checked by glass antiquarian Björn Arfvidsson, head of collections at Kulturparken Småland in Växjö. Special thanks to Stefan Erlandsson, Ulven Art Glass; Mats Jonasson, Målerås glassworks; Berne Karlsson, Kosta; Stefan Brandstedt, Målerås glassworks; and Kerstin Fröberg, Bergdala Glass Technology Museum.

## Definition of the term pressed glass

There are several definitions of pressed glass. The following documentation uses a definition made by the author of this document in collaboration with Björn Arfvidsson, glass antiquarian and department head of the Kulturparken Småland/Smålands museum. According to this definition, pressed glass is a glass object formed in a mechanical glass press. The glass mass is poured into a cast-iron mould, which corresponds to the outer

shape of the glass, and is pressed with a plunger of cast iron or graphite, giving the glass its internal shape. The technology provides a glass product where the inner and outer mould is independent of each other, unlike mould blown glass where the inside follows the outer mould. The inner surface created by the plunger is often smooth, because the plunger is usually smooth, without a pattern. The decoration is created by the cast-iron mould. Multi-part glass moulds, additionally, allow one to create a stem or handle pre-formed in the mould, which is time-saving. The plunger can have straight sides, or, most commonly, a downward tapered shape. A fully or semi-mechanised glass pressing can be performed by a robot. In this type of pressing, several moulds are used which are placed on a rotating table or carousel. It is typical with furnace melted glass manufacturing to make many products in a short time. Compare this contemporary definition of pressed glass with earlier definitions on page 54.

### Techniques closely related to pressed glass

Some technologies are closely related to pressed glass either through similarities in the manufacturing technology or the final appearance of products. This often leads to a variety of products being confused with pressed glass, which is why it is of interest to describe these close variants in this publication as well. Below is a brief description of the cast-slump method, pour casting, fixed mould blowing, injection moulding and sand casting.

The **cast-slump** method is a mechanised pressing technique, which is a further development of the traditional pressing method. The procedure is programmed on a computer and carried out with the help of hydraulic presses. The shape of the press' lower haft consists of a flat plate with incised decorations. The disc can have a diameter of up to 40 cm. From the glass furnace, a glob of glass is measured of the desired size and is released onto the disc, a process in which the "feeder" delivers the "gob". The hydraulic press depresses the

plunger. The disc is ejected when the template or ring is lifted and the factory worker, a "presser", takes the flat round glassware and moves it to a slumping mould of graphite. In the slump mould, the glass is allowed to sink into the shallow shape that is desired. Manufacturing takes place at a fairly high pace. Therefore, many copies of the graphite moulds must be prepared. These moulds go around in a looped production line, being constantly filled and emptied along the way. The method was developed by Göran Wärrff at Kosta Glassworks. The technology was also used manually for individually manufactured "edition pieces" and more artistically designed glass.

**Pour casting** can be described as a precursor to pressed glass. The glass mass is poured into the mould. When the glass mass fills the mould to the required level, a pattern or figure is squeezed into the glass mass with a metal or graphite object that can be likened to a seal stamp. The decoration is added through the "seal stamp" from above, but there can also be decoration in the base mould which the glass is being case into. As an example from the 1950s, Erik Höglund at Boda glassworks used this technique. Today, casting technology is most commonly used in the manufacture of small solid glass objects such as sculptures, figurines and candlesticks.

**Fixed mould blowing** means that you blow glass in a mould, but you do not twist or rotate the glass inside the mould. The mold is built and hinged in two parts and this allows for interior patterning that will be impressed on the glass object. Blown glass in fixed moulds has in some cases been mistakenly referred to as pressed glass. It is a technology whose origins are old. In Sweden, fixed moulds were used in the 1580s by the glass factory in Nyköping. In the coming centuries, many bottles and simpler glassware were blown in fixed moulds. The material used in the moulds has varied over the centuries but there are examples in clay, wood, brass or bronze alloys and cast iron. From the 1820s and onwards, the use of fixed

mould blowing was increasingly used to decorate, for example, wine glasses, drinking glasses or decanters. The technology was a manual craft from the beginning but later on also came to be completely mechanised. The method can sometimes be difficult to distinguish from pressed glass.

**Injection moulding** is often used in the manufacture of small patterned figurines. In injection moulding, a glob of glass is pressed through a narrow channel under pressure into the second and final part of the mould. The “pin” remaining in the channel can be cut off. The method is still used today.

For the **casting** of glassware, various types of moulds are used. Even within the pressed glass technique, the mould is central to the process, that is where the similarities are found.

Sand casting is an example of an old technique that has resurfaced, revived by glass designers Bertil Vallien at Åfors/Kosta Boda and Kjell Engman at Kosta glassworks. When pouring in sand, a box is filled with a moist sand and clay mixture. With various templates, imprints are made in the sand. The cavity is filled with hot molten glass. Various pre-formed glass objects can also be placed into the middle of the glass mass as it is being poured.

# History

## Tentative start

The art of producing pressed glass in metal moulds was developed in the United States in the late 1820s. The driving force was a desire for a cheaper alternative to the cut glass which had then come into fashion. The earliest pressed glass was produced by the New England Glass Company in Boston in 1827. It has been claimed that cast or pressed glass was manufactured in Holland and England as early as the late 1700s. Everything indicates that this is a misunderstanding. Instead, it is believed that those objects were instead cast or blown in fixed metal moulds, a technique used in England at the end of the 1700s.

Pressed glass as a manufacturing method can be regarded as one of the greatest innovations within the glass industry during 1800s. This new way of making glass came to revolutionise manufacturing worldwide. It became possible to mass-produce glass at a low price, and therefore target and reach groups who previously could not afford to buy glass objects at all. Around 1830, machine-pressed glass had become common in Europe as well. The first manufacturers of pressed glass in Europe were French.

Also in Sweden, the interest in pressed glass was great. Joachim Åkerman at the Institute of Tech-

