FABER-CASTELL

since 1761

PRODUCT KNOWLEDGE MANUAL

THE COMPANY 1

FABER-CASTELL
since 1761

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FOREWORD

You can only give good advice to others, if you are well informed yourself. This adage sounds as simple as it is truthful.

This is why FABER-CASTELL has been publishing a Product Knowledge Manual for a number of years, in order to impart the required product knowledge to interested sales staff.

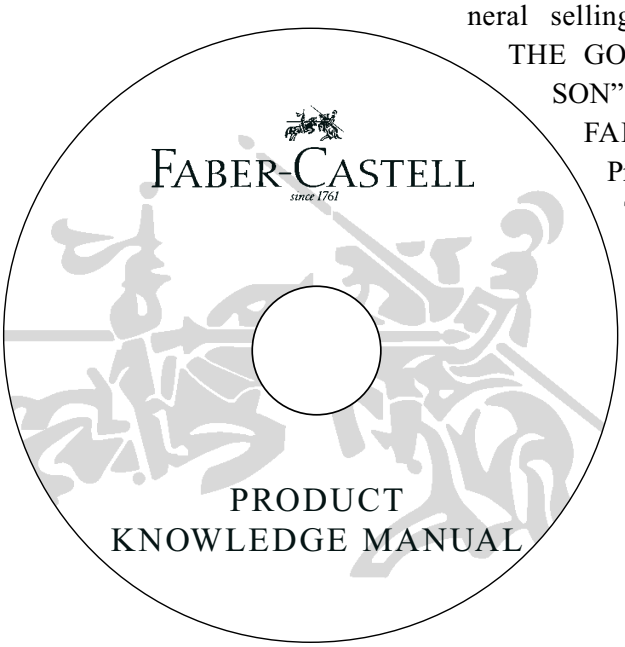
In this new revised edition, the fundamental information has been summarised in the GENERAL PRODUCT KNOWLEDGE section. Product-specific information, in conjunction with selling propositions and arguments that can be incorporated in the sales dialogue, make up the FABER-CASTELL PRODUCT KNOWLEDGE section.

Due to repeated request, an additional chapter entitled "General selling performance – THE GOOD SALESPERSON" has been added to FABER-CASTELL's Product Knowledge. This chapter is ideally suited to convey the most important ground rules for successful customer relationship management to sales pro- fessionals as well as entry-level employees.

The FABER-CASTELL Product Knowledge Manual is available in printed format, bound in a folder, as well as in a PowerPoint presentation format and as PDF files on CD-ROM. The FABER-CASTELL Product Knowledge Manual can be looked up in the internet-address **www.Faber-Castell.com/Service**.

The FABER-CASTELL Marketing Team always welcomes suggestions for improvement and related propositions. Please contact the Marketing Services department at FABER-CASTELL headquarters in Stein (+49-911-99 65-480), if you believe that you are able make a constructive contribution.

The FABER-CASTELL Marketing Team wishes you much success with FABER-CASTELL Product Knowledge Manual.



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THE COMPANY

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THE HISTORY OF THE FABER-CASTELL COMPANY

*The 1st Generation – Establishment of the business by Kaspar Faber (*1730–†1784)*

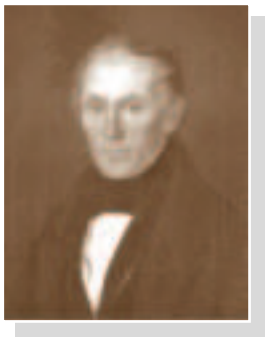
1761–1784
In 1761, the cabinet-maker Kaspar Faber commences production of his first pencils in Stein and sells them at the Nuremberg market. The year **1761** thus formally becomes the **business establishment** date.

*The 2nd Generation – Anton Wilhelm Faber (*1758–†1810)*

1784–1810
Named after Kaspar's son **Anton Wilhelm**, the 2nd generation business name is **"A. W. FABER"**. Anton Wilhelm expands the small craftsman's workshop. He acquires additional real estate, enlarges the pencil production – the company grows.

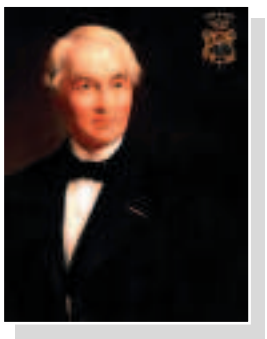
*The 3rd Generation – Georg Leonhard Faber (*1788–†1839)*

1810–1839
Georg Leonhard Faber leads the pencil business through difficult political and economic times,



however, he is unable to avert a strong decline in production and the resultant threat to the company's viability.

*The 4th Generation – Lothar von Faber (*1817–†1896)*

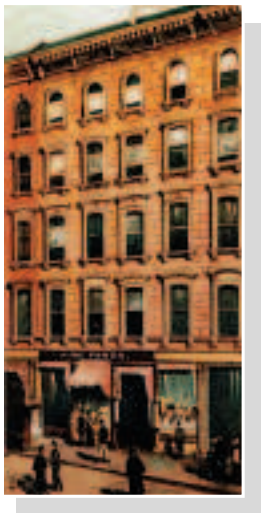


1839–1896
Following the death of his father Georg Leonhard in 1839, Lothar von Faber takes over the Stein pencil factory. Having gained valuable experience in companies producing writing instruments in Paris and London, the 22 year old completely overhauls and repositions the paternal business. Driven by strong vision and an iron will, he moves the business forward. His stated goal: "… **to rise to premier position** by making the best products in the world …".

He develops the modern quality pencil, sets down the lengths and different grades of hardness that remain valid today, and for the first time produces a hexagonal-section pencil. He labels his pencils **"A. W. Faber" – the world's first brand pencil** is born.

Lothar von Faber is the first pencil manufacturer to travel to the major European countries and subsequently returns with a full order book. His sights set on the substantial global markets, he is also drawn to the "New World".

In 1849, he founds his **first branch in New York**, followed by subsidiaries in London (1851) and Paris (1855) as well as agencies in Vienna (1872) and St. Petersburg (1874).



In 1856, through the acquisition of a graphite deposit of unprecedented quality in **Siberia**, he secures the best graphite available at the time for the company. Once again, a new and improved pencil quality standard has been achieved.

The Geroldsgrün branch factory in Upper Franconia is founded in 1861 to mark the centenary celebrations. Originally set up as a slate board factory, it later progresses to become one of the largest **manufacturing facilities of slide rules** worldwide.

As a result of successful sales via an international sales & distribution organisation built up successfully by Lothar von Faber in only some decades, the product range not only gains global significance – the "A. W. Faber" brand is from now on frequently replicated. With his petition "for legislation to protect trade marks" in 1874, Lothar von Faber **paves the way for the Trademarks Act** in Germany.

Lothar von Faber also made a name for himself as co-founder of the **Bavarian Trade Museum** (1869) – these days known as the Bavarian State Office of Commerce, the **Nuremberg Union Bank** (1871) and the **Nuremberg Life Insurance Company** (1884) – nowadays the Nuremberg Insurance Group.

The company's history also shows Lothar von Faber to be an **exceptionally public-spirited** entrepreneur. For instance, in 1844 he sets up one of the first health insurance schemes and in 1851 establishes one of Germany's first nursery schools. Furthermore and among other things, Lothar von Faber finances the construction of company-owned flats, schools and a church. In 1867, Napoleon III dispatches an expert delegation to Stein to study Lothar von Faber's **exemplary social amenities**.

On account of his immense economic and social contribution, Lothar von Faber is accorded **numerous honours**: In 1861 he is raised to peerage and in 1881 to hereditary baronial peerage; in 1865 he is appointed lifetime, and in 1891 hereditary, "**Imperial Councillor to the Bavarian Crown**".

*The 5th Generation – Wilhelm von Faber (*1851–†1893)*

1877–1893
Lothar von Faber's only child, Wilhelm, is actively involved in the company from 1873 and in 1877 becomes designated successor. Wilhelm, who has an more artistic disposition, loses his two sons Lothar and Alfred

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Wilhelm at the early ages of three and four years. Wilhelm, who suffered greatly from the death of his sons, also dies prematurely in 1893 at the age of just 42 years. He leaves behind a wife and three daughters. As a result, his father Lothar von Faber must once more manage the company until his death in 1896. His widow, Baroness Ottilie von Faber, then inherits the "A. W. Faber" company and manages the company until the turn of the century.

*The 6th Generation – Alexander Graf von Faber-Castell (*1866–†1928)*

1900–1928
In 1898, Wilhelm von Faber's eldest daughter and eventual heiress, Baroness Ottilie von Faber (*1877–1944), marries Count Alexander zu Castell-Rüdenhausen, who is descended from one of Germany's oldest noble families. Prior to his death, Lothar had prepared a testamentary disposition, by means of which he ensured that future generations would always have to integrate the name "Faber" into the new family name. Thus the new family line of "**Count and Countess von Faber-Castell**" comes into being by allowance of the Bavarian King as well as the new company name **"FABER-CASTELL"**.

In 1900 Count Alexander Graf von Faber-Castell joins the management.

In 1903, the foundation stone of the large "**New Castle**" is laid in

accordance with plans drafted by Theodor von Kramer (Director of the Bavarian Trade Museum) – today it embodies a unique monument to Historicism and German Art Nouveau. It is built opposite the factory site and is connected to the smaller old castle by a tower. The original construction of the "**Old Castle**", a Renaissance style villa that had undergone miscellaneous renovations, was commissioned in 1845 by Lothar von Faber to the Architect to the Royal Court of Bavaria, Friedrich Bürklein.

In 1905, Count Alexander launches the famous **green "CASTELL" pencil range**.

The new product logo of the "**Tournament of the jousting Pencil Knights**" is introduced as a sign of a new high quality beating all competition. These knights are once more integral to the trademark today.

At the end of Word War I the **FABER-CASTELL corporation** in the US is **expropriated** and sold at auction. Similarly, the sales & distribution companies in London, Paris and St. Petersburg are lost.

In the 20's, Count Alexander commissions the construction of new **manufacturing facilities of substantial proportion** at the Stein factory. The three-storey, light-filled manufacturing complex becomes a modern, exemplary production facility.

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*The 7th Generation – Roland Graf von Faber-Castell (*1905–†1978)*

1928–1978
Following the death of Count Alexander in 1928, his son Roland takes over the company management.

In 1931/32, FABER-CASTELL acquires the "Johann Faber" pencil factory – an enterprise founded by Lothar von Faber's brother Johann in Nuremberg in 1879. Thus FABER-CASTELL simultaneously acquires an interest in its "Lapis Johann Faber" subsidiary in Sao Carlos, Brazil.

1955 sees the setting up of the manufacture of wood-cased pencils in **Ireland**, where ballpoint pens are also produced at a later stage. This commitment by FABER-CASTELL is designed to maintain its competitiveness in the European Free Trade Association (EFTA) countries.

In 1957, the company acquires a **minority shareholding** (25%) in the FABER-CASTELL **US** corporation, which had been expropriated in Word War I.

In 1960, a sales & distribution company is once again established in France.

In 1961, FABER-CASTELL celebrates the **company's 200th anniversary** with over 2,000 staff and guests.

In 1962, production facilities are set up in **Australia** (Sydney) and **Austria** (Engelhartszell).

In 1965, a manufacturing plant for wood-cased pencils is launched in **Argentina**. At the same time, a ballpoint pen factory is established in Peru.

In 1967, Count Roland succeeds in re-acquiring the majority shareholding in the "Lapis Johann Faber" pencil factory in Sao Carlos, **Brazil**, which had been expropriated during World War II. This company is the **largest colour pencil factory in the world** today.

A sales & distribution company is founded in Japan (Tokyo) in 1977.

*The 8th Generation – Anton Wolfgang Graf von Faber-Castell (*1941)*

since 1978
Following the death of his father Count Roland, Anton Wolfgang Graf von Faber-Castell takes over the helm at the company in 1978.

That same year FABER-CASTELL commences the production of wood-cased decorative cosmetic pencils (Private Label) in Stein.

In 1978, sales & distribution companies are set up in Hong Kong and Malaysia.

In 1980, subsidiaries are founded in the United Kingdom and South Africa. In 1980, the world's largest contemporary rubber eraser factory is founded in Malaysia.

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In the mid-80's, a globally unprecedented **reafforestation project for wood pencil slats** is established in South eastern Brazil (2,500 km from the rainforest).

In 1990, FABER-CASTELL sets up a production site for wood-cased pencils in **Indonesia**.

Throughout the 90's, the Stein and Geroldsgrün factories are modernised and restructured as state-of-the-art line production facilities. At the same time, the company embarks on a new design of the manufacturing areas, featuring a unique **colour concept**.

In 1992 FABER-CASTELL sets new global benchmarks in pencil lacquering methods by introducing its environmentally friendly **water-based paint technology** for wood-cased pencil production in Germany.

1993 sees the initial implementation stage of a strategic "**realignment**" for the FABER-CASTELL group of companies. The main focus is on a completely **revised brand image and visual appearance** which is launched on a global scale and provides the FABER-CASTELL brand with adequate brand value and appeal. Likewise, the newly designed product range is clearly structured according to **five core competence areas**.

In 1994 Count von Faber-Castell reacquires the US **trademark rights** that had been forfeited during World War I.

In 1996, a new FABER-CASTELL sales & distribution company is established in New Jersey. Also in 1996, a logistics centre for sales & distribution in Eastern European countries is established in the **Czech Republic**.

In 1997, FABER-CASTELL acquires a majority interest in the "Technacril" company in **Columbia**, which produces technical drawing instruments and operates a sales & distribution organisation for FABER-CASTELL products.

Another sales & distribution company is founded in **India** (Mumbai) in 1997, followed a year later by a plant in Goa, initially producing erasers and subsequently expanding its production lines to manufacture wax crayons and markers for school and office.

