Rosenthal

Production Facts

Porcelain
Ceramics
Glass
Cutlery

Content

Porcelain, Ceramics, Glass, Cutlery

These are the vessels which contain our means of sustenance – food and drink – and the tools for one of our more pleasant pastimes: eating.

The cults, ceremonies and customs associated with eating and drinking are as old as humanity itself.
Along with cultural evolution and changes of habit, the eating and drinking habits of all ethnic groups have changed considerably over the centuries.

Nature provided the first bowls and utensils. Humans made their first knives out of obsidian and flint. The first bowls were hollowed stones and baskets lined with clay.
Soon people learned that baking would harden the clay and that a framework of wicker or rush was no longer needed once the clay was fired.
Thus began the evolution of the art of pottery. The basic raw material, clay, could be found in most parts of the world.

In China another, similar, material was found which could be formed extremely thinly and, when fired, it remained light in colour: that was china clay.

There is only one place on earth where the right mixture of raw materials for porcelain can be found in its natural state. Thus blessed, China had a head start in developing fine porcelain.

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Once humans had learned how to melt and process metals, dagger-type weapons for killing animals were among the first objects made. The use of knives for eating was a logical development.

In the making of weapons and jewellery from bronze, hard shiny beads in brilliant colours would form where the sand of the moulds came into contact with the very hot cinders and glowing ashes of the fire: the very first glass.
A waste product?
A coincidence?
For a long time used only for jewellery, people discovered the versatility of these beads.

The development of processing all these materials rich in tradition has come a long way from the very beginnings to today's high quality products.

Manor House Erkersreuth near Selb

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In 1879 Philipp Rosenthal sen. together with a porcelain painter, laid the foundation stone of a company that 50 years later was to become one of the best known porcelain manufactures in the world as Rosenthal AG, at a country seat near Selb.

He started by painting on white porcelain from other manufacturers and sold it on. When these manufacturers declined to sell him any more whiteware, he founded a limited company (AG) and produced the first Rosenthal porcelain.

Rosenthal studio-line

Rosenthal studio-line, name for a brand?
A concept that stands worldwide for all that is original in our times, for porcelain, glass and cutlery with international characteristics.

With its studio-line Rosenthal presents a collection of varied design characteristics without dictating a specific style or setting formal guidelines.
This is assured by often contrary characters of the many artists and designers from all over the world. Each make their personal mark with their individual, independent contribution to this concept.
The common denominator is the uniformly high standard and the awareness that authentic evidence of contemporary culture is being created.

Only those designs that meet this demand will be taken into the studio-line collection, thus gaining entrance into Rosenthal Studio Houses and the Rosenthal Studio departments of sophisticated retail stores.

This is where the »concept Rosenthal« comes into contact with the customer. First impression being the Rosenthal window with its ever changing themes. After that the Rosenthal sales assistants are above all the most important link in the chain of communication within a company as committed to culture as Rosenthal.

Rosenthal Classic

Rosenthal is the collection that upholds tradition in the House of Rosenthal, that nurtures it and passes it on.

Here various shapes and gift items from the 19th century, the opening period of the company, take their place beside the new creations of classic-modern and tradional-elegant charm.

As it was done 100 years ago, every single piece is carefully produced. The patterns are applied by hand or etched and the decorations hand-painted.

Dinner sets with complementing stemware collections as well as the gift items of Rosenthal reflect the highest standard of fine dining.

Thomas

Thomas – for everyday use but not ordinary.
Thomas has adapted fully to the spirit of the times, orientating itself on target groups.

Thomas – always young – tracks down the trends of an international lifestyle. It manages to set trend orientated and brand specific accents of design and represents everyday culture, the aesthetics for every day. Thomas shows competence in producing beautiful though functional crockery, restrained in its simplicity and uncomplicated to use.

The extensive collection is made up of seven building blocks which are clearly defined. Products are developed and marketed for the areas Home + Kitchen, Design, Colours, Ambience, Kids, Glass and Gifts. Therefore sales concepts which aim at specific target groups can be carried through.

The building block Home + Kitchen undoubtedly commands a central position with the form »Trend«, the best selling dining service programme worldwide.

Porcelain

The oldest porcelain discovered to date is a wine jar, unearthed during excavations in the Honan Province of China. Archaeologists believe it dates from the sixteenth or seventeenth century B.C. This yellow-glazed vessel, decorated with an ornamental relief, shows that the Chinese knew how to shape and fire delicate porcelain over 3000 years ago.

The art of making porcelain first came into its own during the Sung-Dynasty – between 1000 and 1250 A.D. During the Crusades, porcelain was brought to the Middle East and Europe via the »Silk Route«.

In 1300, when Marco Polo returned from China to his native Venice and reported all the wonders of the Far East, he used the word »porcella«, meaning shell to describe the magnificent ceramic ware of China, thus giving porcelain its name.

In the late fifteenth century European explorers set out to discover the world. Very soon the Portuguese, followed by the Dutch and the English, returned to Europe, bringing with them whole shiploads of elaborately painted Chinese porcelain.
Porcelain became the obsession of European royalty; it was every nobleman's desire to possess such priceless treasures. Some nobles even employed alchemists and chemists to unravel the secret of this »white gold«.

In 1709 the Dresden alchemist Johann Friedrich Boettger and the Chemist Walter von Tschirnhaus finally succeeded in discovering the composition of hard paste porcelain: kaolin, feldspar and quartz.

Augustus the Strong of Saxony installed Boettger and his porcelain makers in the Albrechtsburg, a castle in Meissen. But not even the strictest security measures could keep the secret within the castle walls. In Germany alone, as many as eight major factories were manufacturing porcelain by the end of the 18th century, including such well known names as Nymphenburg, Berlin, Fuerstenberg and Frankenthal.

Elaborate porcelain tableware soon became the fashion among nobility, especially cups which enhanced the fine aroma of the new fashionable beverages: coffee, tea and chocolate.

Political turbulences at the end of the eighteenth century brought difficult times to the manufacturers under royal or noble patronage.

With the industrial revolution of the nineteenth century, the middle classes began to enjoy more wealth and new respectability. State owned factories became privately owned and new porcelain works were established. Porcelain rapidly found its way into countless households in all strata of society and became an object of everyday use.

At the same time shapes and decorations of bygone ages inspired copies in porcelain as well as influencing many other areas.

Even in our mechanized age, the making of fine porcelain demands high standards of craftsmanship, just as it did some 3000 years ago. From the design and modelling stage through to final production, no machine can replace the skilled hands of a craftsman without forfeiting the quality and variety of forms which we associate with elegant porcelain tableware.

The work of the designers

Rosenthal Creative Center – the centre of product development

Rosenthal's artists and designers come from far and wide to the Creative Center at Selb. The Creative Center is part of the Product Development Division, which operates independently of production. At the Creative Center, artists and designers are involved in all stages of a new product's evolution: from the drawing board and the first model through to a finished collection of tableware or glassware.

The Product Development Division with all its necessary workshops develops new creations for all Rosenthal brands: studio-line, Rosenthal and Thomas.

The work of the modellers

The model of a vase is turned from a plaster cylinder

Modellers are master craftsmen. In close cooperation with the designers, they manually construct plaster moulds following their designs. As a modelling medium, plaster 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. Handles and spouts are carved separately from plaster blocks.

Since porcelain shrinks by approximately 15 % 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 straighter and at a steeper angle. As the degree of sagging cannot be calculated, it is the experience and sensitivity of the model maker one has to rely on.