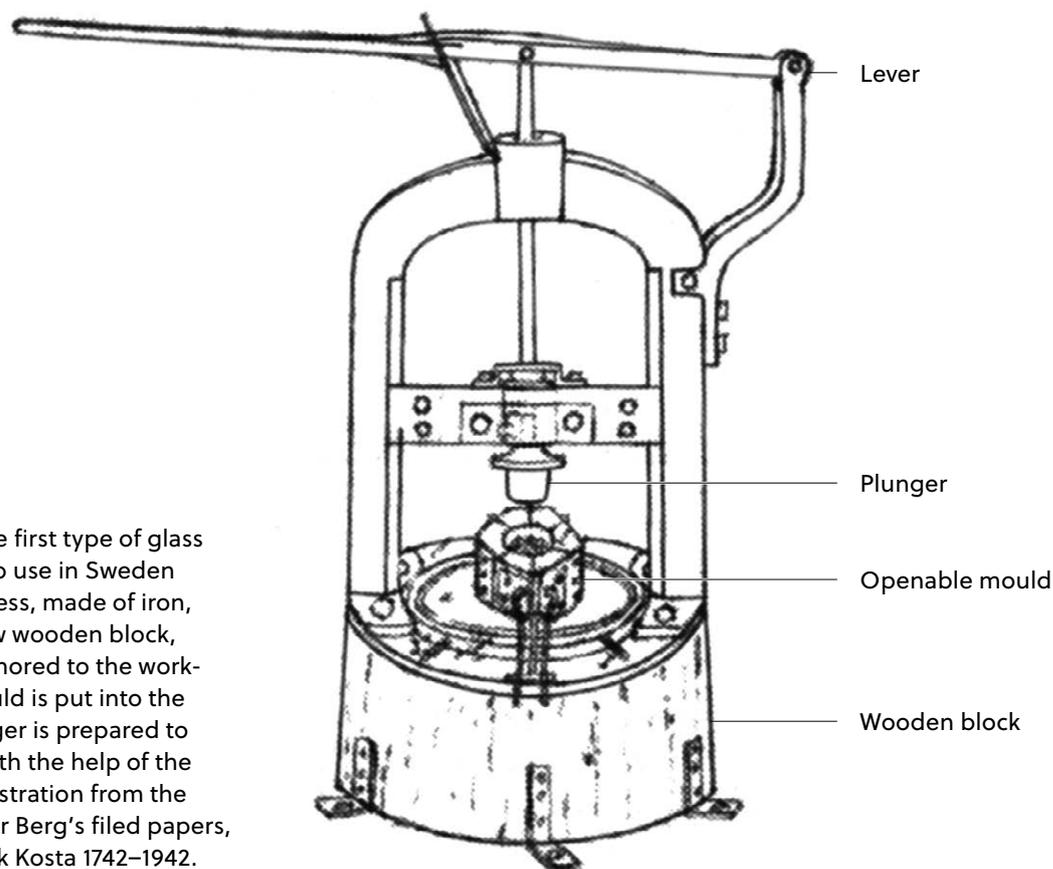


Pressed glass in the shape of a chicken, which consists of two parts, manufactured by Alsterbro glass factory. Photo: Pierre Rosberg, Kalmar läns museum.

nology in Stockholm was therefore commissioned to investigate how pressed glass was manufactured in France during a study trip to Paris in 1833–1834. When he returned to Stockholm he brought samples of pressed glass as well as drawings for glass presses and moulds for glass pressing. In 1836, Reijmyre glassworks bought a glass press from the company *Joachim Åkerman Östergötland* and soon the firm became the first in Sweden to produce pressed glass, closely followed by *Skönvik's Glassworks* in Väster-norrland.

It took some time for high quality pressed glass to be manufactured in Sweden. The earliest Swedish pressed glass was often defective. Only a few examples are preserved. At the National Museum och Science and Technology in Stockholm, there are some early examples of pressed glass, including a candlestick cuff from Reijmyre glassworks, manufactured in the 1830s.

At Kosta glassworks, the owners wished to start manufacturing pressed glass just as they did at Reijmyre glassworks. The factory blacksmith was asked to make a glass press. The blacksmith was Peter Stenberg. His father Magnus had started as a blacksmith at Kosta in 1797. In 1839 Peter Stenberg built his first press. The result was less than successful. The two presses that were subsequently purchased from S. Owen in Stockholm and the utility patron Morsing in Nyköping, respectively, were no better. The moulds kept breaking and the blacksmith kept having to repair them. Then the factory inspector Berzelius involved himself in the situation. Berzelius, the workshop manager and the blacksmith travelled to Reijmyre to “gather knowledge of press mould work and the repair of moulds if they broke”. Then, for three years, the blacksmith was put to work pressing all the glass that was manufactured. The labour yielded results over time and pressed glass appeared in



An illustration of the first type of glass press that came into use in Sweden in the 1830s. The press, made of iron, is mounted on a low wooden block, which in turn is anchored to the workshop floor. The mould is put into the press and the plunger is prepared to be pushed down with the help of the lever. Processed illustration from the glassworks manager Berg's filed papers, taken from the book *Kosta 1742–1942*.

the factory catalogue in 1850. It is likely that the early presses resembled the sketch found among workshop manager Berg's filed papers at Kosta, see page 11.

The work on the production of the pressed glass was unfamiliar to those who worked in the blowing workshop. For a long time, it was the master himself who cut the mass into the mould and thus made the assessment of how much was needed. When using a press mould, its temperature is important. A mould that is too cold produces wrinkles on the glass surface. The opposite, a mould that is too warm, makes the glass stick to the surface of the mould. Another important detail is the importance of keeping the moulds clean and free of dirt and foreign particles. The smaller objects were easier to make, but significant care was also required to clean the moulds. It was more difficult to manufacture large objects. To produce roof tiles using a glass press, the glassworkers had to pour the glass mass with a ladle, instead of gathering with a rod as they normally would.

### Further development of moulds and presses

During the first ten to fifteen years, the moulds were of brass but a transition to cast iron occurred during the second half of the 1800s. In a letter preserved since 1854, sent from Kosta and addressed to press mould maker Petersson in Växjö, the mill inquires whether there is the possibility of ordering cast iron moulds as *“these last much better and smooth pressed glass becomes more beautiful in them”*.

The presses improved over time and they became an import commodity. The first type that stood on a wooden block was replaced at Kosta by a lighter and more portable variant. The new variant was a so-called eccentric press that was first tried out in 1893. The eccentric press did not last long at Kosta as it was perceived as awkward and clumsy during the moment of pressing. Instead, they switched to the more modern spring press, as described briefly in the anniversary book about Kosta from the year 1942. *“Uppfinningarnas bok”*

