



THE FASCINATING WORLD OF PORCELAIN PRODUCTION



PRODUCTION, PROCESSING AND FINISHING

Dear Readers,

Porcelain manufacture may involve three simple components – production, processing and finishing – but it is precisely these processes that create something special.

Over the following pages, we will show you the various steps that a service piece or vase has to go through, the skilled craftsmanship required, the different production methods that exist, and the methods used to decorate and finish products. You will discover that the production of white gold is not only an exceptionally long and complex process, but also that – in spite of state-of-the-art production facilities – this process is still associated with a great deal of craftsmanship and handiwork. But most of all – and this has distinguished our products for over 135 years – it is all thanks to the expertise, the passion, the attention to detail and the vast experience of our 850 employees that each individual Rosenthal product is designed to impress with a very special formal and functional quality as well as white quality that makes your home unique.

Warmest wishes,



Gianluca Colonna

Chief Operating & Sales Officer



PORCELAIN ART THROUGH THE AGES

Rosenthal GmbH may have one of the longest traditions of Germany's brand manufacturers, but is also one of the most modern. Just as we did when we were originally founded over 135 years ago, Rosenthal develops products equally for discerning end customers and for exacting professional clients from the restaurant and hotel trade. Our products stand out with exceptional form, function, quality and craftsmanship and represent a cultural asset "made in Germany", never ceasing to combine innovation and creativity. The collections are manufactured in the Rosenthal porcelain factory in Rothbühl in Selb and the "Thomas am Kulm" porcelain factory in Speichersdorf, which offer some of the porcelain industry's most advanced production facilities anywhere in the world and deliver sus-

tainable manufacturing with careful use of resources thanks to the forward-looking investments that have been made. Today, the primary sales markets are in Central Europe, North America and Southeast Asia. With a global presence in 105 countries, alongside the USA the company's key growth markets also include Poland, Russia, China and India. In August 2009, Rosenthal became part of the Sambonet Paderno Group, the Italian market leader in the production of high-end designer products for the table and kitchen. New interior and lifestyle collections enrich the Rosenthal world by adding designer objects that go far beyond the limits of a conventional table setting and open up additional promising growth markets for the company in the luxury segment.



Rosenthal am Rothbühl factory, designed by W. Gropius



Rosenthal Interior furniture collection

ROSENTHAL GMBH



Rosenthal

With its award-winning porcelain design, trendy lifestyle collections and modern, elegant classics, the Rosenthal brand raises the bar time and again for aesthetics and individuality. Established figures from the worlds of architecture, design and art, but also the hottest newcomers and talents design avant-garde dinner table collections, foster a joy of giving and create sophisticated furnishings.



VERSACE

Rosenthal meets Versace

Antique motifs and ancient myths, baroque symbols and exotic dream worlds – the luxurious Rosenthal meets Versace collections combine the glamorous lifestyle of the fashion house with the highest requirements in terms of aesthetics, perfection and craftsmanship.



AND ITS BRANDS



HUTSCHENREUTHER

Hutschenreuther

Taking its inspiration from the colours and shapes of fauna and flora, the Hutschenreuther porcelain line boasts a collection of affectionate motifs to see us through the whole year. Whether spring, summer, autumn or winter, the versatile service concepts allow you to play with the seasons. Seasonal gift ideas and lovingly crafted collector's items will make you want to diversify your decorations.



Thomas

Thomas

The joy of cooking, eating, drinking and giving paired with a functional and unique design, trendy white shapes and cheerful, sunny colours – these are all characteristic features of the Thomas brand founded in 1903. The brand conjures up an appealing sense of uniqueness for every dinner table with its numerous combination options, a mixture of different materials and many practical details!