Synthetic resin and plaster cast moulds

On the left the synthetic resin mould, on the right the negative casting mould

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 cast mould can be used about seventy times. However, if the shape is in relief, the casting mould is discarded after approximately thirty-five castings because a relief pattern wears away slightly with each use. This is why no two reliefs on table or giftware are exactly alike.

Preparing the raw material

The raw materials are loaded into the drum mill

Porcelain is primarily made up of 50 % kaolin, 25 % feldspar and 25 % quartz. 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, a vacuum press sucks out the air. Now the porcelain is ready for moulding.

Once all occluded air has been removed, the porcelain clay is extruded from the vacuum press

Turning

A cup being »jolleyed«

The porcelain clay is portioned into relevant sizes and placed onto the plaster cast moulds for the cups, which is then inserted into the cup machine, a continuous moving track. A metal template is lowered and by turning, the cup is jolleyed.

When the raw 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 they are attached to the cup.

Cup handles on a tray

Isostatic press moulding

Open mould of isostatic plate press

The dust-pressing of plates involves a porcelain paste consisting of minute dry granules (spray-dried).

These granules are poured into the press mould and bond under high pressure. The pressure necessary is ca. 300kg/cm^2. The press tool itself 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 article and is fitted with an elastic membrane to isostatically mould the pieces. When upper and lower dies are closed the granules are being pumped into the hollow area inside using compressed air. An article is being moulded under pressure of ca. 300 bar – thereby ensuring it is evenly bonded which is extremely important for the success of the subsequent production process.

An elastic conveyor belt catches the plate made from porcelain granules

Dust-pressed articles have then to be smoothed off around the rim only. The normal finishing process follows after that. Press moulding is a more efficient method and among its many advantages is a significant quality improvement in the production of plates and platters.

Slip casting

Pouring the slip into a mould made of plaster-of-paris

Porcelain items like teapots, handles, spouts, boxes, oval platters and figures are shaped in moulds of plaster-of-paris. For this purpose a porcelain slip is used. 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 a layer of set clay on the mould wall. Any remaining liquid slip is then poured out.

Pouring away the liquid slip (Slip casting)

Opening of the plaster-of-paris mould

Handles, spouts, cup feet and lid knobs are made separately and then stuck onto the actual body by hand, using the slip as a locating medium. Porcelain figures 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.

The slip-casting machine automatically fills the moulds

Press casting

Open mould used in 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 remaining slip, the actual porcelain paste, stays within, shaping the desired item.

When finished, the mould opens automatically and a suction pad lifts out the pieces.

Biscuit firing

Fast fire kiln

After the raw porcelain has been pre-dried and biscuit fired at about 1000 degrees C, it is no longer water soluble but still porous and water absorbent.

The latest development in firing technology, for biscuit firing as well as for the subsequent smooth firing, is the so-called fast fire kiln. Here the articles are transported on fireproof support slabs made from silicon carbide on a conveyor belt through the furnace. Saggers and the stacking of items now becomes obsolete. The firing is much improved and the firing time reduced to 4 – 6 hours, thus considerably reducing the consumption of natural gas. (The old tunnel kiln requires a firing time of 36 – 40 hours).

Glazing

A machine dips the plates into a bath of glaze turning them at the same time

Automatic rotation distributes the glaze as evenly as by hand

The biscuit fired articles 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. The glaze melts when fired and fuses with the body before its pores »close«, creating an inseparable bond between body and glaze.

The glaze is applied to the porcelain either by hand or machine dipping. Because of its high content of quartz it produces a very hard surface when fired. With particularly delicate pieces (e.g. »Zauberflöte« and Limited Edition Art), the glaze is applied using a special spraying process.

Moving and turning distributes the glaze evenly onto the plate

Sharp firing

On the left an unfired coffeepot, on the right in comparison, a coffeepot after firing

In the smooth or sharp firing process at temperatures of up to 1400 degrees C, the paste shrinks, becomes non porous and waterproof. The intense heat causes vitrification and turns the porcelain into a hard, delicate, translucent substance. This process not only effects a chemical change in the porcelain article but also changes its contours. Therefore it is virtually impossible to produce identical porcelain articles. Even the sharp firing is done in fast fire kilns nowadays.

Supporting props

Special supports are needed during firing to prevent the porcelain from becoming distorted

To keep distortion of the soft, hot porcelain to a minimum, many pieces are fired using props. Props are supports that are made from the same porcelain paste, so that they undergo the same shrinking process during firing. Once a porcelain piece is fired, the prop cannot be reused.

Hard-paste porcelain

Translucency is the main characteristic of good porcelain

After the two firing processes at intense temperatures, the porcelain has become hard, impact resistant and translucent despite its extreme fineness.

Hard paste 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, sometimes slightly bluish hue of the porcelain is achieved by reduction firing: that means it is fired in an atmosphere of reduced oxygen.

Porcelaine noire

»Gropius –Service« in Porcelaine noire

Black porcelaine is dyed with metal oxides in the body as well as in the glaze.

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. A sustained contact 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.

Grinding

Cup rims are smoothed off and polished

The unglazed contact surfaces of the porcelain are still rough after the second firing.

By grinding and polishing repeatedly they become smooth and dirt resistant.

Sorting

A good eye and a lot of experience are required to select only perfect pieces

The undecorated porcelain, also called »white ware« is carefully inspected and sorted by highly skilled personnel.

The intrinsic characteristics of the materials and the ceramic production process, especially the firing, inevitably cause minute deviations between individual pieces within pre-set standards. The sorting process, painstakingly executed, eliminates the items with an unacceptable level of deviation and discards altogether pieces with obvious defects.

Decorations

Since ancient times people have enjoyed decorating articles used in their everyday life

Through their colours, decorations on porcelain enliven the white of the material, creating a vivid contrast to the plain white shape. A vase or a dinner set, 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.

A colourful pattern can help to set the mood for certain purposes and occasions. Besides, a variety of decorations appeal to different consumer tastes.

Hence the Product Development Department offers a host of designs and patterns created by artists and designers of international fame, using the strictest criteria in selecting the best.

Decorative transfers

Precision is essential when applying the decorative film to the porcelain

The most frequently used technique for decoration porcelain is the application of a sheer, wet colour film. This process demands extreme precision, patience, a steady hand and a sharp eye. The expressions »sliding print« and »transfer« create a totally wrong impression of what is involved.

The transfers are printed by a special flat- or silk- screen process. These days they 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. A porcelain painter cannot simply copy a design by an artist. The reproduction of designs by eminent artists on to porcelain has been made possible by using new, elaborate printing techniques which produce a perfect replica in ceramic colours.

Hand painting

Gold decorations are carefully applied by hand

Lustre, gold and platinum bands, gold etchings and gilded reliefs are hand painted.

The gold is applied in two layers and fired after each application. Fibreglass brushes are then used to burnish the gold to a high gloss. After the final firing, the hand painted decoration contains as much as 95% pure gold (22 carat).

All figurines are also painted by hand. There are two methods: on glaze – when the figurine is decorated after the second firing, and under glaze when the biscuit fired figurine is painted before being glazed and fired.

Base colouring

The red colour is sprayed evenly on to the article

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 varnish and before firing, the white areas of the porcelain are cleaned carefully. Even the tiniest colour residue turns into visible spots.

Decorative transfer printing

Checking of the transfer sheets after the final print

Thanks to new printing techniques it is no longer the case that only hand painted porcelain is of true value.

These days the artist's design is scanned into a computer and reworked by an elaborate software programme in order to make it fit onto each piece of a dinnerware set, adapted to its three-dimensional shape. The character of the artist's »signature« is fully preserved. After this process the design is 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 on to the paper by 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.
After printing the transfer sheet is coated with a layer of lacquer.
Before decorating a porcelain piece, the sheet is soaked in water to dissolve the lacquer. The flimsy and wet colour film is then carefully applied to the porcelain.