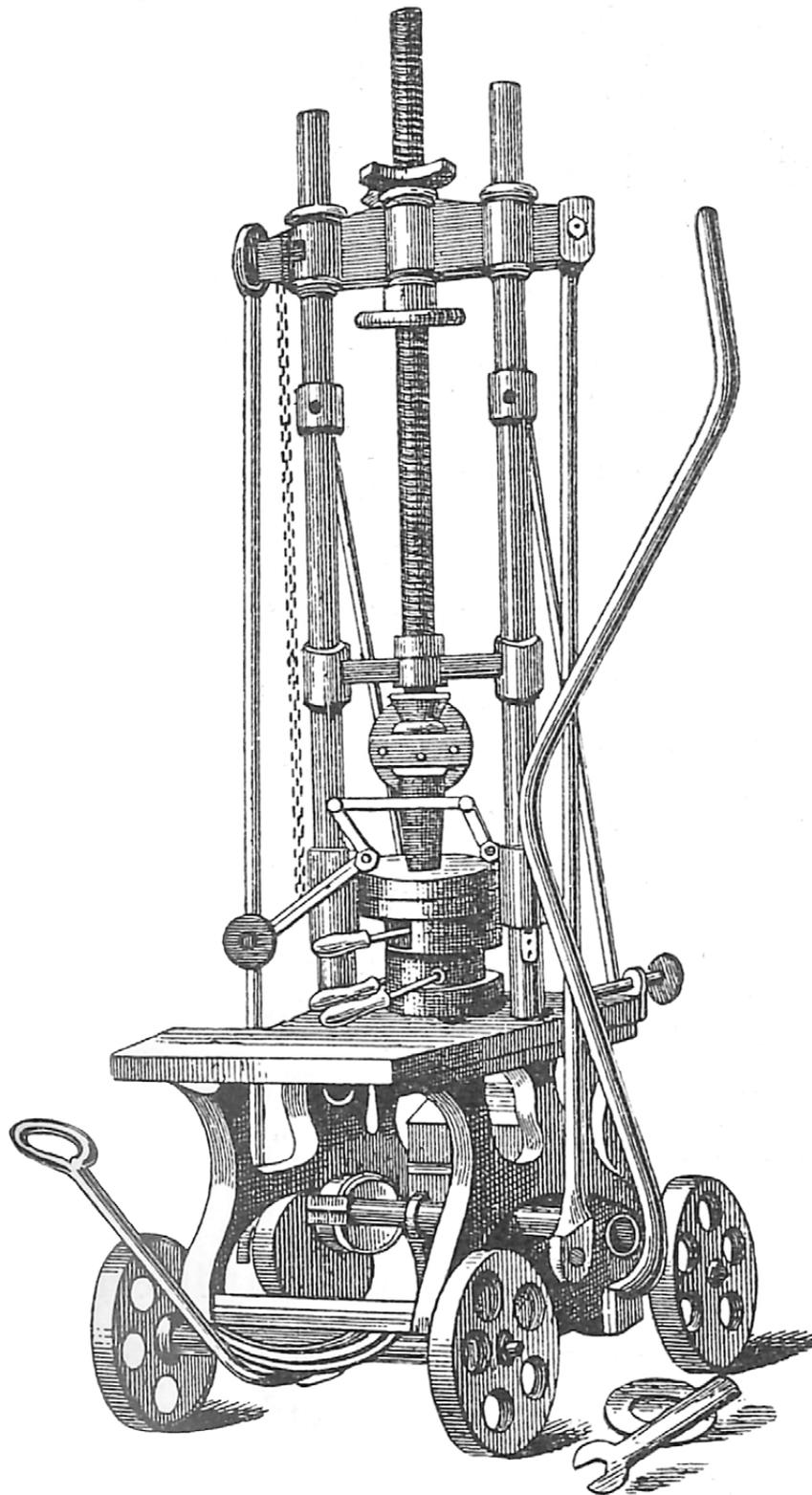


Moulds for pressed glass were initially purchased from abroad. Eventually, moulds were also produced in Sweden. Johan Wilhelm Bergström was the first in the country to do this. To create a mould in cast iron, a cast model was used. In this picture, the model is made of wood. It is manufactured by the Bröderna Andersson mould factory located in the municipality of Alvesta. The casting model served as a template for the casting mould for the foundry that produced the press glass mould. The client was Nybro glassworks. The object is included in the collections of Kulturparken Småland. Photo: Björn Arfvidsson, Kulturparken Småland.

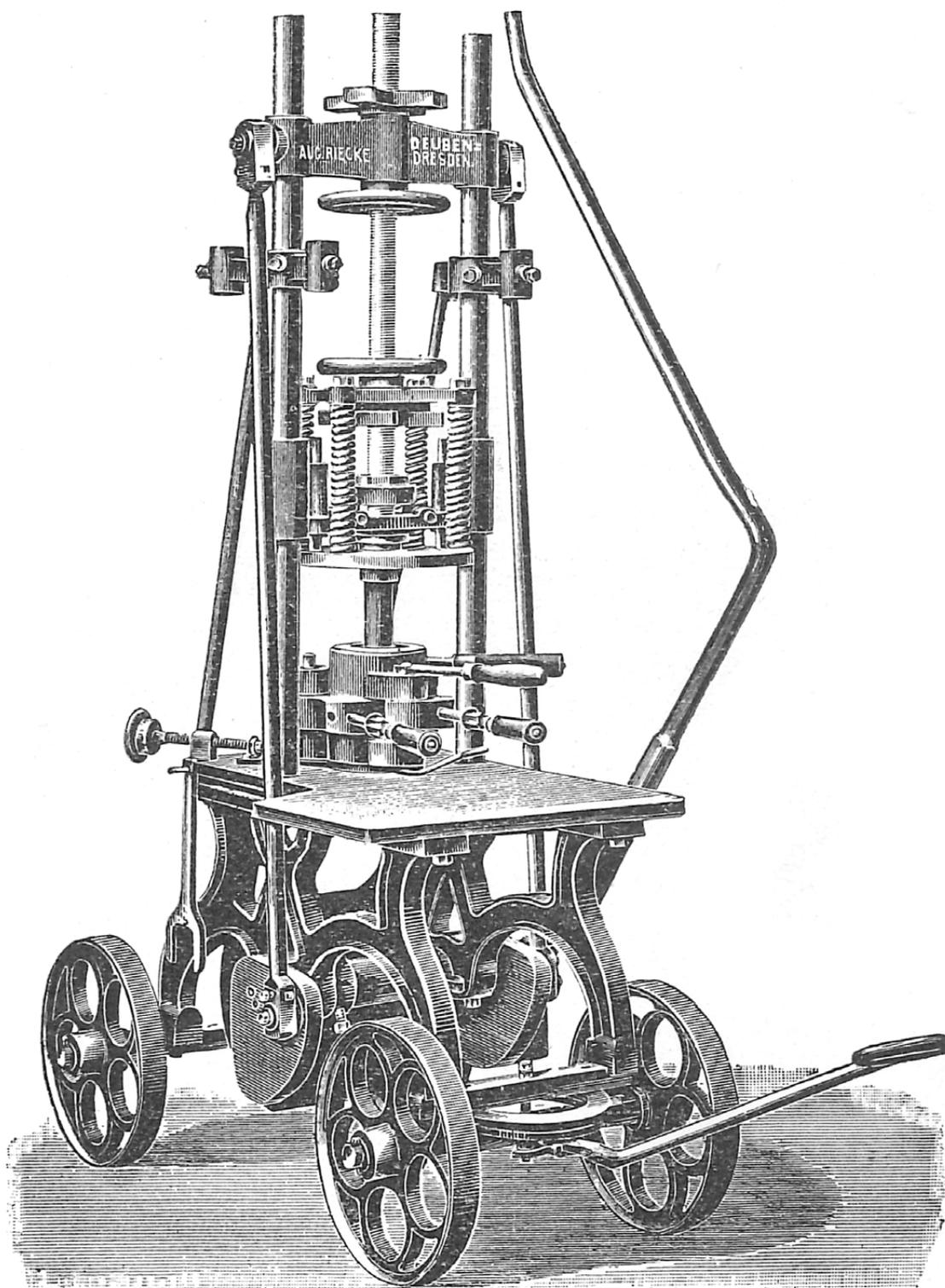


An older pressed glass mould from The Glass Factory's museum. A three-part cream jug mould with a removable bottom made at the beginning of the 1900s. The mould is marked S, which stands for Stenberg, mould manufacturer in Lindås, Emmaboda. A three-part mould is a prerequisite to be able to create a handle simultaneous to the moment of pressing the main body of any manufactured product. Photo: Susann Johannisson.