In 1998, FABER-CASTELL builds a production site for wood pencil slats in **Costa Rica** – using **FSC** (Forest Stewardship Council) certified gmelina wood. Production of wood-cased pencils commences in 2002.

In 1999, FABER-CASTELL purchases the US company "Creativity for Kids" in Cleveland (Ohio), the US market leader in Creative Sets.

In March 2000, FABER-CASTELL and the IG Metall trade union jointly sign a comprehensive and internationally binding "**Social Charter**", which complies with the guidelines of the International Labour Organisation (ILO).

In 2001, a production and packaging centre is built in **China** (Canton), making it the 15th production facility of the FABER-CASTELL group.

In November 2002, FABER-CASTELL opens a new factory in Malaysia and erects the world's largest pencil (19.75 m).

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OUR QUALITY SPEAKS FOR ITSELF – IN ONE UNIVERSAL LANGUAGE

FABER-CASTELL is recognised as one of the world's leading manufacturers and distributors of premium products for writing, drawing & painting and creative designing – the brand name has a global reputation. In the core area of wood-cased pencils, the FABER-CASTELL group of companies is the world's major manufacturer with a capacity in excess of 1.8 billion black-lead and colour pencils annually, with the production of colour pencils being dominant.

On a global scale, FABER-CASTELL employs about 5,500 employees in 15 production facilities and 18 sales & distribution companies. Approximately 2,800 of them are employed with the Brazilian FABER-CASTELL company in Sao Carlos/Sao Paulo (including 500 employees in the reafforestation project in the Prata region in the federal state of Minas Gerais). FABER-CASTELL Brazil is the largest colour pencil factory in the world.

The internationalisation of FABER-CASTELL began as far back as 1849, when the first overseas branch was founded in the US (New York). Soon after, further sales & distribution companies and factories were established, resulting in today's presence in a total of 19 countries around the globe. By virtue of those early worldwide production and marketing activities, FABER-CASTELL considers itself an international group of companies with German roots.

COMPANY MALAYSIA

COMPANY SAO CARLOS/BRAZIL

COMPANY II SAO CARLOS/BRAZIL

COMPANY INDIA

COMPANY INDONESIA

COMPANY CHINA

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WOOD FROM OUR OWN PINE PLANTATIONS

Every hour FABER-CASTELL grows 20 cubic metres of timber. How do we do it?

In the Brazilian state of Minas Gerais, near Prata, FABER-CASTELL maintains its own pine plantations covering an area of 10,000 hectares – 2,500 km from the Amazon rainforests.

Continuous reafforestation of the harvested tree rows creates a closed ecological cycle: 1 million Caribbean Pine seedlings are replanted each year.

These environmentally sustainable resources provide the source material for our black-lead pencils and colour pencils: FABER-CASTELL Brazil – the largest wood pencil factory in the world with just under 2,900 employees – produces 1.5 billion wood-cased pencils annually in this manner.

The Forest Stewardship Council (FSC) has given the forest stands in Prata its select environmental seal of approval for “environmentally responsible, socially beneficial and economically viable management of forests”.

The “Chain of Custody” certification (C.O.C.) further warrants that the origin of the wood can be tracked and traced right from the harvesting of the tree to the packaging of the pencils.

The use of environmentally sustainable resources is just one aspect of our commitment to a better quality of life. In the context of an “integrated product policy” (IPP) the entire lifecycle of our products is subjected to critical analyses, in order to reduce energy requirements to a minimum in the long term and to conserve the environment through a sustainable approach.

This includes the selection of raw materials and production processes, packaging and transport, right through to product utilisation and disposal. As such, FABER-CASTELL is the only company to consistently use environmentally friendly water-based paint in its European pencil production.

Our commitment is not limited to our own operations. FABER-CASTELL is actively contributing to nature conservation in Brazil through its involvement in the Arboris, Animalis and ECOmmunity environmental projects.

The objective is to protect the natural flora and fauna in the Prata region and to foster awareness in order to motivate our employees as well as the local residents to make a personal commitment to nature and the environment.

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AN INTERNATIONALLY BINDING SOCIAL CHARTER

In signing the "FABER-CASTELL Social Charter", the Chairman of the Managing Board, Anton W. Graf von Faber-Castell, wrote a new chapter in the company's longstanding tradition of social responsibility and accountability.

Its scope and internationally binding nature make this Social Charter one of the first voluntary agreements of its kind. It guarantees employment and labour conditions as required by the International Labour Organisation (ILO) to all FABER-CASTELL employees worldwide.

- No forced or compulsory labour
- No child labour
- Payment of minimum wages
- No excessive working hours
- Equal opportunity and equality for all employees
- Respect for the freedom of association and of the right to collective bargaining
- Safe working environment, job security and decent pay
- Clearly defined employment conditions

SIGNING OF THE SOCIAL CHARTER BY FABER-CASTELL AND IG METALL ON 3 MARCH 2000

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THE QUALITY HALLMARKS OF OUR BRAND

THE PENCIL EXTENDER

We have designed the brand FABER-CASTELL as a quality hallmark for products in the field of writing, drawing and creative colouring which distinguishes themselves by:

- Competence and tradition
- High quality
- Progressive
- Environmental consciousness

The same high level is valid for all media and measures of brand management.

Our products accompany the consumer on his/her path from childhood to becoming an artist, from being a student to becoming a member of the board – and from one generation to another.

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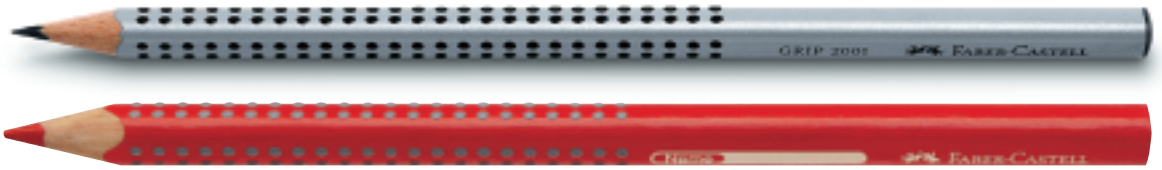
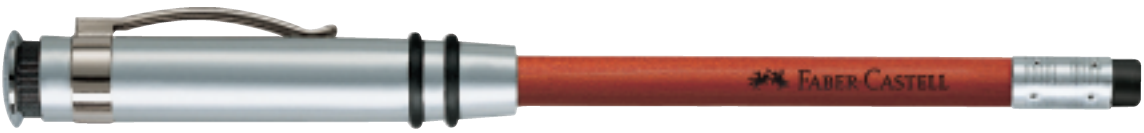
SUCCESS THROUGH PRODUCTS WITH THE "POINT OF DIFFERENCE"

In addition to functionality and aesthetics, there are added convenience benefits that make our products unique: The built-in sharpener in the pencil extender – the "Refilling Station" for fluorescent highlighters – the breaking resistance of the wood pencil leads. The high colour brilliance and light-fastness of our artists' pens also meet the most stringent requirements.

FABER-CASTELL has always defined innovation as a problem-solving process that is discernible and appreciated by the end consumer while also adding value to the product.

The famous "Point of Difference" in all product categories will therefore remain the great challenge for FABER-CASTELL.





THE FABER-CASTELL BRAND IMAGE

The FABER-CASTELL brand image is essentially defined by the following elements:

The unmistakable brand logo consisting of these three elements: FABER-CASTELL lettering, the "jousting knights" and the subtitle "since 1761", the year of the company's foundation.

The classic dark-green company colour with the gold brand logo and the red colour for the "Playing & Learning" field of competence respectively the blue colour for the product line Creative Studio.

The so-called "stage" setting, consisting of a rectangular frame which is set below the logo on main title pages and packagings and that may contain text as well as images.

The uniform typography and the high quality and precision of the (product) illustrations explain the high demands of the brand.

The knights theme dates back to an old advertising poster designed at the turn of the century. It symbolises the brand's virtues, which correspond to those of the knights: Strength, assertiveness, nobility of mind, fighting spirit, continuity and the preservation of traditions.

The consistent application of the corporate design contributes to its certain recognition and contributes to the strengthening of the brand FABER-CASTELL mainly in international markets.

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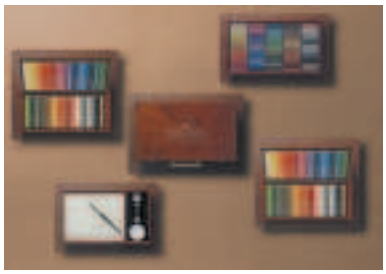
STRATEGIC ALIGNMENT OF THE FABER-CASTELL PRODUCT RANGE

PLAYING & LEARNING



ART & GRAPHIC

PREMIUM

GENERAL WRITING

MARKING

FABER-CASTELL develops, produces, markets and distributes high-quality writing, drawing, colouring and creative design products in clearly defined and core competence areas tailored to specific target groups. This is based on the objective to attain the “Best of its Class” rating for all the products included in its merchandise range. Through all its product areas, FABER-CASTELL desires to be people’s companion for life.

GENERAL PRODUCT KNOWLEDGE 2

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MERCHANDISE KNOWLEDGE

2.1 A brief journey through the history of writing instruments

2.2 Graphite pencils (lead pencils)

2.3 Colour pencils

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2.6 Artists' crayons

2.7 Charcoal

2.8 Mechanical pencils

2.9 Leads

2.10 Paste-ink pens

2.11 Liquid-ink pens

2.12 Markers and highlighters

2.13 Paint markers

2.14 Technical drawing instruments

2.15 Erasers

2.16 Sharpeners

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A BRIEF JOURNEY THROUGH THE HISTORY OF WRITING INSTRUMENTS

About 50,000 to 60,000 years B.C., the stone hand axe would have been the first tool to be used by humans in attempting to scratch patterns into stone. Many such scrapers and gravers/burins have been found in caves in Southern France and Spain.

For thousands of years, pictures remained the only mode of communication. Gradually, iconographic writing underwent greater stylisation and developed into pictograms, a type of symbolic writing that could be drawn quickly, of which the cuneiform script of the Sumerians or the hieroglyphs of the Egyptians are prime examples.

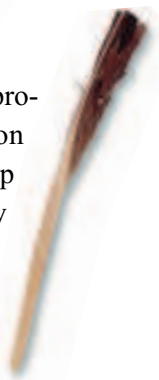
Writing was nonetheless a costly and time-consuming matter performed by well paid fulltime scribes, who etched their glyphs with gravers or burins made from bone or metal into wax-coated wooden slats or moist clay tablets.

Growing demand for written records lead to the desire for more practical writing instruments.

The invention of ink and the use of papyrus as a writing surface represented a great leap forward. The "writing instruments" used at the time consisted of thin rushes whose end pieces were chewed to shape them into a brush. Later a thin piece of bamboo with a sharpened pointy tip was used. It was the birth hour of the first fountain pen.

From the period of the Roman Empire to the modern era the most important writing implement was the quill, which needed to be dipped in ink. The quill was an obliquely cut, sturdy goose feather that had to be repeatedly trimmed, because writing would wear it down quickly.

A veritable quill industry developed over the centuries. At the beginning of the 19th century, approximately 50 million quills were used up each year in Germany alone.



In addition to writing in ink, a new writing technique was established from the middle of the 16th century by the introduction of the lead-pencil writing.

The beginning of the 19th century at last saw the successful manufacture of steel nibs, which equalled or surpassed the quill's writing quality and were not subject to the same wear.

The steel nibs were placed in wooden holders, but the disadvantage was that an ink reservoir needed to be carried along at all times. It was therefore not surprising that innumerable attempts were made to append an ink reservoir to the actual nib holder, which was achieved in the middle of the 19th century by a number of German, English and American inventors.

However, the first and truly useful solution was offered by L. E. Waterman in 1884, when he integrated an ink feed mechanism between the tank and the nib which ensured that the tank would release only as much ink as was needed at a given time, while the same amount of air was fed back into the tank.

FOUNTAIN PEN, LUDWIG II, KING OF BAVARIA

Competition to the fountain pen arrived in the 1930's with the invention of the ballpoint pen, whose real breakthrough however only came about in the 1950's. Because it had the advantage of being able to write for a very long time without constantly needing refilling, coupled with the fact that it was leak-proof and that its ink-paste dried quickly once applied to paper, it soon became the preferred writing instrument worldwide. Moreover, with a ballpoint pen it was relatively easy to fill in duplicate and triplicate forms.

In our era, the ballpoint pen was followed by the ink roller, which is structurally similar to the ballpoint pen but uses liquid ink rather than viscous ink-paste and thus allows for a smooth and flowing writing action.

Followed by the invention of the typewriter that allowed us to put easily legible and standardised writing on paper at high speed, we now share our lives with the computer whose word-processing programs are constantly being refined. Today, computers write when and what we speak to them and independently translate into various languages.

In recent times, digital handheld writing implements have arrived on the market that transfer the writing motion to the computer and convert it to written text by registering the movements in relation to coordinates on the writing surface. The only thing still left to do for a human is to actually think about what to write in the first place.

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GRAPHITE PENCILS (LEAD PENCILS)

HISTORICAL OVERVIEW

The "silver pencil" made from lead and tin, as used by Albrecht Dürer in the 15th century, can be regarded as the pencil's precursor.

The origin of the wood-cased pencil as we know it today dates back to the year 1565, when a greyish black shiny substance was discovered in Borrowdale, in the Cumbrian Hills in England, and described as follows: "It feels greasy and leaves stains on one's fingers", but it was "ideal for writing and drawing".

It was initially thought that the newly discovered substance was a type of lead ore, as it closely resembled that familiar material in its appearance and properties.

In order to be able to use the extracted "lead" for writing purposes, it first had to be cut into narrow, rectangular rods that were encased in a wooden "mantle" in order to be able to hold the pencil properly and not stain one's fingers. The "lead pencil" was born. The first wood casings with the leads glued inside their core were being manufactured by joiners and cabinet-makers. From these beginnings, the craft of the pencil-maker evolved to become increasingly specialised throughout the 18th century.