Gilt-etched decoration

Etching gives the porcelain a fine relief that is beautifully enhanced by gilding

To produce the very valuable gilt-etched border, parts of the decorations are etched into the glaze using hydrofluoric acid, the only acid that affects porcelain. The parts that are not to be etched are protected with a coat of varnish beforehand.

The longer the porcelain is dipped into the acid, the deeper the decoration is etched. Precise timing is essential for consistent quality.

Afterwards the decoration is gilded twice by hand. Each coating of gold has to be fired separately. After the second firing, the gold is burnished to a high gloss with glass fibre brushes.

Combination matt – glossy

Matt glaze being sprayed on

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

A matt glaze is sprayed onto the porcelain in a similar fashion to a colour base and then fired.
Glazed porcelain can be made matt by lightly etching in hydrofluoric acid. The areas that are to remain matt and unglazed are covered with wax before being dipped into the glaze. The wax, shown here in blue, burns off during firing.

The relief is being coated with a blue wax to prevent it from being glazed.

Under glaze decoration

One of the oldest techniques of painting porcelain and still used today

An under glaze decoration is often hand painted onto the porcelain whilst it is still porous after the first firing. The decorated article is then glazed and fired at approximately 1400 degrees C.

Even the company logo (backstamp) is applied before glazing.

There are only a few colours that can withstand the high firing temperatures: cobalt blue, green, brown, a pale yellow and a mixture of these colours from grey to black.

Designers like to combine the under glaze cobalt decoration with gilt-etched decoration.

High temperature decoration firing

The firing of inglaze decorations requires a temperature of 1250 degrees C

High temperature decorations are either transfer-printed, hand painted or sprayed on to the glazed porcelain.

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 1250 degrees C so that the decoration sinks into the liquefied glaze which is protecting it at the same time.

Inglaze decorations remain unaffected by outside influences and are dishwasher safe.

Onglaze-Décor firing

»Karat« gift items

Similarly, onglaze decorations are applied to the porcelain, using transfers, spraying techniques or hand painting. This procedure permits the use of vivid colours, such as red and orange that cannot withstand high temperatures. Also the rich gold, platinum and lustre decorations are fired onto the glaze at temperatures of between 800 and 900 degrees C. Onglaze patterns are not as smooth as glaze normally is and are detectable to the touch.

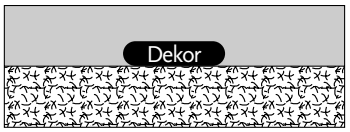
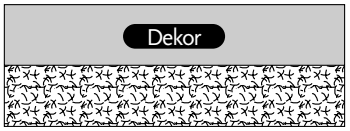
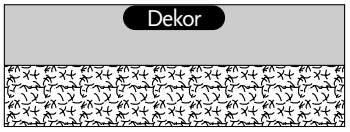
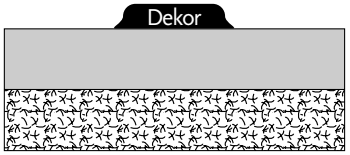
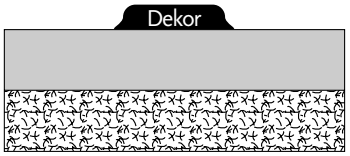
Elaborately decorated porcelain are fired up to six times:

biscuit firing
sharp firing
4 decoration firing processes

»Aida« (the Rosenthal service), featuring a cobalt blue rim and an acid-etched gold border, is fired just as many times:

biscuit firing
sharp firing
cobalt firing (inglaze decoration firing)
1.gold firing process
2.gold firing process
corrective firing, if necessary.

Decoration firing techniques

Symbol/ Description of decoration	Decoration technique/ Colour range	Firing temperature/ Duration	Glaze – Body	
Underglaze **IWT tested** **Dishwasher safe**	The decoration is applied to the unglazed surface after the biscuit firing, then the article is glazed. Cobalt, brown, green, matt yellow, grey to black	1400 deg C 36 – 40 hrs	glaze body	
Inglaze **IWT tested** **Dishwasher safe**	The decoration is applied to the glaze. The glaze melts at the firing temperature and totally absorbs the decoration. Cobalt, brown, green, matt yellow, grey to black.	1380 deg C 16 – 20 hrs	glaze body	
High temperature **IWT tested** **Dishwasher safe**	The decoration is applied to the glaze and is only just absorbed during firing. The decoration is protected, similar to an inglaze décor. Almost all colours, gold and white gold	1230–1260 deg C 1.5 hrs	glaze body	
Onglaze Colour decoration **IWT tested** **Dishwasher suitable**	The decoration is applied to the glaze and is not absorbed during firing. The colour bonds with the glaze. All colours, particularly vivid colours and gold	840-900 deg C 4 hrs	glaze body	
Onglaze Precious decoration **IWT tested** **Precious decoration**	The decoration is applied to the glaze and is not absorbed during firing. The colour bonds with the glaze. Gold, lustre, platinum	840-880 deg C 4 hrs	glaze body	

Porcelain in the dishwasher

Crockery is exposed to many influences in the dishwasher. The composition of the detergent, the temperature of the machine, the degree of water hardness and the method of drying, all this determines the durability of the items. Some of the older machines do not protect the articles as well as new ones. It is important to follow the guidelines issued by the manufacturer e.g. to regularly refill the salt storage container and to follow the dosage recommendations for detergents. Dishwashers that do not automatically disperse the heat should be opened immediately after the rinsing cycle is finished. Most damage is done during loading or unloading of the dishwasher. The crockery must be placed in such a way that it does not touch or rub.
For dishwasher use we divide the patterns into three groups: we make a distinction between precious-, dishwasher suitable- and dishwasher safe patterns.

 = Precious decoration

The appearance of the decoration – the art design – is the predominant feature of the porcelain. Dishwasher suitability is not the first consideration. Use of precious colours and their subtle realisation do not allow dishwasher rinsing. This decoration was tested by the Institute for Material Technology (IWT) of Rosenthal AG.
The service must always be washed by hand.

 = suitable for dishwasher

The colours of this pattern are fired onto the glaze at (at least) 840 degrees C. These resistant colours achieve such a strong bond with the glaze that the dishwasher has little or no affect on the decoration. Dishwasher tests in the Institute for Material Technology (IWT) at Rosenthal AG have proved good durability of the pattern. The service can be put into the dishwasher at a maximum of 55 degrees C. Do pay attention to the guidelines of manufacturers of dishwashers and detergents on the suitability of their products.

 = Dishwasher safe

The colours of the decoration are melted into the glaze at a temperature of over 1000 degrees C, where the glaze softens and absorbs the decoration. Its colours and luminescence then becomes indestructible , scratch and rub resistant. However, gold decors are not totally insensitive to scratches due to their natural material characteristics. The pattern has been tested by the Institute for Material Technology (IWT). It can be placed into the dishwasher without reservation.
To limit the production to decorations rated as »dishwasher safe« would be an exaggerated precaution. Decorations that are suitable for the dishwasher also have a satisfactory life span; they permit more colourful, artistically versatile designs.

Versatility

Although porcelain is an exquisite material, it has great design versatility. The delicacy is equally well expressed in the cool elegance of a black and white tea service as in the cheerful shapes of traditional coffee cups and coffee pots.

Porcelain can have many faces:
It can appear luxurious and splendid, dainty and elegant or cheerful and jolly. But as a beautifully laid table is not complete with porcelain alone, Rosenthal complements its services with the appropriate stemware and cutlery.