In "Uppfinningarnas Bok" (The Book of Inventions) from 1903, the article is illustrated with two types of glass presses. The eccentric press on the left and the spring press on the right. Both types have been used in the Kingdom of Crystal.



from 1903 states that there are a large number of different designs of glass presses but among these "honourable mentions" was the American spring presses and the German eccentric press. The eccentric press got its name from a technical solution used to hold the glass mould. Eccentric is a mechanism that transforms rotary motion into a back and forth motion. An eccentric work was used to hold the glass mould during the pressing. It is unknown whether a complete, preserved eccentric press is to be found in Sweden. A similar type of eccentric glass press can be found at Målerås glassworks, see the chapter in this publication. The second type of glass press highlighted in 1903 is the spring press. In this type of press, four steel springs are used to fix the mould at the pressing moment itself. At Bergdala Glass Technology Museum there is a preserved spring press, see later sections in this publication.

Press glass is manufactured using a press and a mould. In the second half of the 1800s, as previously mentioned, the presses were purchased from abroad. In the beginning, this also applied to the moulds. An exception is Johan Wilhelm Bergström, who started a workshop in 1839 in Stockholm that could produce press moulds for customers such as Reijmyre and Kosta. From Eda glassworks in Värmland, there is interesting information about which moulds were popular in the early stage of pressed glass. The glassworks bought their first four moulds in 1845 which included an oval dish, a soapbox with a lid, a salt dish and a candlestick cuff.

The blacksmith Peter Stenberg, who produced the first press at Kosta, had several children. Two of his sons chose the same profession as their father. His son Peter Alfred, born in 1853, had to help his father in the smith early on. Over time, he wanted to move away from Kosta to learn how to make glass moulds. In 1874, as a 21-year-old he was taught at a mould maker in Vislanda. Over time things went very well for Peter Alfred and in 1901 he opened his workshop, Lindås glass moulds and foundry, today called Xylem, which is on the out-

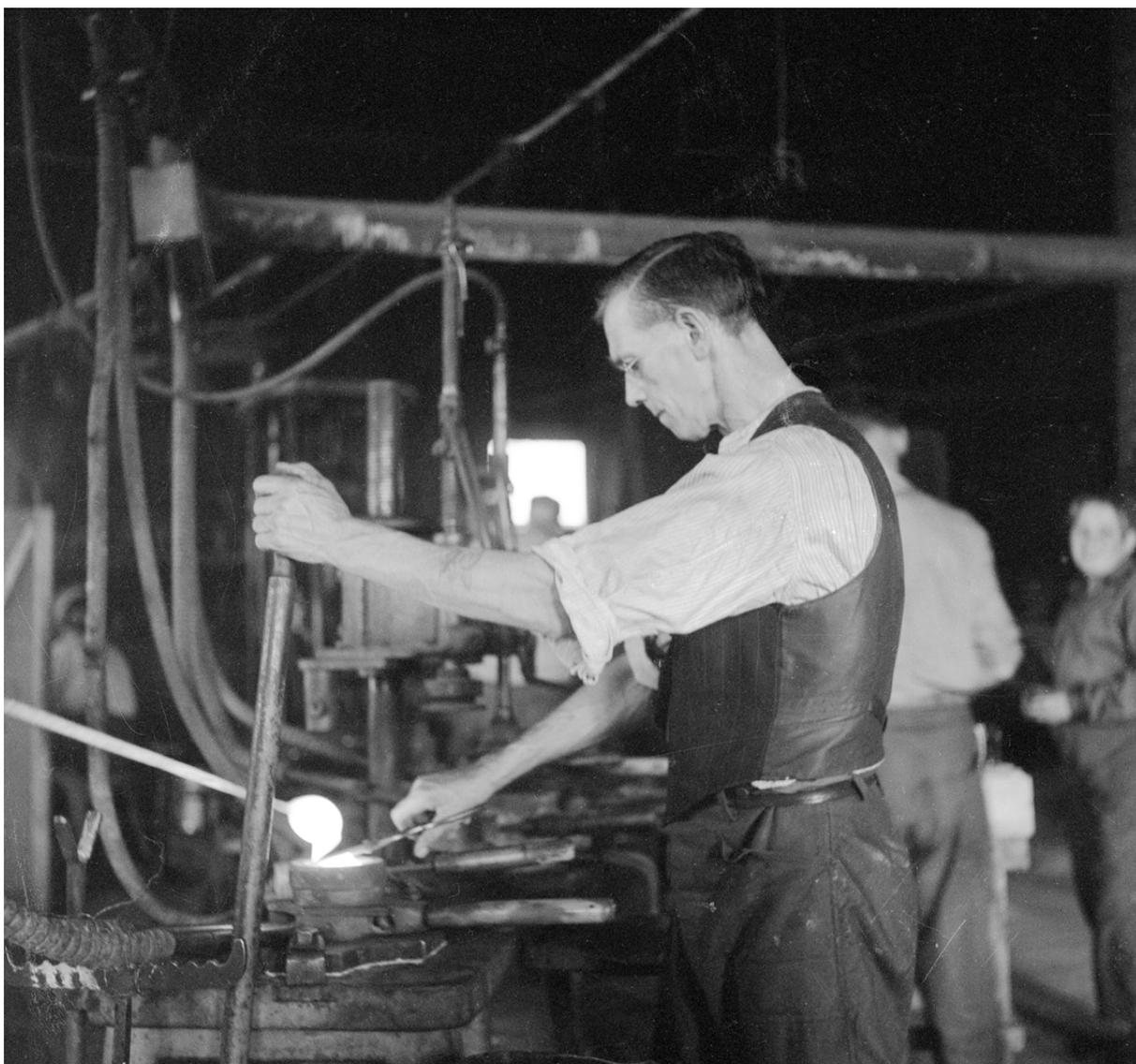
skirts of Emmaboda. Here the machines could be powered by hydropower from Lyckebyån. Peter Alfred had 13 children, one of whom was named William. He would develop the glass press technology further still, then as the owner of Gullaskrufs glassworks in the 1930s and onwards.

### **Gullaskruf and William Stenberg**

Gullaskrufs glassworks was a Swedish glassworks located in Gullaskruf, Hälleberga parish, Nybro municipality. Gullaskruf was built in 1893 as a window glass factory half a mile from the village and the manor of the same name. In the manor lived founder Count Axel Emil Lewenhaupt. With the mechanisation of the glass pane production meant that the window glass factory did not survive the competition, and the glassworks was closed down in 1921.

William Stenberg came from a family of blacksmiths, the son of Peter Stenberg. William was born in 1885 in St Sigfrid's parish outside Nybro but moved as a teenager with the family to Lindås and worked at his father's foundry. One of the products that the foundry manufactured was moulds for glass pressing, first in brass and later in cast iron. It was here William came into contact with glass. He made both glass presses and blown glass of his own design at the glassworks in Transjö. William learned the work of his father in the workshop. He trained in 1909 as an engineer in Norrköping and practised at mould factories in Germany. In 1926, the closed Gullaskrufs glassworks was purchased by William and a C. E. Göransson. A year later, the production of small glassware resumed. In 1930, the glassworks was modernised and the business could be expanded. Jugs and squared storage vessels with smooth vertical surfaces were manufactured in pressed technology, which required a large measure of technical skill. The art lay in getting the clean glass surfaces free of defects.