THE "WORLD'S OLDEST PENCIL" FROM THE 17TH CENTURY

In 1789 the German-Swedish chemist Karl Wilhelm Scheele was able to prove that the new writing medium had nothing at all to do with lead, but that it was crystallised carbon.
10 years after Scheele's discovery, the mineralogist Abraham Gottlob Werner named this modified carbon "graphite" (from the Greek word "graphos" = to write). Graphite is non-toxic, can be extracted through mining processes, is easily crushed, relatively soft and leaves a black mark when used for drawing and sketching.

Following Scheele's discovery, an attempt was made to rename the "lead pencils" to "graphite pencils", but the term "lead pencil" had become so entrenched in the general vernacular that it still retains its original name today.

The gradual shortage of English graphite from Borrowdale led to attempts to reduce the required quantity by mixing it with additives of other materials. In 1794, the Frenchman Nicholas-Jaques Conté discovered almost at the same time as the Austrian Josef Hardmuth, that by mixing graphite with clay it was possible to produce leads with different degrees of hardness, which would accommodate a variety of applications and also preserve the graphite deposits.

In 1839 Lothar von Faber succeeded in significantly improving the graphite-clay mixing process. It was at that time that the hardness grade scale was established, and it remains valid today. (>Degree of hardness)

THE CASTELL 9000 – CONCEIVABLY THE WORLD'S MOST FAMOUS PENCIL. ITS UNMATCHED QUALITY AND THE FACT THAT IT IS AVAILABLE IN 16 DEGREES OF HARDNESS HAVE MADE IT THE ABSOLUTE FAVOURITE FOR ALL PENCIL-WRITING PROFESSIONALS AND ENTHUSIASTS.

The Castell 9000
Since 1905 the green Castell 9000 has been synonymous with pencil quality throughout the world. It has been produced by the billions and succeeded in outclassing all its competitors. Artists and writers such as Beuys, Böll, Fellini, Kishon, Solschenitzyn and even Prince Charles continue to be passionate about the "green classic".

In 1905, Alexander Graf von Faber-Castell invented the "Castell 9000". It is said that the former cavalry captain à la suite chose his regiment's colour when deciding on a green tone for the new pencil. What is certain, however, is that the success of the green "Castell 9000" laid the foundation for the colour green gradually developing into the company colour for the FABER-CASTELL brand.

PENCIL PRODUCTION

Technical design
The design of a pencil is tremendously simple and we all are familiar with it: A pencil lead (>Leads) is cased in wood, which is either left unfinished or elaborately lacquered. The quality of a pencil is determined by the wood used (>Wood) and the quality of the lead.

Although the pencil's technical design is quite straightforward, most people have no idea how the lead ends up inside the wood. The explanation for this is surprisingly simple, as the wooden barrel actually consists of two parts (slats), i.e. an upper part (upper slat) and a lower part (bottom slat) embedding the lead.

Today, pencils are lacquered with non-toxic paint lacquers. FABER-CASTELL was the first manufacturer to develop a water-based paint technology process that does not pollute the environment. (>Water-based paint)

Functional principle of the pencil
During writing, the graphite of the pencil lead abrades on the rough paper surface and adheres to it. The coarser the paper, the more lead grains are abraded. Therefore, a coarse paper generally requires a harder lead quality, whereas a softer lead quality is suitable for smooth paper.

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The more pointed the lead, the finer the line. With increasing writing duration, the tip gets blunter and wider and thus the line becomes broader. The pencil must be resharpened.

Wood and slats
The highest quality of wood for pencils and colour pencils is produced by the Californian cedar and the Brazilian pine that are cultivated in FABER-CASTELL's own plantations. Cedar wood is almost knot-free, long-fibred and characterised by a consistent growth pattern due to minimal seasonal variations in California. It can therefore be easily and cleanly sharpened, which is a very important aspect for a quality pencil.

Nowadays, pencils are no longer manufactured individually but by means of a process utilising specially prefabricated slats that yield up to ten pencils in one working cycle. The standard dimensions of a slat are 72 x 184 x 4 mm.

The individual production stages
The diagrammatic view demonstrates the main stages of pencil manufacture.

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THE INDIVIDUAL PRODUCTION STAGES

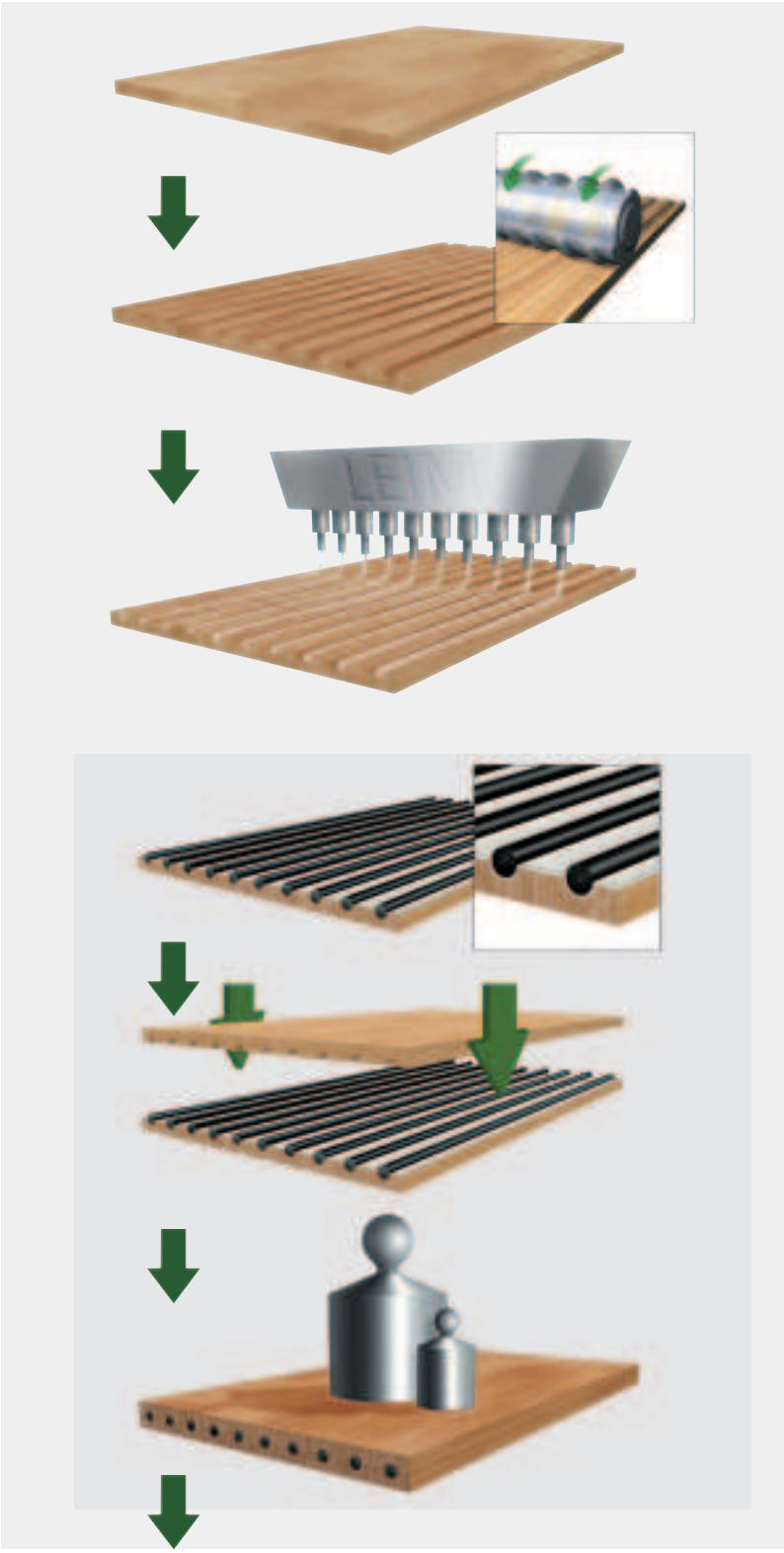
SOFT AND DENSE WOOD IS STORED, SEASONED AND CUT INTO "SLATS".

A GROOVE IS CARVED OUT OF THE UPPER AND BOTTOM SLAT TO ACCOMMODATE THE LEAD.

A SPECIAL LEAD GLUE IS INJECTED INTO THE GROOVE.

THE SEPARATELY PRODUCED LEADS (SEE "LEADS" CHAPTER) ARE PLACED IN THE BOTTOM SLAT. THEREAFTER, BINDING GLUE IS APPLIED TO THE UN-OCCUPIED SURFACES OF THE UPPER AND BOTTOM SLATS.

THE UPPER SLAT IS PLACED ONTO THE BOTTOM SLAT.



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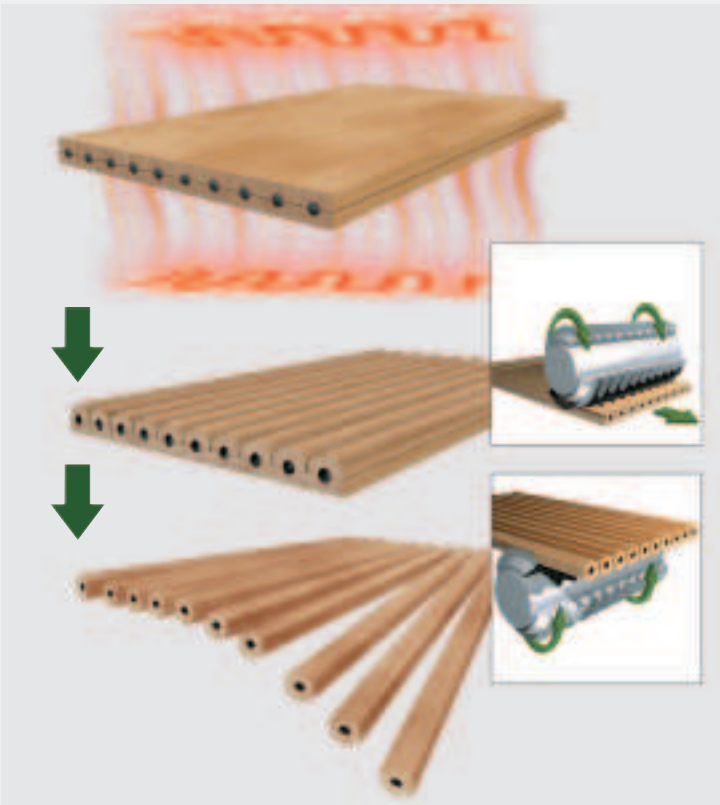
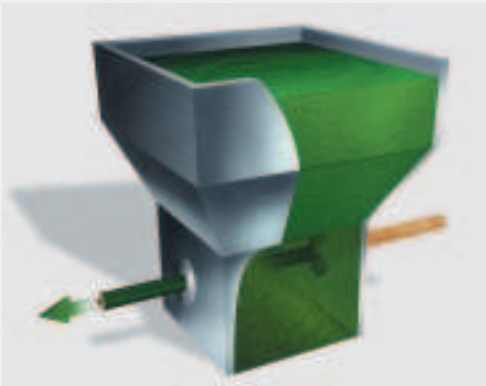
HEAT AND PRESSURE ARE NOW APPLIED SIMULTANEOUSLY TO THIS "SANDWICH", UNTIL THE GLUE HAS SET.

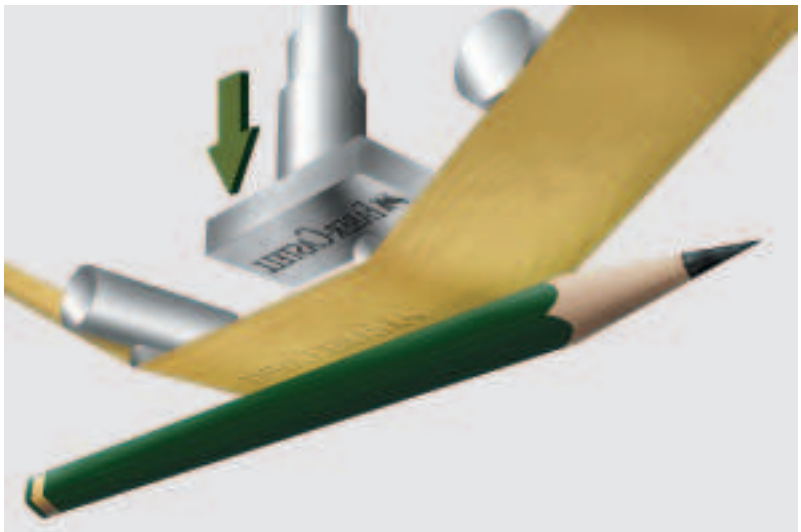
A ROUTER BIT IS USED TO CUT THE ONE HALF OF THE PENCIL PROFILE AT THE UPPER SLAT.

A SECOND ROUTER BIT IS USED TO CUT THE OTHER HALF OF THE PENCIL PROFILE AT THE BOTTOM SLAT. SUBSEQUENTLY, THE "SANDWICH" DISINTE-GRATES INTO THE INDIVIDUAL NON-FINISHED PENCILS.



THE PENCILS ARE REPEATEDLY PASSED THROUGH A LACQUER BATH IN A CONTINUOUS LOOP. SEVERAL COATS OF LACQUER ARE APPLIED IN ORDER TO ACHIEVE A LASTING VARNISH.





HOT-FOIL STAMPING WITH BRAND NAME, GRADE OF HARDNESS AND EAN CODE.

THE PENCIL IS INITIALLY DIPPED INTO A PAINT BASIN TO A SPECIFIED DEPTH.