Porcelain – a utility article only?

Rosenthal products are no fashion products although they do reflect the spirit of their time. They are timeless objects with relevance and value for now and the future, no matter whether it is a dinner service, glasses, cutlery or a gift item.

With the artist-designed services and the limited art ranges Rosenthal makes it possible to integrate not only objects d'arts but also artistically designed everyday articles into ones personal lifestyle.

»It is Rosenthal's desire to create a Renaissance for porcelain sculpture and to draw renowned artists into working with this valuable material.«
(A. Bode)

Ceramics

Porcelain is the most precious product of the wide field of ceramics. The word ceramic derives from the Greek noun »keramos«. Originally »keramos« meant clay and then covered everything that is made of clay such as jug, brick, roof, wall and even floor tiles.

Ceramics are as old as human civilisation.

Every prominent culture has produced important ceramics e.g. the lion gate in Babylon, the wine and storage containers in antique Greece, brick buildings in antique Rome, majolica tiles and vessels in the early Islamic world.

Ceramic works of art were produced all over the world, culminating in Europe with the discovery of porcelain.

In everyday language ceramics are those ceramic products whose main ingredient is clay. They are not transparent in contrast to porcelain, whose main ingredient is kaolin.

Ceramic products consist of plastic and non-plastic matter. Plastic matters are clays, non-plastic matters are quartz, feldspar, chalk etc.

The shape of fired ceramics cannot be altered.

The group of coarse ceramics consists predominantly of building materials. The fine ceramics group includes: pottery, majolica, Faience, stoneware, fine stoneware, vitreous china, bone china and porcelain.

The fundamental difference between »Ceramics« and hard-fired porcelain is: hard fired porcelain consists of kaolin, feldspar and quartz and has a translucent body.

Fine stoneware consists, amongst other things, of kaolin, feldspar and quartz with its most important ingredient being clay, which results in the body not being translucent.

Fine stoneware

Coffee service »Flash«

The fine stoneware compares with porcelain in its technical characteristics. Like porcelain it is formed with the help of moulds, jolleyed and cast. In addition awkwardly shaped articles are formed under pressure.

Articles of fine clay stoneware are particularly attractive. The brownish hue and the slightly grainy textured structure of the surface are often left unglazed as part of the decoration.

As in porcelain production reliefs are engraved into the plaster model. With hand-finished products, the reliefs are shaped manually.

After first firing the pre-dried fine stoneware at approximately 900 degrees C, the body is either colour glazed – whereby the glazing provides the colour – or it is painted by hand and followed by a coat of transparent glaze.

Another method of decoration on Rosenthal ceramics is the painting on the un-fired glaze.

During the second firing process at approximately 1200 degrees C the fine stoneware becomes very dense, making the body watertight. Despite the high firing temperatures, the colour range of under-glaze decorations is almost unlimited. Porcelain on the other hand is fired at a temperature of 1400 degrees C and this limits the colours for under-glaze painting on this material considerably.

In addition decoration such as a transfer or hand painting can be applied to dark or opaque colour glazes. During a third firing the decoration is melted again into the ceramic glaze at a temperature of 1200 degrees C. At this temperature the glaze is softened again, causing the colours to sink into the glaze, which forms a protective coating.

Earthenware – Pottery

When the glaze is intended to be the colour base it is usually dyed with metal oxides. Depending on the concentration of the oxides and the consistency of the glazes, colours differ in intensity. The metal oxides change during glaze firing according to the prevailing kiln conditions.

After each oxidizing firing, that is in an oxygen enriched firing atmosphere, the metals contained in clay and glaze retain the colour of their oxides (e.g. Copper – green).

When fired with reduced oxygen, the metal oxides change back into their metal colours (e.g. copper – red shades).

The potter is particularly attracted by the use of versatile coloured glazes. Because of their composition they react to the slightest variation in temperature during firing with sensitive colour changes. Depending on where they are placed in the kiln, colours vary from one piece to another. This gives each its unique character. The potter increases these typical characteristics even more by dipping the article whole or partly into different colour glazes or glazes of different concentration.

Fine stoneware is ovenproof and if the decoration is under- or inglazed, also dishwasher safe. This applies to everyday ware as well as to gift articles. Fine stoneware is also suitable for the microwave oven with the exception of decorations containing precious metals (gold, platinum) and iron oxide crystal glazes.

However, sudden changes in temperature should be avoided.

Because of its relatively strong, hard-fired body, fine stoneware is highly durable even when subjected to the wear and tear of daily use and automatic dishwashing.

Fine stoneware is thicker than the thin walled porcelain because of the materials used which means that it is better able to retain heat. Therefore plates, cups and serving dishes keep their contents hot for longer. The crockery can also be warmed without becoming too hot to handle.

In English speaking countries tea is therefore often prepared using ceramic teapots and drunk from ceramic cups. It is said, that the good heat insulating properties of ceramic crockery prevent a quick cooling of the drink and allows it to develop its full aroma.

Earthenware is fired at kiln temperatures of approximately 1100 degrees C and pottery at 950 degrees C. They are then glazed and fired a second time at temperatures of between 50 and 100 degrees below that. This temperature is low enough for the application of glazes and underglaze colours in a wide variety of colours. The earthenware and pottery glazes used are always fritted glazes and in almost all cases contain lead.

Unlike fine stoneware the earthenware body does not become dense during firing. It remains porous. If the glaze develops a crack, moisture will penetrate into the clay.

Glass

The oldest man-made glass was found among the artefacts of ancient Middle Eastern civilizations. The glass beads excavated in Ur, Mesopotamia, are believed to be nearly 4500 years old. For centuries up to the birth of Christ, coloured opaque glass was valued as a precious gem and used in the making of the finest jewellery.

Early glass jars were made in a highly complicated process and were treasured like jewels. A clay model attached to a metal rod was dipped repeatedly into molten viscous glass. As soon as enough glass had accumulated around the model, it was allowed to cool and the clay was then removed from the inside.

For centuries the Teutonic countries of Northern Europe imported glass from Mediterranean regions. Its name was derived from the Old High German word for amber, glaesum.

With the introduction of an improved melting technique around 200 B.C., it became possible to melt glass to a lower viscosity. It was discovered that when glass is red hot and molten, it could be blown like a soap bubble through a blowpipe of 1.5 m in length.

The glassblower's pipe remains to this day the most important tool in glassmaking. With its invention and the development of newer, more efficient glassmaking techniques during the height of the Roman Empire, this once precious material became an item of daily use. The art of glassmaking flourished and spread. Glassworks started up all over the Roman Empire from Syria to Britain. Even in those early times Roman glassmakers already mastered almost all the important techniques of making and refining glass.

During the period of the migration of the peoples the Roman art of glassmaking declined in Central- and Western Europe. Although glass-makers continued to produce hollow glassware, it was of poor quality due to inferior materials used. Any decoration was applied whilst the glass was still hot from the furnace, cutting and engraving became lost art forms.

In the Eastern Mediterranean countries however, a glassmaking technique comparable to that used by the Romans and the Egyptians survived.
Distinct styles of painting glass were developed, first in the Byzantine area and later in the Islamic Empire. In the Middle East glassmaking reached its height during the fourteenth century, but was later to fall into decline.

The Venetians revived and refined many of the Roman techniques of glassmaking and they were the first to discover a way of melting colourless glass.
During the thirteenth century Venice became the centre of glassmaking in Europe. The formulae and processing techniques were carefully guarded; severe penalties were imposed on glassmakers who betrayed these secrets.
In 1291 the glassworks spreading over several kilometres were moved from Venice to the island of Murano. This eliminated the fire risk to the town of Venice and isolated the skilled glassmakers from the outside world.
Nevertheless, by 1600, Venetian glassmaking techniques had spread to most European countries and many glassworks were already producing thin-walled goblets on elegantly ornamented stems, once the exclusive domain of Venetian glassmakers.