The experience and the success of the pressed glass also led to the production of technical glass. William Stenberg streamlined the production of



Alsterbro glassworks in the 1940s. Presser Einar Söderberg in the workshop. Photo: Jan Erik Anderbjörk, Kulturparken Småland

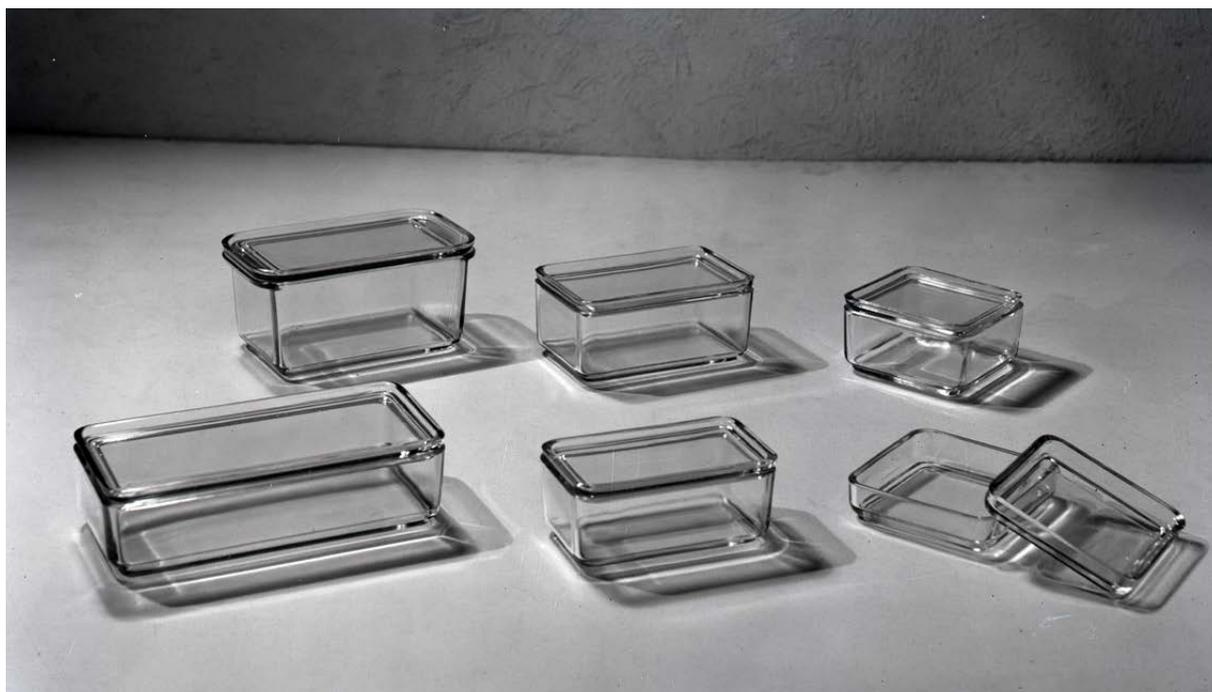
pressed glass and other glassworks purchased his presses. He led the way on improving and developing the lever which pressed the glass mass into the mould by allowing it to be driven by compressed air instead of manual power from 1950. He knew how the moulds should be cared for and used in the best way. E.g. using compressed air rather than water to cool the moulds during pressing, for durability. During Gullaskruf's most glamorous period, in the mid-1900s, about 6,000 pieces of glass were made every day. The annual production was close to two million glass prod-

ucts and Gullaskruf was thus Sweden's largest producer of pressed glass. Gullaskruf's glassworks was active until 1983.

### **Pressed glass during the second half of the 1900s**

During the second half of the 1900s, pressed glass was a part of the production at several of the factories in the Kingdom of Crystal.

For Kosta and Orrefors, the goal was to increase production and reduce manufacturing costs, to



With the introduction of refrigerators to Swedish homes came the demand for practical square storage containers. This type of glass container with lid was hygienic, took up very little space in the refrigerator and was stackable, which was an important part of the design. Målerås glassworks, undated photo in KLM's archive.

compete with foreign, cheaper glass. At Kosta Glassworks, in the 1970s, a more simplified and mechanised pressing technique was developed, known as the cast-slump method, in collaboration with the designer Göran Wärff. In the 1970s, the glass factory invested in a large, new tank furnace (a furnace that continuously supplied molten glass), called Vanna 3, with two glass presses imported from England. The units were computer-controlled, which was a novelty, and the presses were hydraulic. Glass plates such as "Party" could now be manufactured at a speed of 700-800 units per hour. The development of the cast-slump method could be said to be the latest major technological development in pressed glass.

For factories like Nybro and Målerås, pressed glass has been a crucial part of the factory's success in recent decades, while the technology for glassworks such as Kosta was seen as a complementary to reach a larger audience through cheaper glass products. Nybro glassworks, for example, had great success with products such

as "the herring ship" and "the shrimp trawler". However, they have chosen not to emphasise that the products are pressed glass, but have marketed the glass as "*hand-made*". This shows the low status of pressed glass.

### **The importance of pressed glass for the Kingdom of Crystal**

Pressed glass has been a significant source of income for many of the glassworks in Sweden. One way to find out more about the occurrence and development of the pressed glass is to look at when it appears as an item with model numbers in the glassworks' product catalogues. Of the glassworks in the Kingdom of Crystal, Kosta is the earliest that we can see with changes around the mid-1800s. In her research on 19th-century glass, Elisa Steenberg has produced comparative material from the catalogues. The catalogues for the years 1837-42 offer 60 models. Of these, none are of pressed glass. By 1850, the number of models had risen to 126, of which 9 were from pressed glass. The trend is fast moving in terms of the

Manufacture of square storage vessels in pressed glass. The molten glass is about to be cut so that the right amount lands in the mould. In the press to the right of the image, the square plunger for squeezing the glass into the mould is visible. Målerås glassworks, undated photo in KLM's archive.



The square glass container is now pressed, the mould is turned upside down and the storage vessel has been allowed to fall out of the upside-down mould and onto a board for further transport to the annealing kiln. Målerås glassworks, undated photo in KLM's archive.



number of models and in 1855 there are a total of 205 of which 30 are of pressed glass. During the second half of the 1800s, the development of glass was very prosperous. This applies to several types of glass, as well as pressed glass.

Separating pressed glass in the accounts from other small glass production becomes more difficult further ahead in time. The pressed glass accounted for volume and typical products were drinking glasses, cream jugs, salt jars, bowls, candlesticks and glass dishes.