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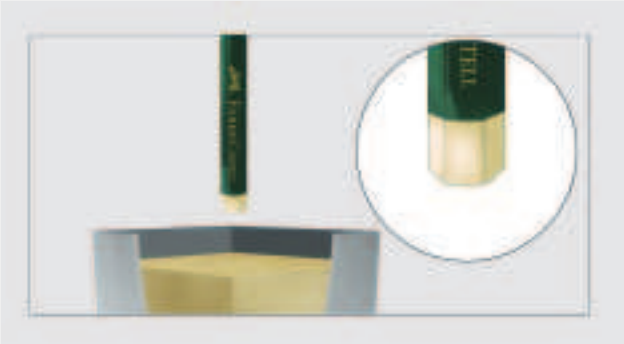
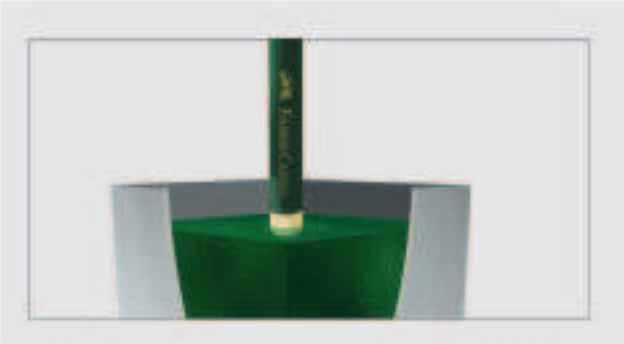
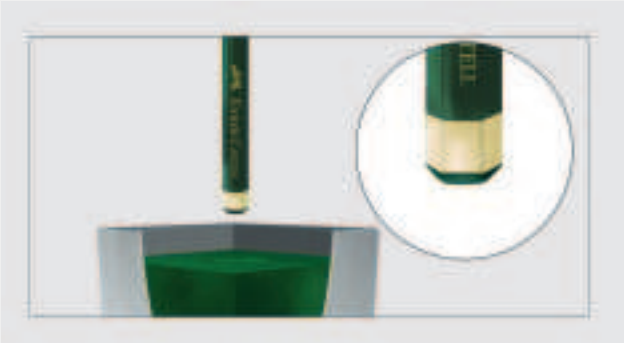
IN THE FOLLOWING STEP, THE PENCIL IS RETRACTED FROM THE BASIN.



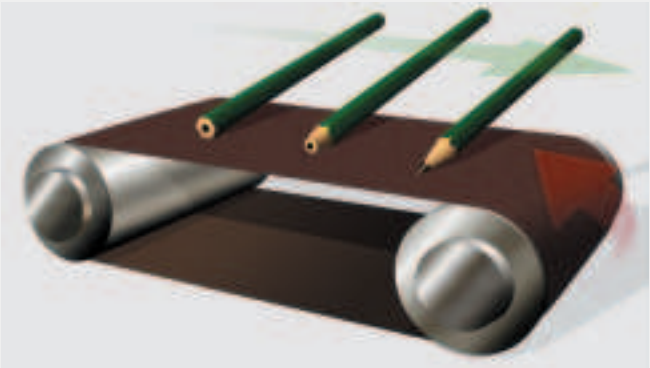
THEREAFTER, THE PENCIL IS DIPPED INTO A DIFFERENT PAINT BASIN, AGAIN TO A SPECIFIED DEPTH.



IN THE FINAL STEP, THE PENCIL IS RETRACTED FROM THE BASIN. THE DIFFERENT DIPPING DEPTHS IN THE TWO PAINT BASINS ALLOW FOR THE CONTROL OF THE PENCIL'S DISTINCTIVE DESIGN ELEMENTS.
THE DIPPING PROCESS HAS NO EFFECT ON THE PENCIL'S FUNCTION, BUT ONLY SERVES TO ACHIEVE ITS CHARACTERISTIC APPEARANCE.



THE PENCIL IS SHARPENED.



QUALITY CONTROL BREAKING TEST

QUALITY CONTROL SHARPENING TEST

QUALITY CONTROL CLASSIFICATION

PACKAGING

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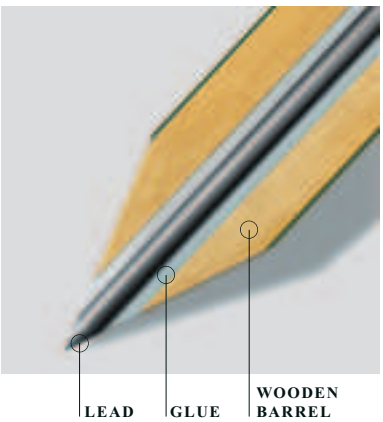
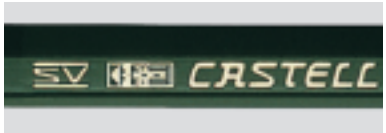
THE "SECURAL" PROCESS (SV BONDING)

In past pencil manufacture processes, the two slats were only spot-glued. It was thus possible at times for the lead to slip out of the wooden barrel.



With the introduction of a new patented manufacturing process in the 60's, FABER-CASTELL succeeded in firmly bonding the lead along its entire length to its wooden casing. That process was called the "Secural" process (SV derived from the Latin word "secura" = secure/safe).

This measure prevents the lead slipping out of the wooden barrel and significantly enhances the breaking resistance of the lead, e.g. when dropping the pencil. In addition, it facilitates the sharpening of the pencil and increases the breaking resistance of the tip.



FABER-CASTELL employs the Secural process for all its wood-cased pencils and in most cases marks them with the "SV" (= "Secural" process) stamp.

DEGREES OF HARDNESS

By varying the mixing ratio of graphite to clay in the lead manufacture, pencil makers can adjust the hardness degree of a pencil lead. The more clay versus graphite is introduced into the mixture, the "harder" the writing action of the pencil will become.

The identification of a lead's degree of hardness is expressed in letters and numbers. Generally, the harder leads are labelled with the letter H and the softer ones with the letter B. By placing a number in front of the letter it is possible to define various degrees of hardness. For instance, a 6H lead is harder than a 4H.

These designations are most likely derived from English expressions. Thus, B designated Black and H meant Hard, while the added number indicated increasing blackness or hardness. F may have stood for Firm or Fine Point.

The classification of degrees of hardness has never been unambiguously standardised internationally, which is why the exact designation still depends on each manufacturer.

For example, FABER-CASTELL supplies its famous classic, the Castell 9000, in 16 degrees of hardness.

The more precise a drawing is intended to turn out, the harder the pencil ought to be. Soft pencils are preferred in the creative and artistic domain.

The ideal writing pencil (e.g. in the office) has a medium degree of hardness (so-called "HB"), while the school student's pencil has a B hardness degree.

FABER-CASTELL applies the following designations:

B	=	Black
H	=	Hard
HB	=	Hard Black = medium hard
F	=	Firm

Degrees of hardness alternatively expressed in numbers:

1	2	2 1/2	3	4
(2B)	(B)	(HB)	(H)	(2H)

CROSS-SECTIONAL PROFILE

Wood-cased pencils are produced and supplied worldwide in predominantly three profiles.

Round profile

This shape is used principally in offices for shorthand, as the round pencil is easily rotated in the hand, thus preventing a single-sided blunting of the lead and reducing the frequency of resharpening.

Owing to the easier rotatability of the round profile, the pencil requires a firmer grip. Correspondingly, the hand will tire earlier after extended use.

Hexagonal profile

The hexagonal profile is currently the most used shape for standard school and office application.

It allows for a more comfortable grasping of the pencil during use and also prevents the pencil from rolling off the desk.

Triangular profile

During normal writing posture, the pencil is held by the thumb, index and middle fingers. A triangular profile pencil provides a larger area of contact for each of the three fingers. This conforms to human ergonomics and therefore results in a writing action that is less tiring. Furthermore, such a pencil does not easily roll off the desk.

THE CIRCLE "TOUCHES" THE CORNER POINTS OF THE TRIANGLE PROFILE. IT CAN THEREFORE BE SHARPENED WITHOUT DIFFICULTY.

In recent times, the triangular profile has been recommended for writing novices. As the triangular profile pencil has a round, conical shape near the tip, it can

Clay/graphite mixing ratio

16 degrees of hardness (from hard to soft)

6H 5H 4H 3H 2H H F HB B 2B 3B 4B 5B 6B 7B 8B

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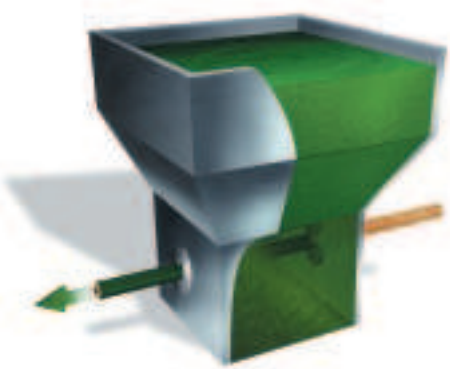
be easily sharpened with a normal pencil sharpener.

LACQUERING ("POLISHING")

The lacquering of the pencil is designed to protect it from getting dirty or stained (e.g. through perspiration from the writer's hand). But hygienic reasons also play a role: Ten times as many germs will accumulate on an unlacquered as on a lacquered pencil.

During the lacquering process the pencils are passed through a lacquer bath in a continuous loop. This process is repeated several times. In order to achieve a lasting lacquering finish, several colour lacquer coats and finally up to three clear lacquer coats are applied. The following general rule applies: The more lacquer coats are applied to the pencil, the more brilliant the lacquer colour and thus the more exquisite the pencil's appearance becomes. (For example, the Castell 9000 pencil by FABER-CASTELL has six lacquer coats; Polychromos and Albrecht Dürer Artists' colour pencils have up to eight lacquer coats.)



As children in particular tend to put pencils in their mouths, all lacquers used by FABER-CASTELL are absolutely safe toxicologically. All wood-cased pencils made by FABER-CASTELL comply with the purity stipulations of the European standard EN 71-3 of 1988, the so-called toys standard.

Two different types of lacquer are commonly used: acetone-based and water-based lacquer. The consumer is unable to visually distinguish the type of lacquer used. Durability as well as brilliance and lustre are identical for both types.

Water-based paint
In 1992, FABER-CASTELL was the first manufacturer to venture into water-based paint technology. In using this process, FABER-CASTELL has replaced conventional acetone-based lacquers with environmentally friendly water emulsions. FABER-CASTELL has set new global benchmarks in pencil lacquering methods by introducing its water-based paint technology.

In water-based paint technology, the chromophoric pigments are dispersed in water. This means that, unlike in the case of acetone-based lacquer, no harmful vapours are released during the drying process.

However, water-based paint requires heat for the drying process and thus necessitates greater energy expenditure when compared to acetone-based lacquer.

Dermatological studies show that users of these pencils are not exposed to any health risks, e.g. skin irritations.

Knobbed soft-grip technology
From a technical point of view, the knobbed soft-grip technology developed by FABER-CASTELL represents a raised ("convex") structure composed

of "small prominent dots" made of water-based lacquer.

These raised dots are positioned at the lower segment of the pencil and thus function as a "anti-slip device" in order to ensure a secure and non-slip grip.

QUALITY CONTROL

Extensive and strict controls ensure that only absolutely flawless pencils find their way to the consumer.

Generally, each production stage is followed by a visual inspection, ensuring that leads and/or pencils that fail this control stage are rejected.

The leads are first monitored for diameter consistency immediately after undergoing the compression stage. Following the firing process, they are checked for breaking resistance and diameter consistency. After the lead has been impregnated, it is checked for breaking resistance, stroke quality, grade of hardness, straightness and uniform diameter and length.

The pencils are checked after each production stage, e.g. for breaking strength, sharpenability and hot-foil stamping. Any pencil failing these controls is rejected.

ENVIRONMENT AND WASTE DISPOSAL

The pencil is one of the most environmentally friendly writing instruments ever made.

The lead consists of graphite and clay, both totally safe natural materials.

The company uses wood, a renewable resource, as casings for its leads. FABER-CASTELL was the first manufacturer in Germany to lacquer its pencils with environmentally friendly water-based paint.

All wood-cased pencils supplied by FABER-CASTELL comply with the purity stipulations of the European standard EN 71-3 of 1988 (toys standard).

By virtue of the composition and purity of the lacquers used in their manufacture, waste from pencils and colour pencils does not present any hazard in land-fill disposal or waste incineration.

B.A.U.M.

FABER-CASTELL IS A MEMBER OF B.A.U.M., THE NATIONAL GERMAN WORKING PARTY FOR ENVIRONMENTAL AWARENESS IN MANAGEMENT.

Long before environmental considerations attracted much special public attention, FABER-CASTELL was looking at ways to preserve wood as a valuable resource.

A number of years ago, an extensive reafforestation project was launched in Brazil with the aim of safeguarding the company's supply of consistently high-

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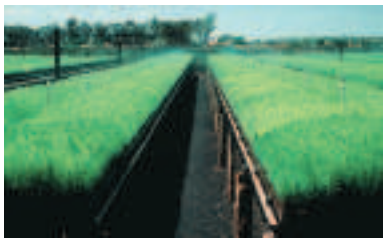
quality wood without destroying the local forest resources.