DESIGN AND MODELLING

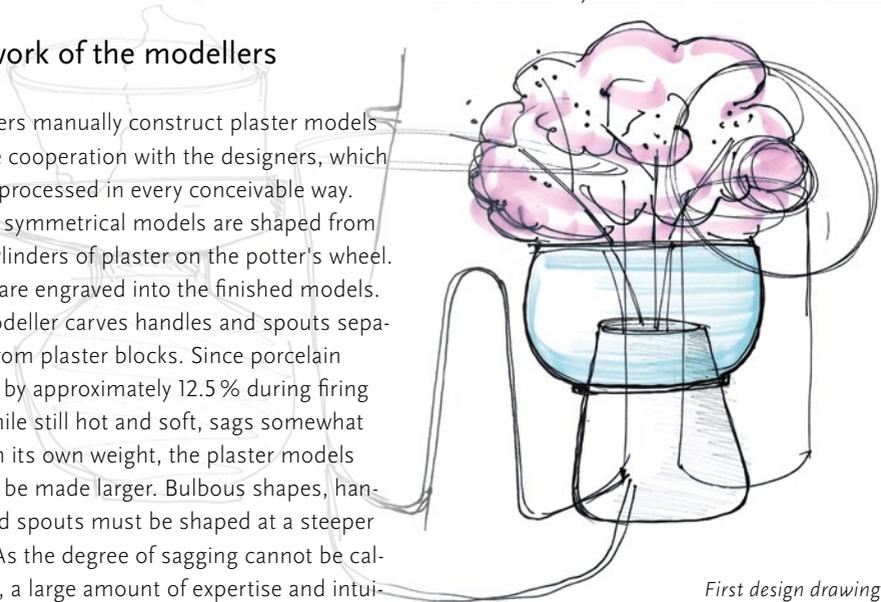
Rosenthal has been working for many decades together with renowned designers and artists in designing new products. A development division, which operates independently of production, known as the Creative Centre is in charge of the design evolution process from the first model through to the finished, decorated service. The Product Development Division with all its necessary workshops develops new creations for the Rosenthal, Rosenthal meets Versace, Thomas and Hutschenreuther brands.

The work of the modellers

Modellers manually construct plaster models in close cooperation with the designers, which can be processed in every conceivable way. Round, symmetrical models are shaped from solid cylinders of plaster on the potter's wheel. Reliefs are engraved into the finished models. The modeller carves handles and spouts separately from plaster blocks. Since porcelain shrinks by approximately 12.5 % during firing and, while still hot and soft, sags somewhat through its own weight, the plaster models have to be made larger. Bulbous shapes, handles and spouts must be shaped at a steeper angle. As the degree of sagging cannot be calculated, a large amount of expertise and intuition are required.

Synthetic resin and plaster casting moulds

Once the delicate plaster moulds have been shaped to satisfaction, they are used to make the master moulds in a durable synthetic resin or in silicone. These are used in turn to make the negative plaster casting moulds. Plaster is used because it is porous and absorbs the excess moisture from the porcelain clay. A plaster casting mould can be used about 140 times. However, if the shape is in relief, the casting mould can only be used around 70 times.



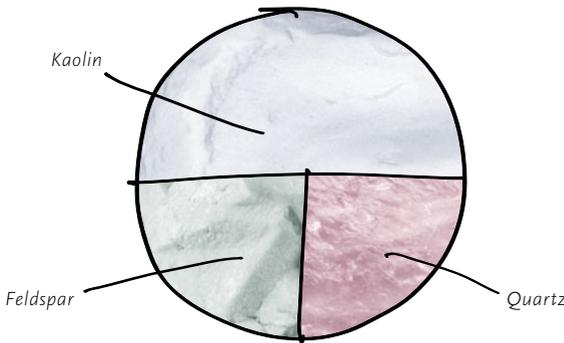
First design drawings by Sebastian Herkner for »Collana«

PREPARATION

Preparing the raw material

Hard-paste porcelain body is primarily made up of kaolin (50%), feldspar (25%) and quartz (25%). These raw materials are crushed in large drum mills with added water and flint until they are finely ground and mixed. This liquid mixture is passed over a magnetic belt, which extracts iron particles, which would otherwise cause

brown stains on the fired porcelain. A fine mesh screen removes all other impurities. Most of the water is removed by a hydraulic press and a vacuum press sucks out the air. Now the porcelain is ready for moulding. Rosenthal is one of very few manufacturers who still produce porcelain body and glaze according to a secret formula.



The components are ground and mixed.



The finished extrudate exits the press.

PRODUCTION

Turning

The porcelain clay is portioned into relevant sizes and placed onto the plaster casting moulds for the cups, which are then inserted into the cup machine, a continuous moving track. A metal template is lowered and by turning shapes the inside of the cup. Once the piece has dried, it shrinks from the plaster mould. The rough edges are trimmed with wet sponges until they are nicely rounded, smooth and even. The cup handles are cast separately. All casting marks are carefully removed by hand before the handles are attached to the cup.