In “Uppfinningarnas bok” of 1903, pressed glass technology is described alongside what success it has achieved: *“The manufacture of pressed glass has during the last decades gained very wide distribution because it is cheap and especially suitable for a variety of household articles. There is hardly any household in the civilised world, where there are no objects of pressed glass.”*

In the book “Journey to the Glass” from 1986, the authors, who were both well versed in the problems of the Kingdom of Crystal, take a look back whilst also asking questions of the future. The mechanisation is partly viewed with scepticism but they also wish to restore the high quality pressed glass that they think may have a future:

*“That we mentioned pressed glass and Fuga in the same breath has its natural explanation. But first, take the glass from Gullaskruf (1927–1983) and Transjö (1870–1951) and look at it carefully. We would think that it is difficult to find anything more well done, even though several other glassworks produced pressed glass within ideas that come about in different ways. There is no doubt that, through the efforts of William Stenberg, pressed glass production was developed into a well-known branch of the Swedish handicraft. That branch is missing today. There should be a market for Swedish pressed glass made according to the craftsmanship methods that were at their peak during the 1950s. Moulds and presses are still there, but the professionals who know the craft are soon gone.*

*If a rescue operation is to be implemented, it must be done quickly. Does anyone believe in the Swedish pressed glass? Nobody believed in the Swedish crockery anymore in the 1980s, and now it sells like never before.*

*Let’s return to Fuga. Palmqvist’s idea with Fuga was to produce a beautiful, functional and artistically high-quality glass at a low price. The idea of pressed glass was the same. But how does that carry today?*

*The centrifuge remains and it is used for a wide range of items of varying quality. The pressing technique has been greatly simplified, and a large number of objects are cast in moulds. None of these techniques requires a higher degree of craftsmanship on the part of the manufacturer, so you react a bit if the products are sold under the label of hand-made glass.*

*Today’s consumers may not react very much, but the connoisseur and collector of old glass pose some questions that unfortunately must be left unanswered.”*

When Gunnel Holmér, head of department and glass antiquarian at Kulturparken Småland/Sveriges glasmuseum in 2019, is asked about the importance of pressed glass, she explains how in principle all glassworks made pressed glass during the 1800s and the beginning of the 1900s. Reijmyre was first and Kosta followed. Pressed glass was of great economic importance for the glass factories. Gunnel Holmér is quoted here: *“I think the glassworks saw it as a new market. Pressed glass meant a type of mass production that made glass cheaper. In this way, even the less affluent could afford to buy glass. It should be emphasised that the preliminary work is important in the production of pressed glass. The makers’ knowledge and skills are of great importance. For glassmaking, it involves large investments in making moulds, but once they are made, the same mould can be used thousands of times”.*

# The manufacturing process at Målerås glassworks September 2019

Anemone and Poppy are the names of two bowls from the same series, both made in a glass press. The bowls are designed by Mats Jonasson in the 1990s. The uncoloured variant is called "Anemone" and is available in five sizes. Anemone is decorated by blasting parts of the bowl in a sandblaster on the outside of the object by staff at the glassworks. "Poppy" is the second variant from the same mould. It is manufactured in four sizes. Poppy is decorated by the factory staff with an airbrush. The material used for the red colour is a water-based paint from Germany by the manufacturer Ernst Diegel GmbH. After the paint is applied to the outside, the glass is fired to 185 degrees Celsius, a process that takes about 6 hours when starting with a cold kiln.

## Preparations before pressing

The process includes two moulds and an associated plunger, all three made of cast iron. Before pressing, the parts are preheated in a kiln to 480 degrees Celsius to have the right temperature in relation to the molten glass mass. The work is done with two moulds so that the pressing itself can be performed as efficiently and methodically as possible. When one mould is in the press, the other can be prepared for the next pressing. The plunger is the part that is brought down from above and compresses the glass into the mould.

When the pressing is to be performed, the mould is moved from the kiln to the press. The plunger is also taken from the kiln and placed on a dolly



Målerås glass factory 2019. Photo: Bernt Fransson/Wikipedia.

that can be pushed over the press table. The dolly is pushed forward to the two grip claws of the press where the plunger is mounted and held in place. The dolly can then be slid away and removed. The mould is placed on the press table and a piece of fireblanket is placed between the plunger and the mould to protect the plunger during the adjustment. The two guide blades ensure that the moulds fit just right with the plunger. The underside of the moulds and the top surface of the press table are glazed with wax to slide easily during pressing as the moulds are pushed forward to the plunger and returned to the same position. Now the press is prepared. The first mould is ready to be partially filled with molten glass mass that has been heated to a temperature of about 1090 degrees Celsius.

### The manufacture of a pressed glass object

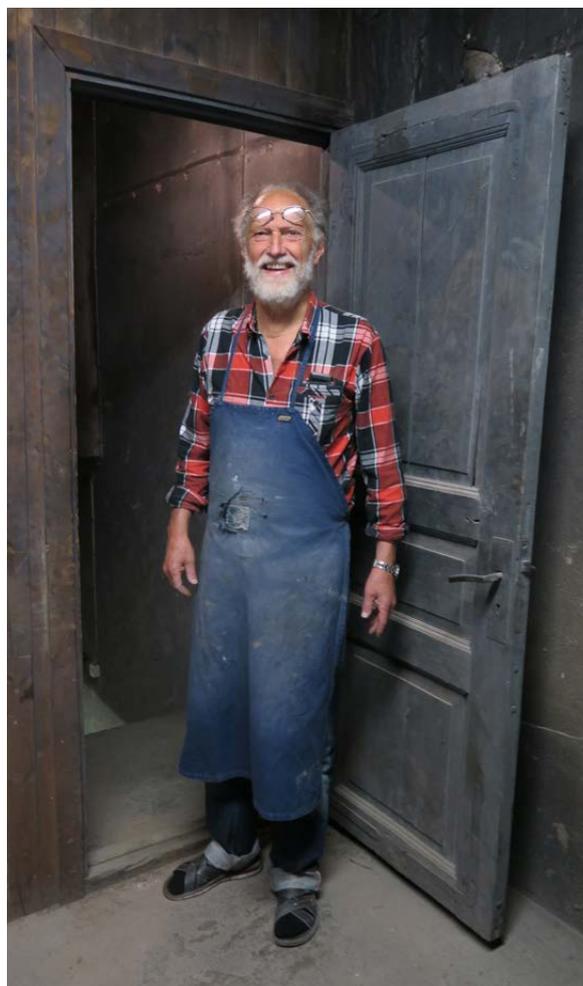
The mould usually consists of two parts, a mould plate that gives the glass a pattern and the plunger that presses the glass into the mould. Previously, there was also a detachable ring on top of the press mould to provide a smooth edge. The mould itself could also be divisible and openable to enable complicated moulded glass moulds. As of today, 2019, there are no divisible moulds or moulds with rings in production in Målerås.

In regards to this dish, Anemone or Poppy, the idea was to achieve an organic expression by pressing the pulp up to the edges and forming an uneven edge as on a flower's petal. Therefore, a ring is not used here. When pressing without a ring, the technology utilises the element of randomness that causes the glass mass to be distributed somewhat unevenly in the mould. The bowls become slightly different but sufficiently similar so as not to be perceived as unique.