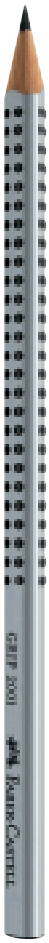


Currently, more than 2.5 million tree seedlings are planted each year. (read more about this topic in Chapter 1.4 "Wood from our own pine plantations")

VARIOUS SCOPES OF APPLICATION FOR WOOD-CASED PENCILS

Scope of application	User	Pencil type
Writing	All	Standard pencils (2H, H, HB, B, 2B)
Learning how to write	Children	Jumbo pencils, Triangular pencils
Sketching	Artists, Designers	All pencils and colour pencils
Watercolour painting	Children, Artists, Designers	Watercolour pencils with water-soluble colour leads
Mixing paints	Artists, Designers	Artists' pens (e.g. Polychromos) with colour leads for generating special effects by overlayering the colours
Marking	Office employees and school & university students	Fluorescent colour pencils
Technical drawing	School & university students Architects, Designers	Standard pencils (HB–6H)
Shorthand	Office employees	Round pencils (HB–2H)
Writing in/under water	Divers	Standard pencils
Determination of lacquer hardness	e.g. suppliers to the automotive industry	A standard 4H pencil; the lacquer is scratched superficially for the purpose of determining its hardness
Wood marking	Joiners & cabinet-makers and the furniture industry	Special (flat) carpenter's pencils with a broad, oval lead; often used as a substitute ruler
Stuffing one's pipe	Otto von Bismarck and others	A particularly long FABER-CASTELL pencil used by Bismarck not only for writing but also for stuffing his pipe
Drawing with compasses	School & university students	Some compasses will accept a standard pencil; However, precision compasses predominantly work with pencil leads
Writing on smooth surfaces	All	Glass markers
Indelible writing	Office employees	Indelible colour pencils
Make-up and fancy dress	Children	Cosmetic pencils made of dermatologically tested materials

WHAT MAKES A GOOD PENCIL?



A pencil's quality is influenced by diverse factors:

The wood used in manufacture should be as knot-free, long-fibred and uniformly grown as possible in order to ensure easy and neat sharpening of the manufactured pencil.

A consistently uniform graphite/clay mixing ratio guarantees the user the same degree of hardness for subsequent purchases.

The availability of a pencil in a variety of degrees of hardness ensures consistent quality for varying types of applications.

The ingredients of the lead are crushed, finely ground and blended for a long period of time, resulting in an even lead stroke without scratching. Additionally, the lead stroke should provide good coverage and, depending on paper quality and writing pressure, should be easy to erase.

The lead must be firmly bonded to the wood in order to prevent it from slipping out of the wood casing and to avoid tip breakage (e.g. during sharpening).

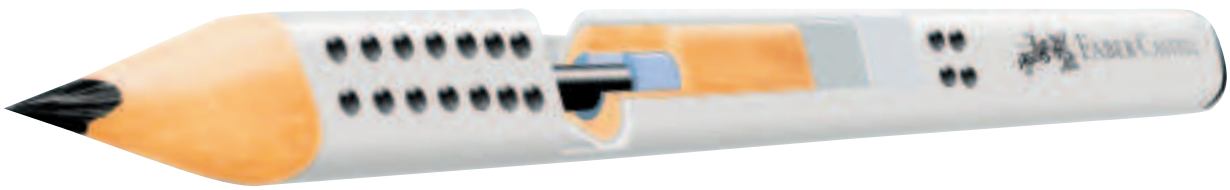
Owing to a lacquering process involving several coats, the lacquer coverage is particularly good and uniform. This also reduces the occurrence of pressure marks and indentations.

In addition to the above quality attributes, an attractive design (lacquering, hot-foil stamping, end trim) also contributes to enhancing the writing pleasure.

ADVANTAGES OF THE PENCIL

Despite the introduction of ink writing instruments, traditional lead-pencil writing has lost none of its fascination. This is not least due to the many advantages of pencil writing:

- A pencil stroke is erasable and thus correctable.
- Pencil writing is environmentally friendly, since all materials used in manufacture are of "natural" origin. Moreover, wood is a renewable natural resource.
- A pencil writes in/under water, in a vacuum and "upside down".
- Pencil writing is absolutely non-toxic, because all ingredients used in manufacture consist of entirely safe substances (clay, graphite, wood, water-based lacquer).
- Pencils can even be used on extremely cold and hot days, as the lead does not react to temperature fluctuations.
- Pencils are always "ready-to-write" and can even be sharpened with a knife.
- Pencil quality has always been consistently good over the years. (e.g. degrees of hardness).



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THE PERFECT PENCIL

A disadvantage of the pencil, particularly when used on the move or away from the desk, is the fact that it needs to be periodically resharpened in order to write accurately. After all, a suitable sharpener is not always within reach.

As the leading manufacturer worldwide, FABER-CASTELL has come up with the perfect solution for the transportable pencil problem: A pencil with integrated sharpener, eraser and clip, that is as easily carried around as a ballpoint pen or fountain pen and can be resharpened quickly and anywhere.

FABER-CASTELL's perfect pencil concept is available in various price categories.

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COLOUR PENCILS

A FABER-CASTELL CATALOGUE FROM 1883.

HISTORICAL OVERVIEW

While the graphite or "lead" pencil's history can be traced quite easily, there exists only little historical material on the history of colour pencils. Even though a writing utensil catalogue from 1820 provides one of the first references to a red wood-cased pencil, the significantly longer history of creative colour work suggests that colour pencils must have been in existence long before then.

So-called "porte-crayons" – wooden barrels with an adjustable ring retaining the lead within the barrel – were used for both pencil and colour pencil leads. For this reason, we may assume that the development of wood-cased colour pencils was occurring in parallel to the development of wood-cased pencils.

As early as in the 19th century, the FABER-CASTELL product range included wood-cased colour pencils. In an 1881 catalogue wood-cased colour pencils are listed in a range of 52 different colours.

COMPARISON WITH PENCILS

Technical design
The design structure of colour pencils is identical to that of pencils, and they are manufactured accordingly. Their difference lies in the composition and diameter of the lead.

Functional principle
Colour pencils function just like pencils. However, they are usually not erasable or water-soluble.

FABER-CASTELL has developed solutions for manufacturing erasable and water-soluble colour pencils.

Unlike pencil leads, colour pencil leads do not undergo a firing process but are dried only, as the sensitive colour pigments would not be able to withstand the high temperatures of the firing process.

The individual production stages
The diagrammatic view demonstrates the main stages of pencil manufacture.

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since 1761

THE INDIVIDUAL PRODUCTION STAGES

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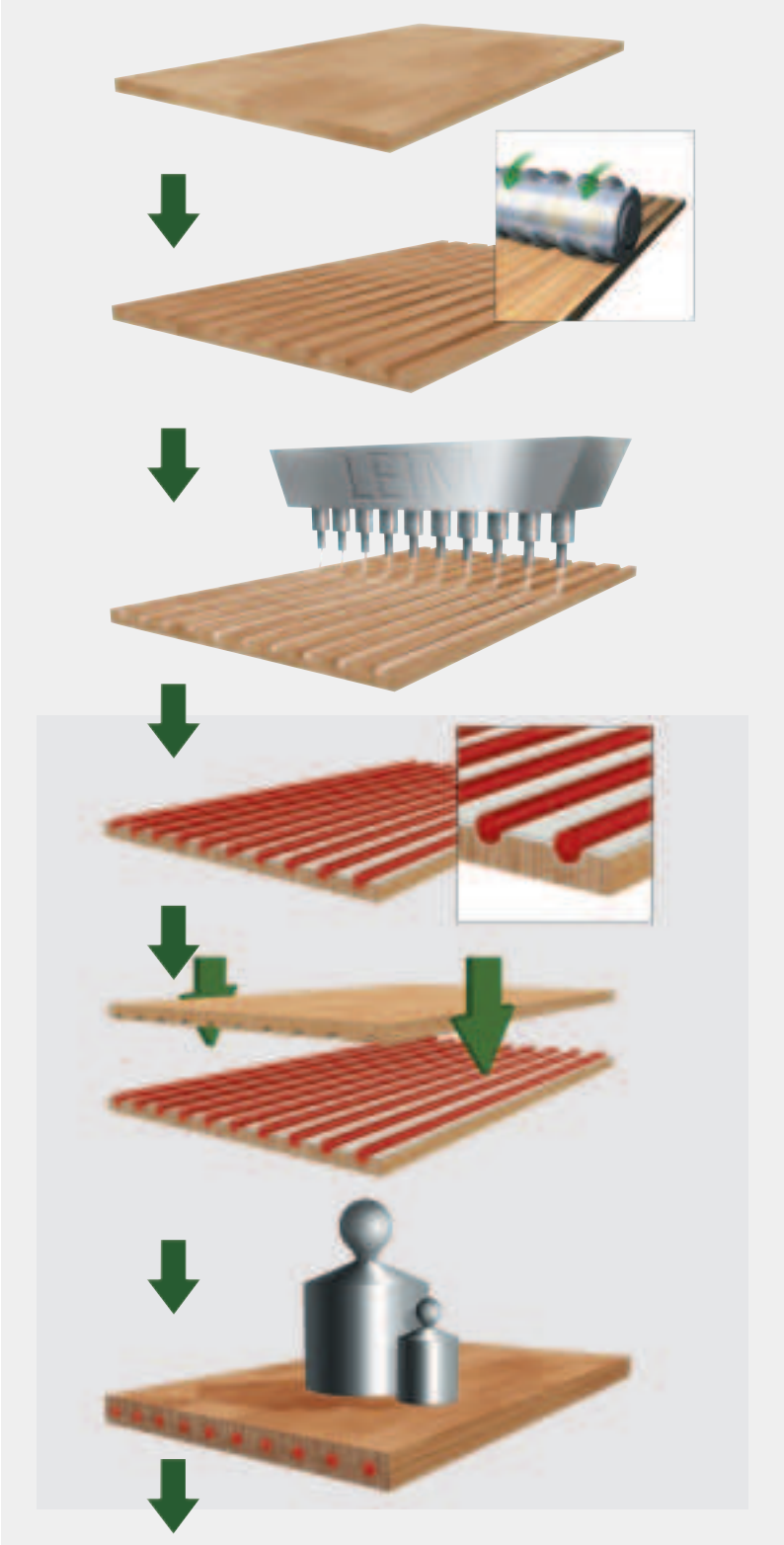
THE UPPER SLAT IS PLACED ONTO THE BOTTOM SLAT.



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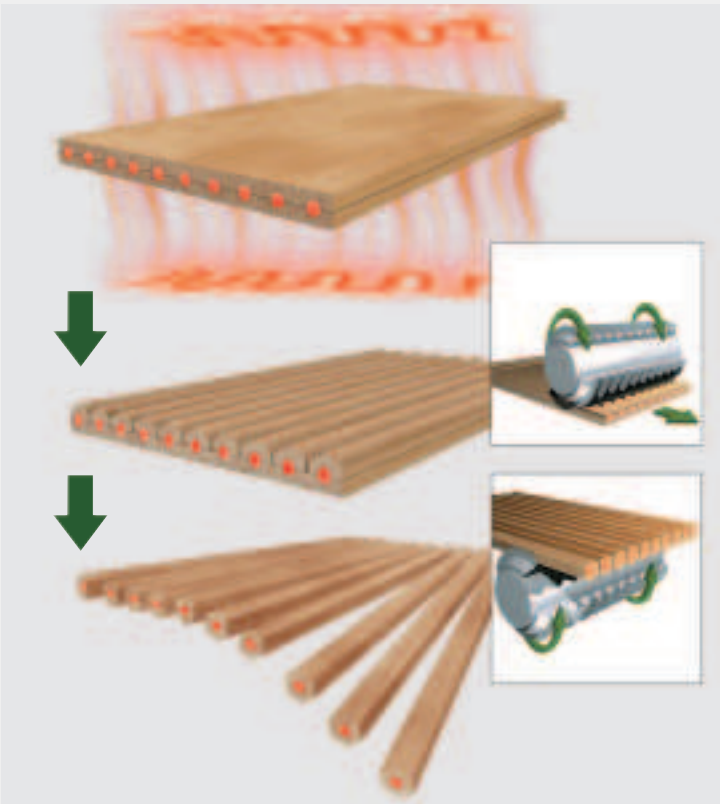
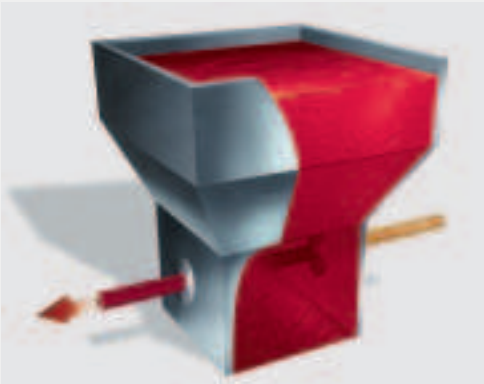


THE PENCILS ARE REPEATEDLY PASSED THROUGH A LACQUER BATH IN A CONTINUOUS LOOP. SEVERAL COATS OF LACQUER ARE APPLIED IN ORDER TO ACHIEVE A LASTING VARNISH.



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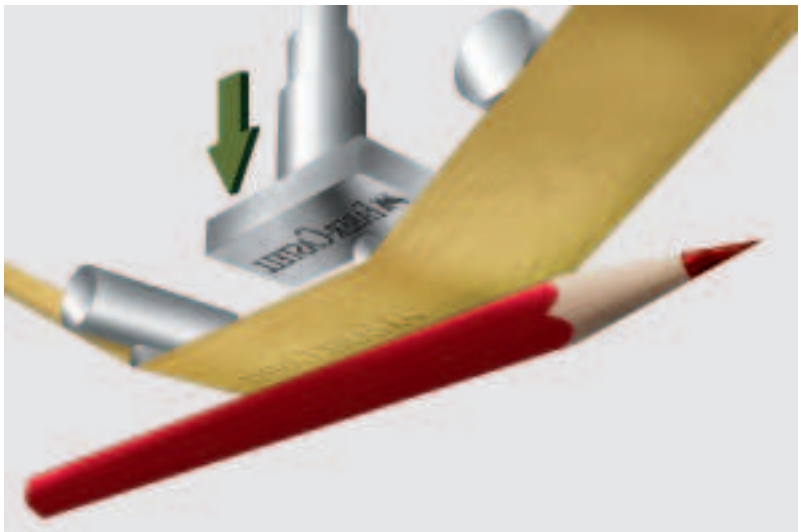
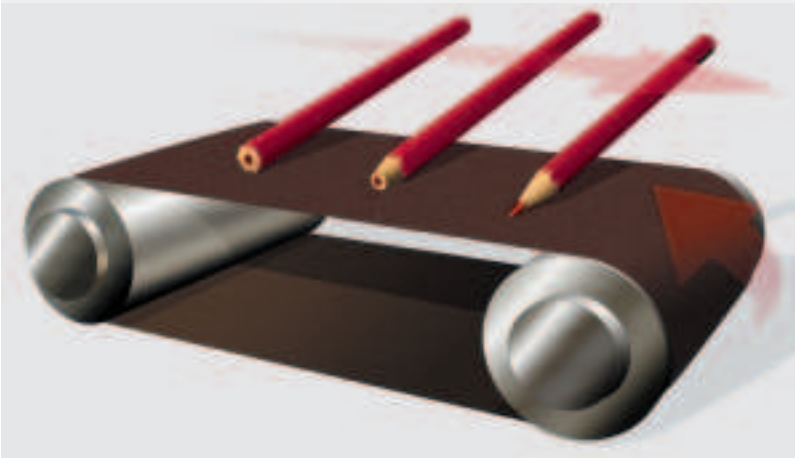
HOT-FOIL STAMPING WITH BRAND NAME, COLOUR NO. AND EAN CODE.