Isostatic press moulding

Isostatic dust-press moulding of plates is another method. This involves a porcelain paste consisting of minute spray-dried granules. These granules are poured into the press mould and bond under high pressure. The press tool required is divided into two parts, the upper and the lower die. The upper die is used to shape the top of the item and has to be rigid. The lower die shapes the back of the item and is fitted with an elastic membrane to isostatically mould the pieces. When the upper and lower dies are closed, the granules are pumped into the hollow area inside using compressed air. The item is moulded under pressure of approximately 280 bar, thereby ensuring it is evenly bonded. Dust-pressed items have to be smoothed off around the rim only. The normal finishing process follows after that. Press moulding is a high efficient method and among its many advantages is a significant quality improvement in the production of plates and platters.



Jollying of mugs on the machines.

Slip casting

Porcelain items like teapots, handles, spouts, boxes, oval platters and figurines are shaped in plaster moulds. A porcelain slip is used for this purpose, the addition of a little water and other thinning ingredients making sure it can be poured. The two- or multi-sectioned plaster moulds absorb the water from the slip leaving an even layer of set clay on the mould wall, which is known as the body. Any remaining liquid slip is then poured out. Handles, spouts, cup feet and lid knobs are made separately and then attached to the actual body by hand, using the slip as a locating medium. Porcelain figurines are also assembled by hand from many separately cast pieces. The casting seams, visible on all pieces once the mould has been opened, are smoothed by hand with blades and sponges.

Press casting

This method is used in the production of square and oval platters. The porcelain slip is pumped into a two-part, porous plastic mould and then put under pressure. The water escapes through the open pore canals of the plastic mould while the porcelain paste stays within. When finished, the mould opens automatically and a suction pad lifts out the pieces.



The cast and still very soft body leaves the plaster mould for the first time.



The plaster mould is filled with the liquefied porcelain paste, known as the slip.



Many items must still be attached by hand today in spite of state-of-the-art production methods.

FIRING

Biscuit firing

After the raw porcelain has been pre-dried and biscuit fired at about 950°C, it is no longer water soluble but still porous and water absorbent.



The batch times (the time the piece spends in the kiln) vary from five to seven hours depending on the firing process, the porcelain clay and the item.

Glazing

The biscuit fired pieces are stamped with the logo of the company and then glazed. The glaze is immediately removed from the foot of the plates and the rim of the cups with wet sponges to prevent the porcelain from sticking to the base during the second firing.

The glaze is a mixture of quartz, feldspar, some kaolin and a high proportion of different thinning agents. Because of its high content of quartz it produces a very hard surface when fired. With particularly delicate pieces (e.g. »Magic Flute« and Limited Edition Art), the glaze is applied using a special spraying process. The glaze melts when fired and fuses with the body before its pores close, creating an inseparable bond between the porcelain body and glaze.

Glost firing

In the glost firing process at temperatures of up to 1400°C the paste shrinks and becomes watertight. This causes vitrification, turning the substance into a hard, delicate, translucent porcelain. This process effects a chemical change in the porcelain item and also changes its contours. After glost firing, the porcelain is 12.5% smaller (shrinkage) than when it was moulded. Even glost firing is done using a burn-off method nowadays in modern fast fire kilns or roller kilns.



Nowadays, state-of-the-art machines dip the plates and cups into the glaze with the utmost precision.



Although glazing is mostly done by machines today, some items still have to be glazed by hand.

PORCELAIN TYPES

Hard porcelain

After the biscuit and glaze firing processes, the porcelain is hard, impact resistant and translucent. Hard porcelain has the highest scratch resistance to stainless steel cutlery and is unaffected by acids, except hydrofluoric acid. Porcelain is weatherproof and does not change after the last firing, no matter how old it gets. It is suitable for use in the microwave oven with the exception of items decorated with precious metals (gold, platinum). The white colour of the porcelain is achieved by reduction firing. This means it is fired in an atmosphere of reduced oxygen.



Black porcelain

Black porcelain is a special Rosenthal product. As precious a porcelain as “porcelaine noire” should never be put in the dishwasher. It is best to wash it by hand in warm water and to dry it immediately with a soft cloth. Sustained contact of crockery with food containing lemon or acetic acid should be avoided as staining could occur. Black porcelain should also never be used in the microwave oven.