In seventeenth century Bohemia the development of glassmaking techniques using potash gave rise to the creation of a new type of glassware. The colourless glass was noted for its brilliance and was particularly suitable for cutting and engraving. In fact, it was possible to adapt the technique of cutting rock crystal to this type of glass.

The Baroque period saw the inception of new styles of glassware and ornamentation. Typical of this period are lidded goblets in sparkling, facetted glass, which refract light like a prism into all the colours of the rainbow.
Bohemia soon became the centre of glassmaking.

The last important step in the art of making lustrous glass was the invention of lead crystal in England. The exceptional refractive properties of lead crystal endowed fine nineteenth century stemware with the sparkle of cut diamonds.

The short-lived period of Art Nouveau brought about a revolution in glass design. Oriental and floral motifs provided inspiration for flowing shapes and flamboyant decorations in colourful opaque glass.

New styles of glassware were introduced internationally around 1930. Design became more functional and reflected the character of the material itself. The pure beauty of the material is enhanced by a wealth of designs. Contemporary designs are superimposed layers in contrasting colours, textured ornamentation and air bubbles, adding charm and beauty to today's creations in glass.

Glass design

Rosenthal glasses are designed by renowned artists and designers.

Glasses which are being designed for the Rosenthal studio-line, Rosenthal and Thomas are developed and reworked until the result is a matured range of stemware series and giftware items which are being passed on to the glassworks for production.

Raw materials

Depending on the composition of the glass required and the raw materials used, many types of glass with most varied characteristics can be melted.

Rosenthal create their products from crystal glass or lead crystal.

Crystal glass is a pure, hard colourless glass with a strong light refraction and a good resonance. It is produced from quartz sand, soda, potash and calcium with the addition of some barium and minium.

Lead crystal is heavier and softer that crystal glass. It has a particularly strong light refraction and is therefore very suitable for cut decorations, which bring its visual qualities into full effect. It is mainly smelted using the same raw materials as those for crystal glass and contains 24 % of lead oxide as determined by the EU-standard. The addition of metal oxides allows the production of glass in almost any colour.

Glass furnace

These days in hand blowing glass works crystal glass and lead crystal is melted in tank furnaces as well as in glasshouse pots. A pot furnace usually consists of 1 – 5 pots made from fireclay which are slowly preheated to above 1100 degrees C. The preheating prevents the pots from cracking when placed in the melting furnace.

These pots can hold between 600 – 900 kg of glass.

The life span of a brick pot is about 12 – 16 weeks. The furnaces are fired with gas and light oil and are used for several years without interruption.

The walls of the glass furnaces have openings through which the glassblowers gather the molten glass from one of the pots with their special blowing irons.

Whereas in pot furnaces glass is melted and worked with in a daily rhythm, tank furnaces can be used continuously. A glass level regulator automatically refills the amount of molten glass as it is extruded from the front. Production is carried out in shifts.

In the modern glassworks of Amberg smelting is carried out in tank furnaces. Pot furnaces are used for coloured glass only.

Glass smelting

The preparing, weighing and treatment of the raw materials for glass has to be carried out with great care and precision. The smallest variation in the quantities results in a change of glass quality. The purpose of glassmelting is to change the raw mixture into a homogenous liquid and it is essential to bond the very finely ground raw ingredients.

The smelting worker melts the glass in the pot furnaces overnight. After the glass batch has been fed into the furnace, the smelting process itself consists of three phases. The first phase produces a liquid glass full of bubbles, the raw smelt. During the second phase, the fine smelt, the temperature is increased to 1400 degrees C. Then the smelt worker »bubbles« the glass by dipping a piece of wet wood into the glass, causing the bubbles to rise to the surface. Here and there tiny bubbles can remain and will be visible later in the finished glass.
In the third phase the glass has to cool slowly to a working temperature of 1200 degrees C.

The next morning the glassmakers can start their work.

The glass batch is filled into a glasshouse pot through the furnace opening

At night the raw materials are melted at temperatures of around 1400 degrees C

Glass blowing

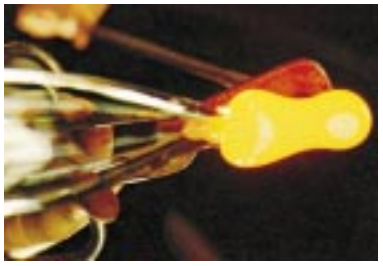
Three to five glassblowers usually work as a team at the pot or tank furnace

With his blowing iron the glass-blower gathers a small globule of molten glass and blows it into a round ‘gob’.
Dipping the blowing iron with the gob back into the pot, he gathers enough glass needed to produce the intended piece by rapidly turning the iron. By blowing, swinging and turning it in a wooden spoon, the article is then pre-shaped.

In serial production of hand blown glass, it is blown into a wooden or steel mould. The glass maker lowers his blowing iron into the mould until, by constantly blowing and spinning, the glass is forced into the shape of the mould and has cooled and hardened. Then the mould is opened and the article removed.

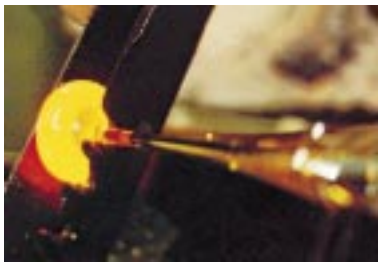
Goblets

The bowl of the glass is turned continuously as it is blown in to a metal mould



The glassblower attaches a small knob of molten glass to the bottom of the bowl...

... and with a pair of tongs he draws out the stem



The base is patted into shape with wooden slats

The first step in producing a goblet is the making of the bowl, as described above. Then a small knob of red-hot glass is gathered and attached in the centre of the bottom of the bowl with extreme precision. Using a simple tool the glassmaker then draws the knob into a stem, cutting off any excess glass.
A second knob is then attached to the base of the stem, which the glassmaker quickly pats into shape with wooden clappers to form the foot.

Where the glass has a »drawn« stem, a cone of glass is blown into the centre of the bottom of the glass. The cone is reheated and then drawn and further shaped like an attached stem (e.g. »Maître 13/66).

Forming the stem and foot requires a great deal of skill and a sharp eye. Years of practice and experience are needed to make a series of goblets, which are identical in appearance.

A team of glassblowers usually consists of three to five craftsmen who must work hand in hand with speed and accuracy as glass hardens within only a few seconds.

With hand blown glassware small variations of thickness in bowl, stem and foot cannot be avoided.

The connoisseur appreciates this as distinguishing marks of hand blown stemware in comparison to machine-made glass.

Cooling

A view of the cooling track

By the time a piece of stemware has assumed its final shape, it still has a temperature of about 450 degree C. It is removed from the blowing iron and transferred with a fork into the cooling oven where it gradually anneals to a normal temperature.

This gradual cooling process is essential as it prevents the build up of stress within the glass, which would occur if the glass cooled too quickly.

If a glass is not cooled or cooled too quickly, stress cracks can occur, even years later. This happens suddenly without contact. A typical tension-break runs smoothly, starting from the most solid part of the glass, e.g. the foot, or horizontally, approximately 2 cm below the glass rim.

Finishing the rim

The caps are cracked off by scoring the glass with a special tool and then reheating the bowl

Handblown glass has a »cap« where the blowpipe was attached to the upper part of the bowl.