THE PENCIL IS SHARPENED.



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QUALITY CONTROL BREAKING TEST

QUALITY CONTROL SHARPENING TEST

QUALITY CONTROL CLASSIFICATION

PACKAGING

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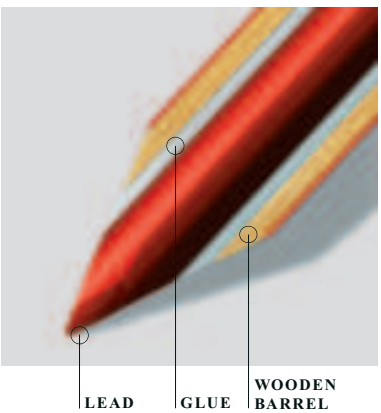
THE "SECURAL" PROCESS (SV BONDING)

By virtue of its composition and due to the lack of a firing process, a colour pencil lead is substantially softer than a pencil lead. That is also why colour pencil leads have a larger diameter than pencil leads. (pencil lead diameter 2.0 – 2.8 mm; colour pencil lead diameter 3.0 – 3.3 mm)



For the purpose of enhancing breaking resistance, firm bonding of the colour pencil lead to the wood is even more important than in pencil manufacturing. Besides, this is the only way to prevent the lead from slipping out of the wood casing and to avoid tip breakage.

Cross-sectional profile

Just like wood-cased pencils, wood-cased colour pencils are available in round, hexagonal and triangular profiles. (>Pencils)

Pencil tip

When looking at a sharpened pencil, we see a long tapered tip. The tip can be used for writing or drawing fine lines for quite some time, until it becomes blunt and requires resharpening.

Being substantially softer, a colour pencil lead must be sharpened differently from a pencil lead. The tip of a brand new colour pencil initially appears to be just like a pencil tip. Only a closer inspection reveals a small additional tip. This is designed to prevent the lead from breaking while the product is being delivered to the customer. (Is used by FABER-CASTELL for the Polychromos and Albrecht Dürer artists' pens.)

Some colour pencil leads (e.g. pastel pencils) are so soft that a long tapered tip would keep breaking off during use. Therefore, colour pencils are sharpened to a short tapered point. From a geometrical point

of view, the short tip is stronger than the longer tip. On the other hand, it requires more frequent resharpening.

WATER SOLUBILITY (WATERCOLOUR PENCILS)

Water-soluble colour pencils (watercolour pencils) expand the spectrum of creative possibilities and are thus increasingly popular. Water solubility is achieved by impregnating the leads with an "emulsifier" (= water-soluble, wax-like substance) instead of wax or grease.

One way of working with these water-soluble colour pencils is to apply water to the painting

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surface prior to colouring with the watercolour pencil, or alternatively to put one's sketch to paper and then dissolve and wet-blend them with a brush.

By selecting different paper grades, the watercolour pencils' degree of solubility can be controlled in considerable detail. While the structure of a painting is more or less distinctly preserved when working on very smooth paper, it is easily fully dissolved and transformed into an aquarelle look and texture when painting on rough, coarse-grained paper.

The mode of applying the colour onto the paper can also influence the solubility. The more pressure is exerted on the watercolour pencil the deeper the pigments are pressed into the surface of the paper, which results in a reduced water solubility of the paint strokes.

The gentler the paint application and the more water is used, the sooner an aquarelle-like look and texture is achieved.

Please note!
Water solubility does not mean that the pencil should be dipped in water. That would result in the lead swelling up and the wood being destroyed.

PENCILS FOR SPECIAL PURPOSES

Document lead pencils
These pencils are also known under their former designation of Copying Pencils. However, their original application purpose, the preparation of copies, has lost its role in today's era of the laser copier.

Today, these pencils are valued principally for their indelible stroke. They represent an environmentally compatible alternative (reduction of plastic waste) to indelible ink writing instruments.

The basis for the superior lightfastness and unerasability of these pencils, and thus their indelible strokes on paper, are high-grade colour pigments and water-soluble dyes that enhance deep penetration into the paper.

These colourants are toxicologically safe.

Note:
To ensure the unerasability of these pencils, a minimum writing pressure of 300 g is required (ascertained average writing pressure approx. 350 g).

Grease pencils
Colour pigments are the chromophoric components in grease leads. Binding agents give shape and strength to the lead. In this instance, a grease/wax mixture is used. Kaolin is predominantly used as a filler for colour leads.

Glass marking pencils
The grease leads in glass marking pencils facilitate the lettering/marking of all smooth surfaces such as glass, plastic, metal, leather etc.

Glass marking pencils strokes are water and temperature resistant up to 450° C for black leads, up 1000° C for white and red leads.

WHAT MAKES A GOOD COLOUR PENCIL?

A wood-cased colour pencil's quality is influenced by diverse factors:

The wood used in manufacture should be as knot-free, long-fibred and uniformly grown as possible in order to ensure easy and neat sharpening of the manufactured pencil.

The uniform and even router cutting of the slats ensures that the good quality of the wood is preserved in the ultimate manufactured pencil.

The colours in artists' products do not only need to provide good coverage, but they must also be highly lightfast in order not to fade when exposed to the effects of sunlight.

The ingredients of the lead are crushed, finely ground and blended for a long period of time, resulting in an even lead stroke without scratching.

The lead must be firmly bonded to the wood in order to prevent the lead slipping out of the wood casing and to avoid tip breakage (e.g. during sharpening).

The number of colours offered increases commensurate with the consumers' demands made on the pencil, i.e. the colour range is widest for artists' products. (120 colours available)

Owing to a lacquering process involving several coats, the lacquer coverage is particularly good and uniform. This also reduces the occurrence of pressure marks and indentations.

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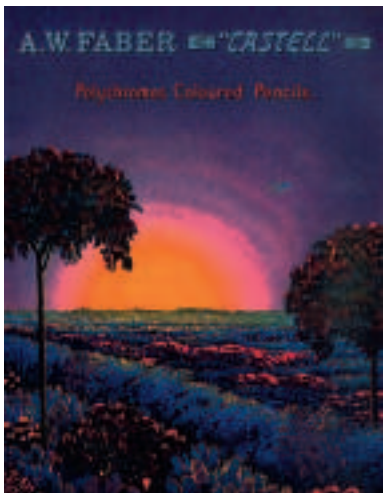
ARTISTS' COLOUR PENCILS

HISTORICAL OVERVIEW

Throughout the course of the company's 240 year history, FABER-CASTELL artists' colour pencils and crayons have gained an outstanding reputation. The pencils even won awards as far back as last century's World Expos.

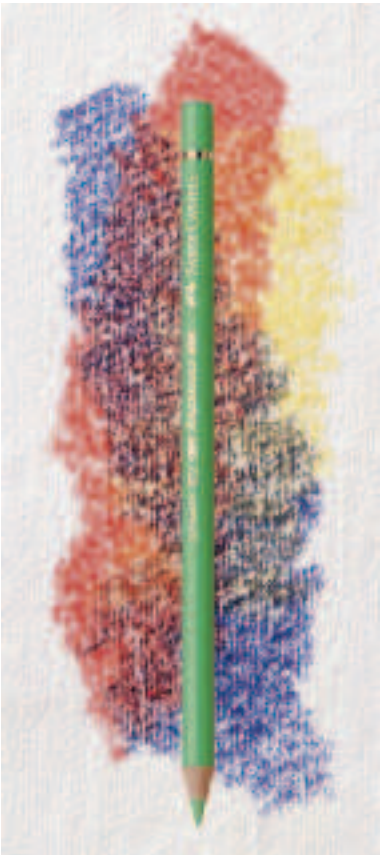


POLYCHROMOS COLOUR PENCIL PACKAGING FROM 1908.

The manufacture of artists' products played a very important role at FABER-CASTELL as early as in the 19th century. Lothar von Faber continuously expanded the product line at the time. The advantage of colour pencils was that they could easily be sharpened, in contrast to the colour pastels popular back then. They were also more suitable for fine and delicate work.

Lothar's successor, Alexander Graf von Faber-Castell, not only continued the successful product lines, he also substantially expanded the range of products. The Polychromos colour pencils in particular, brought onto the market in the early 20th century, were to become a classic.

The high quality standard of all our products continues to live up to today's exacting artistic demands. That very quality received praise from renowned artists like Kaulbach, Vincent van Gogh and Wilhelm Busch.



SPECIAL REQUIREMENTS FOR ARTISTS' COLOUR PENCILS

Light-fastness

Works of art are valuable pieces that are one of a kind and should be preserved at their original degree of quality for as long as possible.

The colours do not only need to provide good coverage, but they must also be highly lightfast in order not to fade when exposed to the effects of natural light (sun).

Therefore, FABER-CASTELL insists on using selected natural ingredients in the manufacture of its artists' colour pencils – especially high grade colour pigments of the highest purity and light-fastness.

FABER-CASTELL was the first producer in the world to label light-fastness ratings of its pencils with specific asterisks:

*** Greatest light-fastness (= no change after sun exposure)
** Very good light-fastness (= little change after sun exposure)
* Moderate light-fastness (Caution: definite change after sun exposure)

This division into various categories is a classification initiative by FABER-CASTELL and to date there is no internationally standardised equivalent.

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CRAYONS

HISTORICAL OVERVIEW

As far back as antiquity, wax – particularly coloured beeswax – was used as a painting medium. In his works dating back almost 2000 years, the Roman writer Plinius praised the eminent wax art of the Greeks which was later adopted by the Romans as portrait art.

Earthy shades such as sepia, red chalk, umber and manganese brown were already known to the old masters in the middle ages.

A 1900 FABER-CASTELL CATALOGUE WITH ARTISTS' CRAYONS AND GRAPHITE CRAYONS

PRODUCT OVERVIEW

Crayons are supplied in tin cases, carry cases and in individual colours. For better handling and protection against colour-staining, special crayon

holders or paper wrappers, cardboard sleeves, plastic film-wrap or sliders can be used.

Artists' crayons in particular are also supplied in wood-cased pencil format. Whether the "classic" crayon format of the pencil variant is used depends on a variety of factors. (Soiling/staining of the hands, stroke width etc.)

STREET MARKING CRAYONS

Blackboard chalk and street marking crayons consist predominantly of natural calcium sulphate or calcium carbonate

and water. Small portions of colour pigments are used as colourants. Large proportions of filler are used to make the crayons compact and to provide a certain binding agent function. Street marking crayons are offered principally in a large diameter cylindrical or rectangular format.

WAX CRAYONS

Wax crayons are wax-based pencils, generally have a round shape and are suitable for painting and wax techniques.

Wax crayons consist of natural and/or synthetic waxes, inorganic

fillers (e. g. talcum), organic and inorganic pigments as well as emulsifying agents in the case of water-paintable crayons.

They are manufactured in either a pressing process or a casting process (cast crayons).

There are two types of wax crayons, water-resistant and water-paintable.

Wax crayons are suitable for a wide variety of techniques such as "Sgraffito", "Encaustic" or "Ironing Technique", "Wiping Technique" and "Fabric Painting".

The wash or bleed technique results in soft, delicate shades and hues akin to those in water-colour painting, when the wax painting is thinned or brush-painted with turpentine. By using this technique, it is possible to create soft bleeds and blurred margins.

With the wax rinse technique the drawing paper is first coated with a totally opaque colour (or aquarelle wax) before drawing the motif over it with a water-resistant wax crayon. During the subsequent rinsing process with water, the colour shade is completely retained underneath the wax.

In "Sgraffito" (scratching technique) several wax layers (from light to dark) are superimposed. The individual layers can then be made visible again or removed by "scratching" with a scraper or a sharp pencil. (The term is derived from Italian: sgraffiare = to scratch / to scrape.)

"Frottage" is an abrasion technique. The surface texture is represented on the paper, the structure graphically visualised. ("Frottage" is derived from the French word "frotter" = to rub.)

FROTTAGE

"Encaustic" is a technique where wax is melted and applied to the paper while it is still hot. Pictures are created by the fusing of the various colours. (The term "encaustic" is derived from Greek and means "to burn in", "to heat with fire" or "to subject to fire".)

Wax crayons can be virtually stored forever, have a vigorous colour stroke quality and adhere to almost all surfaces (with the

WASH TECHNIQUE

SGRAFFITO

ENCAUSTIC

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exception of very smooth surfaces, such as glass, plastic, CDs etc.)

Incidentally, wax crayons are used when first learning how to write: The "classical" (water-resistant) wax crayons are used for handwriting exercises during writing lessons, because the uniquely solid wax compound does not soften when held in one's hand. The handwriting exercises relax the hand muscles and the schoolchild gradually acquires a sense of shapes and a feel for writing.

MARKING CRAYONS

Two different types of marking crayons are commonly used:

On one hand, marking crayons that are composed and manufactured in the same way as colour pencil leads and impregnated with grease/wax. They are particularly suited for marking cardboard, paper, wood, metal as well as all rough surfaces.