The pressing is performed by three people in a work team where the different functions are called "gatherer", "presser" and "carrier". The people are equally capable and rotate between the three stations.



Poppy. The bowl was designed by Mats Jonasson in the 1990s. The bowl is made in several sizes in clear glass and decorated afterwards. Photo: Målerås glassworks.



Mats Jonasson, owner and designer at Målerås glassworks. In 2019, this glassworks continues to manufacture both pressed glass and its own metal moulds for their glass products in production.



From the annealing kiln to the left of the picture, Erik Boden has taken out two moulds and a plunger on its dolly to be moved to the press. They have a temperature of 480 degrees Celsius.



The plunger hangs on a stand that is allowed to slide out over the press table. Two grip claws from the press hold the plunger in place and then the stand can be removed. This press is from the middle of the 1900s.



Here are the two guide plates that are anchored to the press table.



One of the moulds is placed on the press table and a piece of fibre insulation is placed between the plunger and mould to protect the plunger from being scratched. The two guide blades, which are here adjusted by Ivarsson, ensure that the mould fits just right with the plunger so that the glass mass is evenly distributed in the mould "sideways".



The underside of the moulds and the top surface of the press table are glazed with wax to slide easily during pressing as the moulds go back and forth.



The glass mass is heated to a temperature of 1090 degrees Celsius.



A gatherer takes an appropriate amount of the molten glass from the furnace on a gathering ball and goes over to the press. The gatherer holds the glass mass over the mould.

It starts with the gatherer taking a suitable amount of molten glass mass from the furnace on a gathering ball and moving over to the press where he or she pours the glass mass over the mould. The presser is waiting until the glass flows down into the mould and then cuts the glass at just the right moment to get the desired amount. The mould is then pushed by the presser under the plunger. The mould ends laterally just below the plunger with the help of two guide plates that are mounted on the press table. The aforementioned fibre insulation is placed between the plunger and the mould to protect the plunger when adjusting the mould in the press.

The presser is ready to push on a pedal which presses the plunger down with compressed air. After about 30 seconds, the template is lifted and the mould can then be drawn back on the press table. The cooled bowl is allowed to slide out of the mould and is picked up by the carrier with the help of a carrier fork. The carrier then throws the bowl into the air to turn it right side up before transporting to the annealing kiln. The carrier fork is padded so as not to cause any damage to the fragile, newly pressed goods. The carrier moves the freshly squeezed glass bowl to the annealing kiln where the bowl is allowed to stand and cool until the following day.



The presser waiting for the glass mass to flow into the mould.



The presser cuts the glass at just the right moment to get the desired amount of molten mass into the mould.



The presser has just cut the desired amount of glass mass.

Two different presses are used for the production in Målerås. The larger version of the bowl is made in a cast-iron press from the middle of the 1900s, where the actual pressing tool, the plunger, is driven by compressed air controlled by a pedal. The first person, the gatherer, then brings the glass mass to the presser who does the pressing. After the pressing, the presser and the carrier cooperate so that the latter can move the goods to the cooling kiln. Everything happens with a certain determined calm and methodical pace. The correct temperature of the mould, the glass mass and the finished bowl that will leave the mould is achieved by performing all the steps with exactly the right time in relation to each other. In other words, timing is the key to successful pressing.

For a smaller version of the bowl, a different glass press made in the second half of the 1800s is used. The press is equipped with wheels but has undergone modification and is now anchored to a pallet. This press is completely hand-driven at the moment of pressing. The press has been modified with a plunger of graphite, which is a modern material in this context. The plunger is heated before the first pressing by gas and two gas nozzles. The plunger is turned from a cylinder-shaped blank and manufactured by staff members at Målerås glassworks. The advantage of a plunger in graphite is that the glass releases easily and the surface of the glass becomes nice and glossy.



In the foreground is a mould with a pressed glass bowl ready for cooling. In the background, the mould with glass mass is on its way to being pushed into the press.



The mould is placed underneath the plunger. The presser is ready to push a pedal which presses the plunger down with compressed air.





After about 30 seconds, the plunger is lifted and the mould can then be pulled backwards on the press table.



The cooled bowl is allowed to slide out of the mould and is caught by the carrier.



The carrier has just thrown the bowl into the air and turned it upright.



To the left of the image is the annealing kiln. The carrier has just moved a freshly pressed glass bowl to the annealer.



The small bowl uses a smaller glass press from the second half of the 1800s, which is anchored to a pallet. It is completely hand-powered. Tommy Karlsson is the presser in the picture.



The small press does not have a mould of cast iron but of graphite. The plunger is warmed with gas.



A detailed image of the plunger, which in this case is made of graphite. The plunger is turned at the factory from a cylinder-shaped blank.



"Poppy" waiting to be delivered to the customer. After pressing it has been decorated.



At Bergdala Glass Technology Museum, this glass press is from the second half of the 1800s. This glass press demonstrates how a press with mould and ring works.

# Manual pressing with a ring in a spring press – an example from Bergdala Glass Technology Museum



The ring to the left in the picture is upside down. With the help of a top ring on the mould, the top edge of the glassware can achieve a decor like here in the picture above or just an even finish.

At Bergdala Glass Technology Museum there is a spring-type glass press from the second half of the 1800s. The glass press in Bergdala illustrates how a press with mould and ring works. With the help of a top ring on the cast-iron mould, the top edge of the glassware can achieve a decor or simply a smooth finish. The ring fits into the cast iron mould with the help of two guiding notches. A press made for moulds with a ring has an ex-

ternal spring load, in this case, it consists of four springs. These springs help to lift the plunger after pressing has been done and therefore facilitate the work. Compare with presses on pages 10-11. The plunger is pressed down after the springs are already under pressure from the lever on the glass press. After pressing, the ring is loosened and the glass mould is inverted and the glassware is taken care of.



The ring is fitted with two guiding notches, in this case, two V's that match up.



Here the ring has been fitted into the mould.



A press for moulds with a ring that has an external spring load. Here the plunger is not yet pressed.



Here the upper edge of the mould is in place but the plunger is not yet pressed into the mould.

# Ring pressing — an experiment from The Glass Factory





A workshop at The Glass Factory, Boda Glasbruk, September 14, 2019. Glassblower Peter Kuchinke attempts here to make a pressed glass dish where the mould has a ring, assisted by glassblower Tillie Burden. In the picture we see Peter cutting an appropriate amount of glass mass. The mould is divided into three parts, one bottom, one centre part and one ring. Photo: Susann Johannisson.