After cooling these caps are »cracked off« by first scoring a line around the bowl with a special wheel. An intense pinpoint gas flame heats the scored glass. By blowing air onto the glass, it cracks and the cap falls off. The glass now has its final shape.
The very sharp rim of the bowl is then ground inside and out and finally finished off with a gas flame to make it smooth to the touch.

The finishing touch

By patting with wooden slats, the glassmaker shapes the rim of the still red-hot vase

A high degree of skill is needed for the finishing touch.

For this purpose an iron rod or »punty« is attached to the foot of the completed, but still hot piece to hold it steady.
Now the cap is cracked off with a sharp file. The unfinished rim is re-heated in the furnace so that the surplus glass can be removed smoothly with a pair of scissors. After further re-heating, the rim is adjusted to the desired shape and diameter.

Now the punty is broken off, leaving a rough scar, the navel, which is then ground and polished after the glass is cooled. This mark is a distinguishing feature that tells the connoisseur the piece is hand blown and finished by hand.

Glasses with injected stems

The head is attached to the goblet using a metal mould

A new technique makes it possible to produce glasses with relief-patterned stems, which could not be achieved using the traditional methods.

A steel mould is made which contains inside the negative image of the head relief. The hand blown bowl is placed on top of the mould and molten glass is forced into the mould from below with compressed air. Once the glass is cooled down and the head is safely attached to the bowl, the mould can be removed.

After that the stem and foot are attached by hand.

Optically blown glass

A relief is imprinted by blowing the glass into a primary mould

A very old, yet a very fashionable technique of decorating glass in its hot state these days is »optical blowing«. This method stretches the glassmaker's ability to the full and requires a special dexterity and years of experience.

To produce an optically blown glass article, the glob of molten glass at the end of the blowing iron is lowered into an open cylindrical mould and blown against the ribbed or patterned walls so that the pattern becomes imprinted in the glass.

The still pliable glass is then blown into a finishing mould, retaining the imprinted pattern optically. The glassblower can achieve additional effects by twisting the fluted pattern into a spiral, turning the mould fast in one direction only.

Other glasswork decorations

Glass series »Maitre 13/66«

There are many different ways for the glassmaker to decorate glass whilst it is still very hot and pliable. Air bubbles and lenses can be worked into the glass. Filaments of glass in contrasting colours can be overlaid on the molten glass, or the glassmaker can create an article from two or three different types of glass or from multi-coloured glass.

By virtue of its inherent properties, glass lends itself to decoration of almost unlimited variety. Such techniques, however, demand the greatest dexterity and can be very labour intensive. It would take too long to describe all the techniques that were developed over centuries of glassmaking.

Pressing

»Kosta stars«

Technology has made it possible to press glass and has opened the way to producing very complicated patterned glass articles which cannot be produced in any other way.

Rosenthal use lead crystal for their exquisite pressed glass articles.

Molten glass is pressed by means of a hand press and under high pressure into a multisectional steel mould. Once the glass has hardened, the article can be removed and cooled.

In special cases the surplus glass, which is attached to the piece in the shape of a funnel, must be ground down and polished and the grind mark cleaned off after cooling.

The pressed glass articles are finally acid polished to a very high gloss.

Automated glass production

The moulds of the automatic glass-making machine have to be changed and cleaned every 24 hours

Producing glass articles by machine has been improved to such an extent over the last years that it is possible now to mass-produce well shaped glass in very high quantities.

Glass for fully automated production is melted in a continuous process in a tank furnace.

Carefully measured amounts of glass are taken out of the tank furnace at regular intervals, which, after a quick pre-pressing, are then blown with compressed air into a blow mould that is continually turning. The finished bowl, once taken out of the mould is then taken to a second mould. Here the stem and foot are attached. Then the glass is taken to the cooling track.

Cracking off the caps, polishing and melting the glass rim is also done in a fully automated process.

Cut-glass process

The stems of »Bvlgari« glasses are cut by hand

Finished glass vessels are cut under running water with vertical carborundum grinding wheels or other very hard synthetic stone. These wheels have different profiles for the various patterns.
There are various types of cut such as the surface or paring-cut for edgings i.e. for goblet stems; the rolling for creating balls and olives, or the square wedge and convex-grinding cut.

The pattern is traced on to the glass and then »pre-scored« by the grinder with a coarse grain grinding wheel, followed by fine »cutting« with a fine grain wheel. The now silky smooth surface is polished to a high gloss with a wood-, cork- or brush-wheel and a polishing agent.

Acid polishing

Acid polishing is a more economical process than polishing by hand.

Hydrofluoric acid is the only acid affecting glass.
The cut glass is dipped into a bath of hydrofluoric and sulphuric acid and polished to a high gloss by stirring continuously for 20 – 25 minutes. This mixture removes all irregularities and gives the glass a smooth and shining surface.

Acid polishing is an extremely complicated procedure since the acid composition has to match the composition of each glass.

Acid etching

Unlike mechanical techniques of decorating glass, acid engraving uses chemicals to create a pattern.

The glass is dipped briefly into a bath containing mainly hydrofluoric acid. Before the acid etching, the areas to remain smooth are coated with a protective varnish. The protective varnish is then removed, revealing a lightly etched pattern on the surface of the glass.

Acid-etched glassware can also be gilded and polished, making extremely precious and highly prized items.

Pantographic decoration

Pantographic method is used to create the filigree decoration of »Rosalina«

With this method the finished glass is coated with a layer of wax or paraffin. Following a template the filigree decoration is engraved through the protective layer using a steel needle. The glass surface is exposed again. This is an automatic process. To finish it off the glass is being acid etched.

Engraving

With a fine grinding wheel the engraver can create elaborate designs on glass

Engraving is a perfect means for applying fine, delicate designs to glassware.
The engraving process is very similar to the cut-glass process, except that the engraver's tools are fitted with minute grinding wheels.

Using combinations of finest lines and shadings, the engraver can »draw« any number of motifs e.g. coats of arms, writings, ornaments and figures to a design covering the entire surface.

The motif is engraved freehand without any need for guidelines. It takes years of experience and practice.

Sandblasted designs

A decoration is given a matt finish with a sand-blasting gun using a rubber stencil

Sandblasting is a new technique used for decorating glass. Extensive and generous design effects can be achieved with sandblasting.

The glass is covered with a special stencil, exposing only those areas which are to be decorated. A stream of compressed air forces a jet of fine sand from the gun, roughening and matting the chosen areas.

Sandblasted designs are often combined with engraved lines. The company logo is normally sandblasted onto the glass.

Hand painting

Gold decorations are painted onto the glass with a brush

Colour decorations can be painted by hand or applied by means of transfers in the same way as for porcelain.

Gold and platinum lines are always hand painted.

The decorations are fired onto the glass at a temperature of approximately 560 degrees C.

Sorting

All glasses are sorted before packaging.

It is important to differentiate:

Faults in the glass e.g. impurities, faults at production stage e.g. badly shaped glass rim and faults in the finish of the glass e.g. bad cut.

Hand blown and handcrafted glasses will always have distinctive differences, which are not to be mistaken for quality flaws. They are a sign that the glass is hand-made.

The smallest, finest and barely visible air bubbles (up to 0.5 mm) do no rate as quality flaws. They are material inherent. Insignificant and inconspicuous tolerances in the thickness of the goblet rims also rate as impeccable. Only obvious deviations or wobbly, lopsided or chipped glasses are rejected as unacceptable.

Handcrafted items will always show variations within set standards.