On the other hand, wax marking crayons that are manufactured like grease leads (glass marking pencils). In these crayons the grease/wax mixture functions as the binding agent. They are

preferably used for smooth surfaces like glass, plastic, leather etc. They are highly light-fast and heat-resistant (the colour white up to 1,000° C). Their strokes are water-resistant.

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ARTIST'S CRAYONS

The product range and application areas of artists' crayons are virtually unlimited. The same applies to the crayons' composition and manufacture.

The most important ingredients of artists' crayons are the colour pigments, as their remarkable colour purity ensures the colours' light-fastness, which is of great significance to artists. In addition, artists' crayons consist of special binding agents and fillers.

High-quality crayons are characterised by very finely ground raw materials and consistent particle size.

It is difficult to subdivide crayons into separate categories. We can roughly divide artists' crayons into graphite crayons, pastel crayons, so-called monochrome crayons and special crayons like oil and aquarelle crayons.

GRAPHITE CRAYONS

Like pencil leads, these crayons consist of a graphite/clay mix and are available in several degrees of hardness.

Quick sketches and studies are the main application areas of graphite crayons. Due to their large diameter, they provide a lush, rigorous stroke. If the graphite crayon has no wrapping or casing, its entire length can be used to lay down the colour on large surfaces.

Graphite crayons can be sharpened with sharpeners or emery boards.

Graphite crayons are also frequently ground to a powder. This powder is suited for smudging. By using the smudging technique it is possible to achieve various outcomes, depending on the degree of hardness. The softer the crayon, the more easily it can be smudged.

The degrees of hardness are subdivided into uniform and consistent increments. Graphite crayons are extremely light-fast and ageing resistant.

GRAPHITE PURE

Pencil-shaped graphite crayons are called Graphite Pure. Graphite Pure pencils consist of a solid, thick lead and are not wood-cased.

The surface of Graphite Pure has a synthetic coating to protect the hands against staining.

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By variably exerting light or vigorous pressure when drawing it is possible to create diverse grey shades, which is ideal for high-contrast drawing, writing and sketching.

Graphite Pure can be sharpened with a conventional pencil sharpener.

PASTEL CRAYONS

Pastel crayons have been used as a drawing medium since the 15th century. The term "pastel" is derived from the Italian word "pasta" (dough), because in the past pigments used to be kneaded into a dough with the aid of a binding agent.

Pastel crayons consist essentially of organic and inorganic finely pulverised pigments, inorganic fillers (such as clay, calcium carbonate, pumice powder, quartz powder, kaolin) as well as small quantities of binding agents (e.g. cellulose derivates). The ingredients are kneaded together and pressed into the particular shape.

Pastel crayons are dried, as the sensitive colour pigments would otherwise become charred due to the intense heat generated during the firing process.

Their pigment content is very high when compared to other painting crayons. Only very small amounts of wax, grease or oil are used, if any. That is why pastel crayons smudge easily and must ultimately always be fixed with lacquer. (The wax content ensures the adhesion of the colour on the background.) It can be reduced to a minimum only on very coarse-grained surfaces.

Pastel crayons without lubricating or binding agents can be ground to a fine powder and are suited for the same techniques as graphite crayons. They can be painted together with oils.

Unlike colour pencils that adhere to just about all types of paper, they require a drawing background of a certain roughness. Pastel crayons are therefore mainly used for surface-covering painting on soft, fine-grained or velvety velour paper or on heavy paper with a coarse-grained surface.

It is also possible to draw on stone or asphalt. This attribute extends the pastel crayons' application options when compared with other products, e.g. colour pencils.

Pastel crayons are available in rectangular or cylindrical format. The degrees of hardness on offer range between the softer and harder end of the scale, according to the manufacturer.

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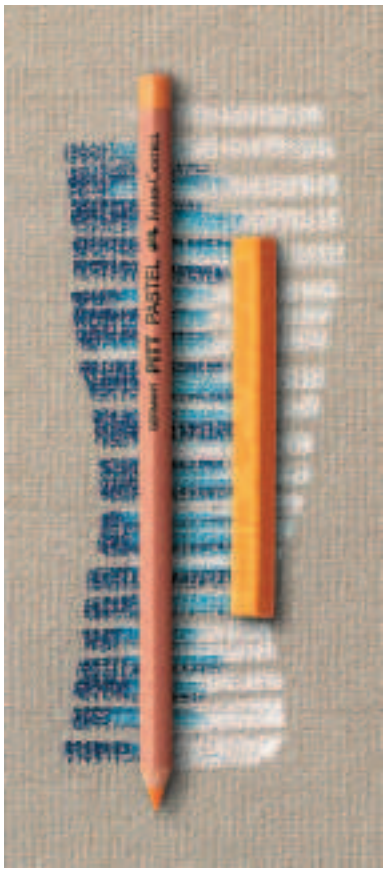
PASTEL PENCILS

Pencil-shaped pastel crayons are called pastel pencils. The crayon is pressed into a lead shape and subsequently dried. Pastel pencils are ideal for detail, fine lines and hatching.

Just like pastel crayons, they smudge easily and must be fixed.

The decision whether to use pastel crayons in their traditional crayon or wood-cased pencil form depends on the artist's style and the size of the motif. Pastel pencils are designed as a supplement for particularly detailed work. The wood casing protects the fingers against staining.



MONOCHROME CRAYONS AND PENCILS

The term "monochrome" means "non-colour" painting. It includes all important colours and shades for working in the contrast areas light-dark or black-white.

Monochrome crayons include red chalk, sepia, umber and manganese brown crayons or even white and also black crayons.

Monochrome crayons are essentially designed like pastel crayons. They are particularly rich in light-fast pigments and have few binding agents.

The colour range is limited to earthy tones and shades. Originally the colours were made from earth colours: White was blended from limestone, black from charcoal and brown from earth/soil. In contrast to pastel crayons, they now contain inorganic pigments (metallic oxides).

There are two types of crayons, fired and unfired. Fired crayons are harder and more brittle. The colour pigments are not easily rubbed into the paper and must therefore be fixed. On the other hand, special binding agents provide the unfired crayons with a soft and ductile consistency. The pigments are thus rubbed into the paper, however, fixing should be dispensed with. Many colour shades are available for both the fired (colour shade variant with a rougher character) and the unfired (original colour shade) versions.

These crayons are either grease-free or grease-based. Grease-free crayons can be wiped or smudged relatively easily and are wet-paintable. The colour is deposited rather loosely on the drawing surface and should always be fixed.

Grease-based crayons have a stronger paper adhesion due to their oil and wax based binding agent. They have a ductile stroke with a satin-finish surface. They are also more difficult to wipe or smudge, only partially erasable but do not necessarily have to be fixed.

FABER-CASTELL pencils are distinguishable as grease-free or grease-based by virtue of their design: Grease-free pencils have an end trim and grease-based pencils have an end cap.

The decision whether to use monochrome crayons in their traditional crayon or wood-cased pencil form depends on the artist's style and the size of the motif. Monochrome pencils are designed as a supplement for particularly detailed work. The wood casing protects the fingers against staining.

Red chalk
Red chalk can be described as the classical drawing material.

A common shade is a deep and rich adobe colour hue, particularly used for nude drawings and portraits as well as for body studies. There are various graduations, from English Red to the violet-like Red Brown. The red chalk colour does not exist as such.

The basis for red chalk is a fine clay that contains iron oxide and is processed into leads after being pulverised.

Sepia
Sepia was originally a liquid drawing colour. Today, this dark brown colour is made from synthetic dyes. Sepia colour shades are mostly used for portrait and nude studies as well as landscapes.

White crayons
White crayons are irreplaceable for working on tinted or black paper as well as for brightening red chalk motifs and charcoal drawings.

Black crayons
Black crayons are available in various degrees of hardness.

The relatively ductile stroke can be water-painted, wiped, smudged or brightened with plasticine.

OIL CRAYONS

Oil crayons consist of inorganic and/or organic pigments, fatty acid derivates, oils and waxes as well as fillers.

Oil crayons adhere to almost all surfaces, even smooth ones. No fixing is required. They are water-resistant, paintable with turpentine or benzene but not water-paintable. They can be partially smudged when dry. The colours provide good coverage, are deep and rich and have a very soft, intensive and smooth colour stroke quality with lustreless to matt or satin-

finish glossy surfaces. Oil crayons are difficult to correct and are not erasable.

Oil crayons are suitable for a wide variety of techniques such as the Encaustic or ironing technique (paint-spreading technique using heat) or the scraping (sgraffito) technique (colour layers can be placed on top of each other and can be removed later).

Oil crayons should not be subjected to higher temperatures (approx. 50° C), as they become soft when heated due to their high wax content.

AQUARELLE CRAYONS

Aquarelle crayons essentially consist of organic and inorganic finely pulverised pigments, inorganic fillers (such as clay, calcium carbonate, kaolin) and in some instances lubricating and emulsifying agents.

The properties of aquarelle crayons are in many ways similar to those of oil or wax crayons. Unlike the latter they are water-paintable, easier to correct and easier to remove from smooth surfaces.

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CHARCOAL

DRAWING CHARCOAL

Drawing charcoal is made synthetically from a fine mixture of carbon black (soot), charcoal and clay with an admixture of binding agents. Depending on the mix of these components, degrees of hardness from "extra soft" to "extra hard" are achieved. These various degrees of hardness allow finely nuanced graduations from the brightest grey to the darkest black.

Drawing charcoal is pressed into the relevant shape and fired. It is characterised by a soft stroke and a lush, rich gliding action on paper. An outstanding feature of drawing charcoal is the darkest, deepest black ever made by man.

It is used for working on large areas. Charcoal lines are easily wiped or smudged with a finger, stump (estompe), brush or cloth. It can only be removed with plasticine. Fixing is unavoidable!

Drawing charcoal is available in two versions: Round rod-shaped drawing charcoal is very well suited for working on large areas, while charcoal pencils with an additional wood-casing are particularly suited for fine, detailed work.

NATURAL WOOD-CHARCOAL STICKS

Wood-charcoal sticks are one of humanity's oldest drawing mediums. It is made from soft and, to the extent possible, resin-free wood (e.g. lime-tree wood, hazelnut wood or birchwood rods). The twigs and branches are heated under the exclusion of air, until they are thoroughly carbonised. Wood-charcoal has a bluish stroke that is easily wiped and corrected.

The extremely brittle material adheres only lightly to paper. Therefore the lines can easily be removed with an eraser brush or plasticine.

Wood-charcoal sticks are particularly suited for studying purposes, sketches and are often used for preparatory drawings in oil painting because of the ease with which they are removed. For this purpose the charcoal on the canvass is tap-dusted with a cloth. Hardly any perceptible patterns remain.

Natural wood-charcoal sticks are available as round rods in diameters of approx. 3 to 14 mm for large-surface work or in wood-cased pencil form for fine, detailed work.

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MECHANICAL PENCILS

Mechanical pencils are defined as pencils holding a lead inside a barrel by means of a clamping mechanism. Releasing the clamping mechanism by pressing or twisting the pencil results in the lead dropping or being transported towards the tip.

TK CLUTCH PENCIL
ADVERTISING POSTER FROM THE 60'S

Depending on the thickness of the lead or the release mode of the clamping mechanism, mechanical pencils are divided into clutch pencils, fine-point pencils and propelling pencils.

HISTORICAL OVERVIEW

A pencil has the disadvantage that its length continues to decrease with increasing use. When working on high-quality drawings, it thus becomes increasingly difficult to achieve a good quality result as the pencil can no longer be held properly.

FABER-CASTELL had already solved this problem in the 40's with the introduction of the so-called TK clutch pencils, which used leads of a similar thickness to conventional wood-cased pencils. (Incidentally, the TK trademark registered by FABER-CASTELL represents the German initials for the main user groups of technicians [Techniker] and artists [Künstler].)

In the 60's a new manufacturing process made it possible to develop the extremely fine, yet break-resistant, polymer leads that resulted in the introduction of fine-point pencils.

CLUTCH PENCILS

Functional principle and technical design

A lead is housed inside a synthetic barrel and is retained by a clamping chuck.

By pressing the push-button, the clamping chuck is opened and releases the lead. The lead's own weight now causes it to drop down out of or into the pencil, depending on whether the tip is pointing up or down.

Releasing the push-button reclamps the lead.

The barrels of propelling pencils made by German manufacturers contain predominantly recyclable plastics and metals. It is not customary to use PVC.

The thicker leads of most clutch pencils have the same composition as those of wood-cased pencils and colour pencils, but are somewhat shorter.

Special sharpeners have been developed for sharpening the leads of clutch pencils. Some pencil models are equipped with a small sharpener integrated in the push-button.

Advantages of the clutch pencil

In comparison with a wood-cased pencil that is sharpened and becomes ever shorter, a

clutch pencil retains a consistent length and is always comfortable when held in one's hand.

The lead can be worn down substantially further than a pencil and is thus almost completely utilised.

Clutch pencils are mechanically simple and therefore very robust.

FINE-LEAD PENCILS

The design structure of fine-lead pencils is similar to that of clutch pencils. They also feature a clamping chuck which retains the lead.

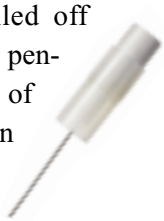
However, in addition to the clamping mechanism they also have a spring-loaded push mechanism. When pressing the push-button, not only is the lead released but it is simultaneously advanced a short distance. This mechanism is called a feed mechanism. In some models the feed mechanism is activated automatically, when the pencil is lifted off the paper. (>Lead slide mechanism)

Extremely fine and comparatively break-resistant special leads, so-called polymer leads, are used in fine-lead pencils. The barrel of the pencil contains a storage tube for refill leads, which can usually be filled at the upper end. It is recommended not to load the pencil with more than three refill leads, as the leads may otherwise get jammed and fail to slide into the lead slide mechanism.