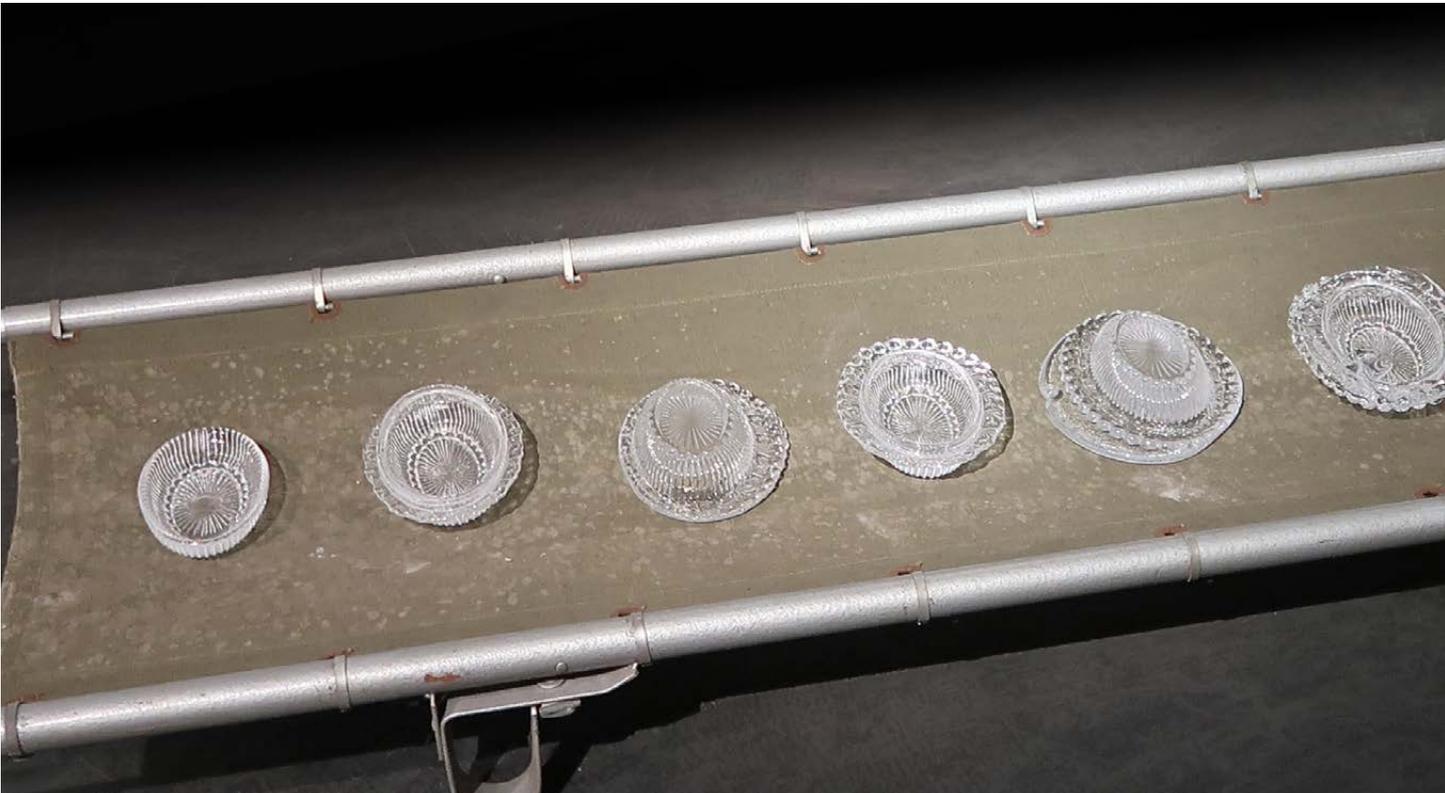


Peter presses the preheated plunger into the mould by hand. Photo: Susann Johannisson.

Here Peter has removed the ring from the mould. The ring is locked during pressing but can be loosened with a handgrip where the two metal knobs are moved towards the centre of the mould. Photo: Susann Johannisson.



Several attempts at pressing were carried out on this day in Boda. This time too little glass mass was added to fill the whole mould. Photo: Susann Johannisson.





Here we see how Peter turning the mould to take out the glass dish. Photo: Susann Johannisson.



The Glass Factory shows a temporary exhibition with some freshly pressed bowls from the experiments with pressed glass that have been carried out. The picture clearly illustrates how critical the right amount of glass mass is for the end result. Photo: Susann Johannisson.

# Post-heated pressed glass — an example from Gullaskrufs glassworks

A pressed glass object that has “glass tags” in the joints from the mould can be attached to a punty and warmed in a glory hole. The glass tag disappears and the object becomes fire-polished. If more than just refinements of the glass object is needed, you can rework the glass to add new characteristics.

Hot pressed glass is a technique in which you further process the pressed glass. The still warm pressed glass is taken out of the mould then mod-

ified with the help of post-heating. The pressed glass object is attached to a punty and the shape of it can be altered. A glass plate can be turned into a bowl or vase. Gullaskruf’s glassworks developed the process and produced playful, irregular shapes in the mid-1900s.

The post-processing of the pressed glass can result in the glass objects having details added, like a handle or the shape being changed. To make the pressed glass, the workshop in Gullaskruf was di-



Ashtray from Gullaskrufs glassworks. A pressed glass that has been re-heated to eliminate traces from the press mould. Designer: Arthur Percy.

vided into work teams with a master, a gatherer, a presser, three warmers and one carrier. The task of the warmer was to enable post-processing of the objects. Three warmers in each work team show how extensive the post-processing of the goods was for the factory and that it was something that was invested in. The gatherer came with molten glass from the furnace, the master cut off a suitable amount which flowed into the mould, the ring was put in the correct position and the presser pushed down the plunger that pressed the glass

mass against the sides of the mould. The glass piece was taken out of the press and mould. The warmer attached a punty with an iron plate under the bottom of the pressed glass piece, heated it at the glory hole and carried it back to the master who would form the piece to its final shape. Bowls could be spun out into plates or given different shapes by pushing the opening inwards or outwards. A handle could be attached by the master and thereby creating a jug.



Flower glass from Gullaskruffs glassworks. The basic shape is round in the pressing, then compressed into three loops. Grooved outside. Designer Arthur Percy (1886–1976), artist, designer. Active at Gullaskruf from 1952 to 1965.

# Earlier definition of the term pressed glass

The Swedish National Encyclopedia defines the concept of pressed glass in 1994 as follows:

*“... glass formed in a mechanical glass press. The glass mass is laid in a metal mould that corresponds to the outer shape of the glass and is then pressed out with a metal press mandrel (stamp) which gives the glass its inner shape. The technique is called mould pressing and produces products where the inner and outer mould are independent of each other, unlike mould blown glass, where the inside follows the outer mould.”*

The glass research association Glafo defines glass in 2005 as follows:

*“Pressed glass is glass formed in a press. With pressing technology you can produce large quantities*

*of glass with detailed designs in a cheap way. The gathering is done on a ball either by hand or with a robot. The mould consists of two parts, a mould plate that gives the glass a pattern and a plunger that extends the glass into the mould. Often several moulds that are placed on a rotating table (carousel) are used. This is common in a tank furnace to make many glass products in a short time. The pressing technique is also used for the manufacture of bottles.”*

The two examples show how the concept of pressed glass has been defined differently. The two descriptions are sometimes contradictory and incorrect. Our attempt at a new modified variant (see page 8) aims to clarify concepts used by professionals in the glass industry today.





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