How to care for glass

Everyone knows that glass can break. However, it is not widely known that water in combination with the carbon dioxide in the air can destroy the surface of a glass.
Water releases the alkaline properties from the outer surface of the glass which then combine with the carbon dioxide in the air to form a potassium carbonate – kali – that turns the glass milky white. This cloudy tarnish can be wiped off initially but it can return time and again and eventually destroy the glass surface. The glass turns »blind«.

Glass should therefore always be stored in dry places and not remain packaged for too long because the packing material retains dampness and, at the same time, keeps out the necessary oxygen.

A progressive destruction of the glass surface leads the glass to become iridescent, as we know from glasses that have been buried in the ground for a long period of time.

To a large extent, valuable lead crystal is immune from this.

Glass in the dishwasher

Similar guidelines are applied to the cleaning of glass as to the cleaning of porcelain.

In the dishwasher glass should not be washed at a temperature hotter than 60 degrees C, using the mildest detergents. Glasses should be stacked in such a way that they cannot touch or rub against each other.

Precious glasses with gold or platinum decorations must be hand washed only. For lead crystal and thick glass the soapy water has to be lukewarm.

Never put two or more glasses in the same bowl when washing up, they can be scratched.

Never let water or soapsuds dry onto the glass but dry immediately.

Older dishwasher models, which do not let the steam evaporate automatically, should be opened immediately after the rinsing cycle has finished. Any type of steam can damage the articles in the dishwasher, therefore also porcelain and cutlery.

It is recommended that glass is not subjected to strong temperature changes, particularly too hot or too cold. A gradual change of temperature will protect the glass.

Cutlery

The knife

The knife probably is the oldest piece of cutlery. It dates back to the Stone Age when man made knives from flint and bone.

For centuries, well into the Roman times, the knife was only used for carving or serving.

The use of the table knife evolved gradually.

In the Middle Ages knives had straight, sharp points as they were also used as a fork.

The spoon

The spoon also is a very old implement.

Early spoons were carved out of wood or bone. For thousands of years they were shaped with short, thick handles, which were designed to be grasped with the fist when eating.

It was not until the late sixteenth century that the spoon handles became longer and flatter, assuming the shape still known today and designed to be held in balance between thumb, index and middle fingers.

The fork

Although forks existed in Antiquity, little is known about their early use and function.

During the Middle Ages two-pronged forks were used to hold the meat during carving.

Forks were first used for eating in the sixteenth century. During the eighteenth century they became commonly used utensils and their shape was already much the same as that of the forks used today with three or four curved prongs.

The tradition of setting a table complete with cutlery is a relatively recent one. In the Middle Ages, every guest brought along his own cutlery. It was worn on a chain around the neck or stuck into the belt or leg of the boot.

Cutlery became increasingly ornate during the Baroque period. Silver and gold decorations were used in combination with agate, mother-of-pearl and carved ivory.

During the nineteenth century more and more cutlery was mass-produced in factories. Fine handmade pieces became a rarity.

In spite of all mechanisation, the production of good table cutlery still demands a high degree of the skills associated with this craft.

Cutlery today

The various stages of shaping a knife from a single metal rod

Prototypes of each piece of cutlery are made from the designer's drawings.

From these samples engravers cut individual dies made from extremely hard steel for each shape of cutlery, working very precisely.

The cutlery pieces are then dropforged into these dies under intense pressure – up to 300 tons – without heat in order to give the pieces their final shape. Rosenthal cutlery is made from sterling silver, »Alpaka« (plated German silver) and special alloys; sometimes it is combined with porcelain or ceramic.

There are two basic procedures: spoons, forks and many other cutlery pieces are usually punched and stamped from cold – less often – from heated sterling silver-, Alpaka- and stainless steel metal sheets. Knife blades and single rod knives on the other hand, are forged from red-hot stainless steel. These days Rosenthal uses two types of stainless steel alloy for its cutlery: chrome nickel steel and a special steel for knife blades and knives forged from a single rod.

Chrome nickel steel

Spoons and forks are made from sheet metal and sheet silver

Chrome nickel steel is identifiable by the marking 18/8 or 18/10. This tells us that the alloy contains eighteen percent chromium and 8-10 percent nickel.
The nickel content increases the steel resistance to corrosion. However, since chrome nickel steel cannot be hardened, it is unsuitable for knife blades of such high quality stipulated for Rosenthal knives.

Forks and spoons are punched out of steel sheets and prepared for the die in several stages. A drop hammer with a falling weight of up to 300 tons moulds the blank into its final shape.

(»Chromargan« is the WMF trade name for chrome nickel steel).

Special steel for knives

Mono-block knives are forged from steel rods

Mono-block knives are forged all in one, handle and blade, from round steel bars. Rosenthal knives are made from a special chromium steel alloy with molybdenum and vanadium additives which make it possible to create extremely imaginative and complex shapes in varying thickness of the material, for example the knives of the »Curve«, »Taille« and »Composition« series of cutlery.

This special alloy is resistant to corrosion and is also capable of hardening for long lasting sharpness. The knife blades should be sharpened periodically with a sharpening steel to retain their effectiveness.

Forging

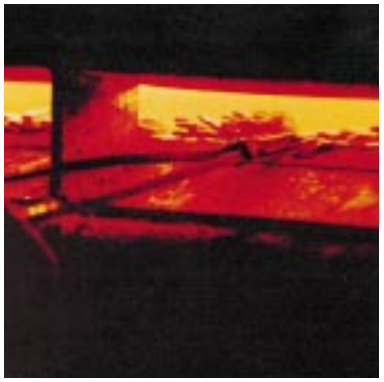
The forging hammer is dropped on to the red-hot knife with a force of 70 tons

The steel bars are »cropped« into short lengths and heated in the fire. By means of the drop hammer the cropped piece is forged into its first, rough shape. With a force of up to 70 tons, the forging hammer moulds the blank into the open die on the anvil.

Once the excess steel has been trimmed from the blank, and the edges cleaned, the cutlery still has to undergo a number of processes before it assumes its ultimate shape and beautiful finish.

A mechanical hammer hardens and shapes the blade with a rapid series of blows

Hardening



Knives are hardened by heating and then chilled with cold air.

Blades and mono-block knives are hardened in three separate stages: heating, chilling and tempering.

First the knife is brought to red-heat, then it is chilled with a blast of cold air. This sudden change in temperature makes the material hard and brittle. A subsequent heating process – known as tempering- relieves the internal stress in the metal and restores the desired toughness and elasticity.

Hardening is a very important work process, it is critical for cutting durability and corrosion resistance of a good blade.

Grinding and polishing

A mono-block knife is ground and polished

Forging and heat treatment processes leave a layer of black scale on the surfaces of the metal. This has to be removed with great care before the very costly process of manual grinding and hand polishing can begin.

Any scale remaining in the pores of the metal, which are invisible to the naked eye, would eventually rust. This naturally constitutes a reason for complaint.

Cutlery is polished to a smooth finish by means of rotating wheels covered with cloth or sisal, using polishing pastes. Cutlery can either be polished to a high gloss or, in a final work process, brushed to a satin finish.

The greater the care that is applied to polishing, the more rust resistant stainless steel cutlery becomes.

Sterling silver

Hallmarks on sterling-silver cutlery

The Egyptians called it white gold and compared it to the moon. To this day, silversmiths in Germany mark each piece of sterling with a half-moon, the symbol for silver.

The history of the silversmith's trade is marked with endless rules and regulations imposed by authorities controlling silver standards. Indeed, German silverware still bears the imperial crown along with the half-moon symbol and the standard mark.

The most commonly used silver alloys are marked 800 and 925. These figures denote the number of parts of fine silver for every thousand parts of material. Sterling silver is marked with the figure 925, meaning that one kilogram of silver contains 925 grams of pure silver and only 75 grams of electrolytic copper, the latter giving the metal its necessary hardness.