Rosenthal is one of very few manufacturers who still produce genuine black porcelain.

PROCESSING AND SORTING

Grinding

The unglazed feet of the plates and contact surfaces of the porcelain are still rough even after the second firing. By grinding and polishing repeatedly they become smooth, pleasant to touch and dirt resistant.



Sorting

The undecorated porcelain, also called finished white ware, is carefully sorted by highly skilled personnel. The intrinsic characteristics of the materials and the ceramic production process, especially the firing, inevitably cause tolerances and minute deviations between individual pieces. The sorting process accurately separates out the items with such levels of deviation and discards altogether pieces with defects.



Careful inspection: the finished white ware is sorted in accordance with rigorous quality standards.

DECORATING AND FINISHING

Decorations

Through their colours, decorations on porcelain enliven the white of the material. A vase or a dinner service, richly decorated in gold, is an elegant and stately embellishment for formal occasions, whereas the same pieces decorated with a colourful floral pattern assume a friendly and cheerful character. Moreover, a variety of

decorations appeal to different consumer tastes. Hence the Product Development Division offers a whole host of decorations created by renowned artists, using the strictest criteria in selecting the best designs.



INTERESTING FACTS

Decorative transfer printing

Aside from hand painting, there is a wide range of high-quality decorative methods available today. Artists' designs are scanned into a computer and reworked by an elaborate software programme in order to make them fit onto each piece of a dinnerware service so that they can then be transferred onto the three-dimensional shape. The character of the artist's signature is fully preserved. After this process, the designs are printed onto specially prepared paper spread with a layer of glue. This makes it easier to lift the colour decorations off the paper and onto the porcelain. The colours are applied onto the paper using the screen-printing method. Very finely meshed metal screens allow the colour to permeate only in desired areas. Each colour is printed separately, which means that a new screen has to be prepared each time. The different colours are printed one after the other and aligned exactly. Screen-printing allows a strong application of colour, which after firing produces a rich glow of colour. After printing, the transfer sheet is coated with a layer of lacquer. In order to decorate a porcelain piece, the decal is soaked in water to dissolve the layer of glue. The flimsy and wet colour film is then carefully applied to the porcelain.

Decorative transfers

The most frequently used technique for decorating porcelain is to apply a sheer, wet colour film. This process demands extreme precision, patience, a steady hand and a sharp eye. These days, decorative transfers are no longer used to decorate tableware alone, they are also applied to valuable limited porcelain editions, which cannot be painted by hand without altering the original design of the artist.



DECORATING AND FINISHING

Hand painting

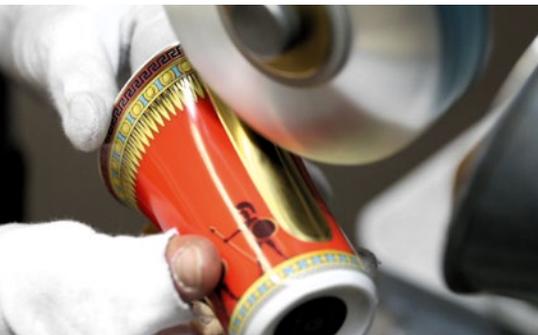
Lustre, gold and platinum bands, handles, spouts and gilded reliefs are all hand painted. After firing, fibreglass brushes are used to bur-nish the gold layer to a high gloss.



The iconic head of Medusa adorning the Rosenthal meets Versace collections is gilded by hand and looks brown in its unfired state.

Base colouring

When larger areas of a porcelain piece are to be coloured, the colour foundation is distributed evenly with a spray gun. All areas that are to remain white are varnished beforehand with a lacquer that must be removed after spraying. After removal of the lacquer layer and before firing, the white areas of the porcelain are cleaned carefully. Even the tiniest amounts of colour residue would turn into visible spots after firing.



Polishing by hand after the decoration firing process.



Ensuring that the colour is applied evenly by hand requires a great deal of experience.

Combination matt – glossy

There are several methods to produce the combination matt – glossy.

1. A matt glaze is sprayed onto the porcelain in a similar fashion to a colour base using a spray gun and then fired.
2. Glazed porcelain can be made matt by sandblasting.
3. The areas that are to remain matt and unglazed are covered with wax before being dipped into the glaze. The wax burns off during sharp firing.

A black, matt glaze makes the structure of the »Vanitas« vase look like real leather.