This is to all intents and purposes the best silver alloy that can be used for making silver cutlery.

The making of silver cutlery

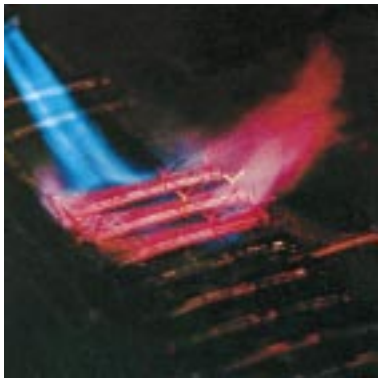
Steel dies are used to shape sterling silver cutlery

The silver alloy is melted at approximately 1000 degrees C and cast into ingots. These are then rolled out into sheets of the required thickness. The stamping press then punches the blanks from these sheets.

The blanks are then rolled to make them slightly thinner at the ends where the bowl of the spoon or the prongs of the fork will be. After careful cleaning, the blanks are placed into dies, where spoons or knife handles are then forged under a pressure of up to 300 tons.

Excess metal is trimmed away and the edges are carefully smoothed. The processes of grinding and polishing with grinding belts and buffing wheels are of decisive importance for the finished quality of fine cutlery. The additional manual grinding skills of the craftsman are still required to produce cutlery of top-quality.

Knife handles



Knife handles are soldered together from two halves

Knives hold a special position in the manufacture of silver and silver-plated cutlery. The blade has to be particularly strong and is therefore made of stainless steel.

The handle, the knife shaft, is made of two pieces and soldered together. Knife handles of sterling silver are then dipped into a galvanizing silver bath in order to silver-plate the soldered joint.

Shaft and blade are fused together with a special cement in such a way that the spigot of the blade does not loosen even after a considerable length of time.

The joint is then ground and polished until it becomes invisible. After having gone through the last polishing process the knife blades are sharpened.

Silver-plated cutlery

Silver-plating spoons in a galvanizing bath

In principle manufacturing silver-plated cutlery follows the processes used with silver cutlery, the difference being that the material core is not silver but stainless steel. Even more rarely 'Alpaka' is used these days. Alpaka – sometimes called nickel silver because of its brightly shining appearance – is an alloy of copper, zinc and nickel.

The cutlery has to be carefully cleaned before it is silver-plated in the galvanizing bath. The thickness of the silver layer can be determined by the duration of the immersion in the bath.

The most commonly used layer of silver plate is 90 grams. The figure 90/18 stamped on a coffee spoon for example tells us that 90 grams of silver are deposited on a 24 square cm cutlery surface. The figure of 18 indicates that for twelve identical coffee spoons 18 grams of silver was used. The stamp 90/3.5 on a single piece, such as a serving spoon, indicates that 3.5 grams of pure silver were used to silver-plate this piece.

Rosenthal cutlery is silver-plated using the most modern processes, which make the silver coating extremely wear resistant.

By virtue of a law of physics, a thicker silver coating is deposited on the exposed parts of the cutlery such as the bowls and edges of spoons, fork prongs etc., i.e. those parts that suffer particularly heavy wear and tear. It is important to the customer to be aware of this.

The value of silver-plated cutlery is not determined by the amount of silver coating alone but by the overall finish such as cut and polish.

Silver will oxidize, caused by sulphur- and chloride combinations found in the air and in many foods. Silver-plated and silver cutlery cannot be protected from this process. Constant use and the correct cleaning methods are the best protection.

The cleaning of cutlery

Cutlery made from different materials, e.g. silver with porcelain handles, stainless steel with ceramic or wooden handles must be rinsed in lukewarm water. If the water is too hot, the metal expands and thus splits the wood, ceramic or porcelain connected to it.

Never leave cutlery with wooden handles submerged in water or detergent! Wood will swell and lose its natural oils. It becomes very grey and splits eventually.

Never leave food particles to dry! The cutlery can oxidize, even steel cutlery, and this may lead to pitting later. To avoid pitting, used cutlery should be cleaned immediately and thoroughly – just rinsing is not enough – and dried off immediately. Clean cutlery either in a suitably constructed dishwasher or by hand. Do not wash silver and stainless steel cutlery together! The silver could get scratched by the steel, which is much harder and the steel cutlery could rust.

Stainless steel cutlery, which has become spotty in the dishwasher (dried water droplets, calcium, food particles) should be cleaned with a non-abrasive steel cleaning agent.

Cleaning in the dishwasher can cause damage, particularly to stainless steel cutlery because an electro-chemical process occurs during the rinsing cycle. This can cause measurable currents to flow between two metals, similar to a current flowing between the poles in a battery. This causes the metal with the lower tension to be dissolved. Stainless steel can be damaged if aluminium or silver are in the dishwasher at the same time.

Quality features

To the untrained eye, cutlery of different qualities and price ranges may look very much alike. However, there are several characteristics, which distinguish high-quality cutlery.

The bowl of a well-made spoon must not have any sharp edges, it has to be carefully rounded and be smooth to the touch. Passing the palm of your hand over the edges will easily establish this.

A high quality fork should be smooth even on the inside of its prongs. Forks of poorer quality are polished only in their more visible areas, and the areas between the prongs for example are being neglected. In addition the face of a good quality fork should be slightly curved, like a spoon.

High quality knife blades are polished until no traces of grinding remain. The better the finish, the greater is the resistance to corrosion.

A forged stainless steel blade is very much thicker towards the shaft of the knife where it meets the handle. On cheaper types of cutlery, a collar camouflages this part of the knife.

All good quality knife blades bear the manufacturer's trademark.

Sales techniques

Good quality has its price.
Consumers are aware of this and are willing to pay the price once they realize they are getting value for money. If a customer has been shopping around and has seen less expensive merchandise in department stores, he may not understand why specialist retailers should sell their tableware at somewhat higher prices. It is important that the sales assistant informs the customer about quality and price differences. A sale is often lost because the sales assistant is unable to explain the higher price of quality merchandise. Cutlery and porcelain are not goods that a consumer buys every day. Nor is the sale of a four-piece place setting on a given day likely to boost your sales average. However, it is more important for the sales assistant to gain the confidence of a consumer who will then return time and time again. What counts in a sales discussion is that the customer can trust your opinion and expertise.

What would you buy in my position?
This is a question frequently asked of salespeople, showing the uncertainty of the customer.
Well, what would you do in his position?
A sales assistant should be able to imagine himself or herself in the customer's position and make suggestions as to what he or she would buy.

How can a layman appreciate good quality if the sales assistant has not provided him with the necessary information?
For most customers price is the main criterion. This means that the sales assistant must be able to make the customer aware of other decisive qualities. Explain, but do not lecture like a professor. Nobody likes to be lectured, but everybody appreciates good advice. Never expect your customer to have a lot of product knowledge, but on the other hand do not blind him with science if not asked.

In most well managed shops it is customary to show cutlery on a felt or velvet mat so as not to cause noisy clatter on the counter. But the sales assistant can do much more to stimulate the customer's buying decisions. Show the effect of cutlery, porcelain and glass within a table setting. Only a skilful combination will show off the beauty and versatility of each piece.

A sales assistant should encourage the customer to take hold of cutlery, crystal and porcelain to get a feel for the merchandise. Not only the eyes appreciate a well-designed piece, but also the hands.

Good product knowledge

Product knowledge alone does not make a good sales person.

But does not good product knowledge in combination with an understanding of human nature and knowing when a spoken word can be used to its most effect at the right time constitute a top sales person?

You are on your way now! What could be more rewarding?

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