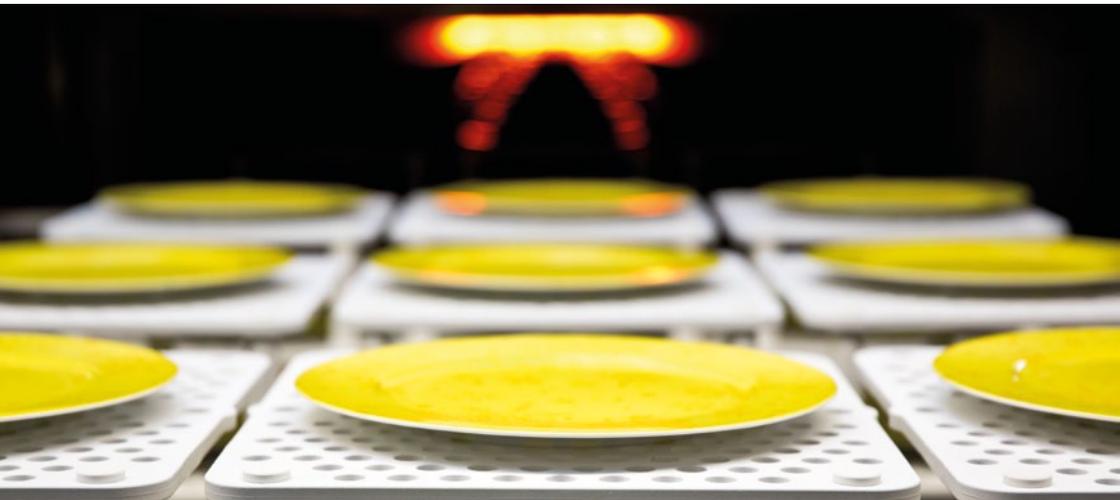
DECORATION FIRING

High temperature decoration firing

High temperature decorations are either transfer-printed, hand painted or sprayed onto the finished porcelain. With in glaze decoration firing, in contrast to under glaze firing, considerably more shades of colour as well as gold and platinum can be melted into the glaze. In only 90 minutes, the porcelain is heated to 1230°C so that the decoration sinks into the liquefied glaze, which protects it at the same time. Gold decorations are also polished to a high gloss after decoration firing using fibreglass brushes. High temperature decorations remain unaffected by outside influences and are dishwasher safe.

On glaze decoration firing

On glaze decorations are also applied to the finished porcelain using transfers, spraying techniques or hand painting and are fired at temperatures of around 850 to 950°C.



CARE TIPS

Although porcelain is an exquisite material, it has great design versatility and can be used for a variety of applications. White porcelain with no decorations is always suitable for cleaning in the dishwasher. Porcelain with decorations is only dishwasher safe if the decoration is melted into the glaze (in glaze/under glaze), where the glaze absorbs the decoration. Its colours and luminescence then become indestructible as well as scratch- and rub-resistant.

To ensure that you continue to enjoy your porcelain over the long term, we recommend the following care tips:

- > Check whether your porcelain is dishwasher suitable.
- > Read the recommendations of your dishwasher manufacturer on handling, cleaning and maintaining your appliance.
- > Stack items in the dishwasher in such a way that the porcelain does not touch or rub against other items during the cleaning cycle.
- > Always clean black porcelain by hand.

SYMBOLS

Dishwasher safe

The product can be placed into the dishwasher without reservation.

Dishwasher suitable

The colours of this pattern are fired onto the glaze at (at least) 840°C. The resistant colours used achieve a strong bond with the glaze. The product can be cleaned in the dishwasher using the delicates cycle at a temperature of 55°C. Do pay attention to the guidelines of dishwasher and detergent manufacturers on the suitability of their products.

Precious decoration

This product must always be cleaned by hand. Use of precious colours and artistic decorations means that the item cannot be cleaned in the dishwasher.

Microwave suitable

The product can be placed into the microwave without reservation.

A close-up, low-angle shot of a white ceramic lattice pattern. The pattern consists of repeating, interlocking, curved rectangular shapes that create a mesh-like structure. The perspective is from above, looking down at the pattern, which recedes into the distance. The lighting is soft and even, highlighting the smooth texture of the ceramic. At the top center, there is a small crown icon above the brand name.

Rosenthal

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