Fine-lead pencils are available for lead diameters of 0.35 mm, 0.5 mm, 0.7 mm and 1.00 mm. They are colour-coded in accordance with the DIN 6775 standard. Yellow stands for a line width of 0.35 mm, brown for 0.5 mm, blue for 0.7 mm and orange for 1.00 mm.

Lead diameters and lengths are designated by DIN ISO 9177-2.

After some time, lead residues may collect in the clamping chuck and block the feed mechanism. Therefore many models are equipped with a cleaning needle, which is usually attached at the push-button. The push-button is pulled off the upper end of the pencil and the opening of the lead sleeve can be cleaned from the tip with the cleaning needle.



Many fine-lead pencils have an eraser (replacements can usually be purchased) at the upper end, which is either firmly attached to the push-button or pencil top or screwed in and out like a lipstick.

Market research has shown that many people do not like to write with a fine-lead pencil, because the most common lead diameter of 0.5 mm tends to break very easily. FABER-CASTELL therefore introduced the 0.7 mm lead for breakproof writing and restimulated the sales of fine-point pencils. In many writing pencils, the lead is also cushioned in order to reduce the breakage risk.

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Fine-lead pencils are available with different lead holder types:

Fixed lead slide mechanism
The lead tube is in a fixed mounting. Prior to drawing or writing the lead must be advanced through the lead sleeve by pressing the push-button once. This provides a writing output of about 2 metres without the need to re-activate the push-button.

These pencils are particularly suitable for technical drawing with rulers, templates and stencils.

Fixed and retractable lead slide mechanism
This lead slide mechanism system is functionally identical to the fixed lead slide mechanism but has the advantage that the sleeve can be fully inserted into the barrel by simultaneously pressing the push button and pushing the sleeve onto the paper. This system ensures a "pocket-safe" transport of the pencil.

Slide-back lead slide mechanism
In this system the lead tube is mounted resiliently ("sliding pipe"). This makes writing more comfortable and the lead more breakproof. Because of the slide-back action of the lead tube during writing, this system provides a longer writing output without the need to re-activate the push-button when compared with the fixed lead slide mechanism.

These pencils are primarily designed for writing and sketching. They are not suitable for technical drawing.

The lead sleeve in a slide-back lead slide mechanism system can also be resiliently mounted. This is called "Cushion Point".

Automatic feed mechanism
With this function the push-button needs to be pressed only once and the lead is automatically advanced.

The light pressure exerted on the lead by the virtue of the writing action causes it to move within the lead sleeve and slide a little towards the tip, so that there is always a small amount of lead protruding from the lead sleeve and available for writing.

The advantages of the automatic feed mechanism include comfortable handling and the fact that the lead hardly ever breaks, thus reducing lead wastage.

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The advantages of the fine-lead pencil
In comparison with a wood-cased pencil that is sharpened and becomes ever shorter, a fine-lead pencil retains a consistent length and is always comfortable when held in one's hand.

In comparison with clutch pencils, fine-lead pencils do not need to be sharpened and thus maintain a consistent line width during writing and drawing.

PROPELLING PENCILS

There are two types of propelling pencils. The first type is the classical retractable pencil, where the pressure on the mechanism is exerted by a rotational motion.

The other type is equipped with a continuously adjustable rotational mechanism, which is activated to retract or advance the lead by twisting the barrel counterclockwise or clockwise.

The lead used is either a thicker, "conventional" pencil lead or a polymer lead (with a lead diameter of 1.4 mm).

The fine-point pencil lead holder has the capacity to hold up to 5 polymer fine-point leads (1 in the lead sleeve, 4 in the lead tube). As with the regular retractable pencil, it is better not to charge this type of pencil with more than 3 refill leads. That way, they cannot get wedged or jammed.

MULTIFUNCTION WRITING INSTRUMENTS

Historical overview
The pencil is ideally suited for sketching and writing. However, where the written text has to be indelible or carbon copies need to be filled in, the ballpoint pen is the instrument of choice.

As is to be expected, prolific writers in particular demand a pen that combines the features of several systems. The idea of the multifunction pen was born.

The multi-colour ballpoint pen became popular back in the 60's and offered a selection of four different colour refills within one pen. The 4-colour pens remained relatively popular for several years but have gradually disappeared from the market.

Today, the multifunction pen remains in demand, in particular for two of its applications – the pencil and the ballpoint pen.

In recent times, the market has been increasingly offering multifunction pens that go beyond incorporating a pencil and a ballpoint pen, by additionally including a marker (Tri-Pen) or IT-stylus to safely write on touchscreens of handheld computers.

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Functional principle and technical design

Inside the barrel of the multifunction pen are a ballpoint pen lead and a scaled-down version of a retractable pencil mechanism.

Multifunction pens incorporate different mechanisms for preselecting the desired writing system – this is primarily done by twisting the lower section against the barrel.

The rotational motion is converted to a lifting motion and thus pushes either the ballpoint pen lead or the pencil mechanism towards the tip.

Just like with a regular retractable pencil, a push-button at the upper end of the multifunction pen activates the forward feed of the lead by a defined length.

The fine-lead pencil lead holder has the capacity for up to 5 (1 in the lead sleeve, 4 in the lead tube) polymer fine-lead leads. As with the regular retractable pencil, it is better not to charge this type of pencil with more than 3 refill leads. That way, they cannot get wedged or jammed.

Owing to the smaller lead size and resultant lower supply of

ink-paste, the writing length of multifunction pen leads is shorter than with conventional large-capacity leads. It is recommended to advise customers of this aspect or even offer a spare refill at the time of purchase.

The lead tube is resiliently mounted (“Cushion Point”) and thus provides a comfortable writing action. An exchangeable eraser is located under the push-button.

The thickness of polymer leads in multifunction pens is currently limited to 0.5 mm and 0.7 mm in many cases.

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LEADS

PENCIL LEADS

Composition

Pencil leads consist of the following basic ingredients:

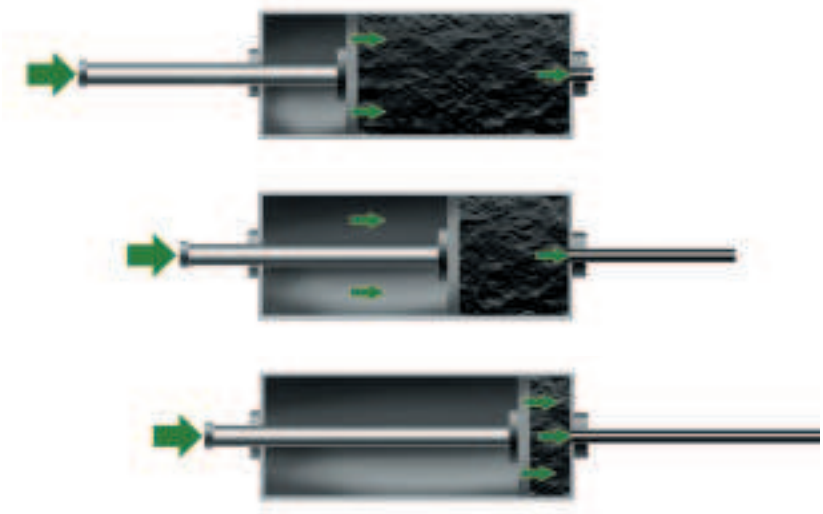
- Graphite
- Clay
- Grease/wax impregnation

Graphite is the colourant ingredient of the lead. Graphite provides the blackness. Clay acts as the binding agent, giving the lead shape and strength following the firing process. The grease/wax impregnation gives the lead additional strength, gliding quality and blackness, while improving adhesion to the writing surface.

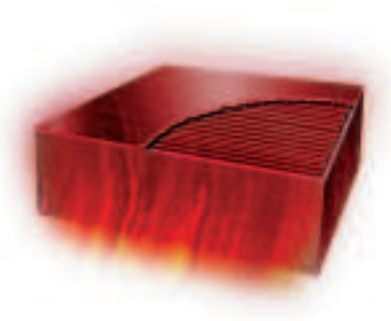
Manufacture

The two basic materials graphite and clay must be cleaned of any impurities prior to processing.

Finely ground graphite and purified clay are mixed in accordance with precisely specified, designated formulas.



Further processing includes homogenising the material in



mixers or kneaders. The mixed material is subsequently pressed into lead strands. Following the

drying process, the raw leads are fired for one hour at 900° C. In the final finishing step the now porous leads are soaked in a grease/wax bath. That is how the leads obtain their specific writing quality.

Degrees of hardness

The lead's hardness is determined by the mixing ratio of graphite and clay.

The greater the graphite content, the softer and blacker the lead. The greater the clay content, the harder (less black) the lead.

The origin of the lead's hardness designations with specific letters cannot be determined with absolute certainty. The actual custom of grading pencils in order to identify the blackness of the stroke probably originated in France.

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These designations are most likely derived from English expressions. Thus, B designated Black and H meant Hard, while the added number indicated increasing blackness or hardness. F may have stood for Firm or Fine Point.

The classification of degrees of hardness has never been unambiguously standardised internationally, which is why the exact designation still depends on each manufacturer.

Generally, the harder leads are labelled with the letter H and the softer ones with the letter B. By placing a number in front of the letter it is possible to define various degrees of hardness. For instance, a 6H lead is harder than a 4H. FABER-CASTELL supplies its famous classic, the Castell 9000, in 16 degrees of hardness.

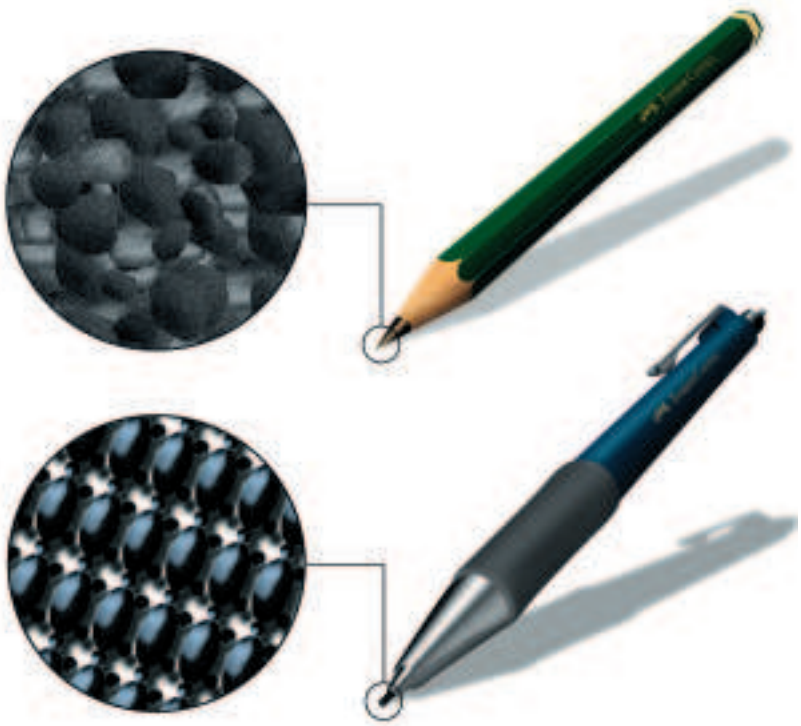
The more precise a drawing is intended to turn out, the harder the pencil ought to be.

Hardness designations:

B	=	Black	
H	=	Hard	
HB	=	Hard Black	= medium hard
F	=	Firm	

Degrees of hardness alternatively expressed in numbers: (as a "dual" system, i.e. the hardness degree designation is made up of letters and numbers)

1	2	2 1/2	3	4
(2B)	(B)	(HB)	(H)	(2H)



POLYMER LEADS

Just like the leads of wood-cased pencils, fine-point pencil leads contain graphite as the colourant ingredient.

Rather than clay (as in pencils) the binding agent is a carbon skeleton ("polymer skeleton"), which renders the leads more elastic. Therefore, a lead can be substantially thinner than a pencil lead with the same breaking strength. The polymer skeleton results from the heating of plastics or of the wood ingredient lignin.

The raw leads are impregnated with a grease/wax mixture, just like conventional pencil leads.

Heavy metals such as lead, cadmium and chrome are not used.

The leads of fine-point pencils are available in diameters of 0.35 mm, 0.5 mm, 0.7 mm, 1.0 mm and 1.4 mm.

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The advantages of polymer leads
Compared with pencil leads, polymer leads are more break-proof and can therefore be made significantly thinner. Sharpening is thus no longer necessary.

Polymer leads provide very good coverage and produce dark black, lush lines of uniform width.

Their stroke is soft and easily erasable.

COLOUR LEADS

Composition
Colour leads consist of
- Colour pigments
- Impregnating agents (greases, waxes)
- Binding agents
- Fillers

A special quality attribute of colour leads is the light-fastness of the applied colour. Their light-fastness is primarily determined by the quality of the colour pigments.

Binding agents give shape and strength to the lead. They are predominantly cellulose derivates similar to wallpaper paste.

The filler used is predominantly kaolin (porcelain clay), a mineral named after the Kaolin mountain in China.

The impregnating agents do not only increase the strength and gliding quality of the lead, but also ensure a uniform stroke laydown during writing and drawing.

Leads with a water-resistant stroke contain grease/wax mixtures as impregnating agents.

Wax emulsifier and/or surfactants are used to render leads water-paintable. Emulsifiers are substances that make the mixing of ingredients such as water and oil possible in the first place. Natural emulsifying agents include lecithin and emulsifiers made up of fatty acids.

Unlike pencil leads, colour pencil leads are not fired but dried only, as the sensitive pigments would be destroyed by the intense temperatures generated during the firing process.

POLYMER COLOUR LEADS

Polymer colour leads are also made from polymeric synthetics.

Like other colour leads they are not fired and therefore do not reach the high breaking strength values of the polymer fine-lead leads.

They are usually available in three standard colours (red, blue, green) and in 0.5 mm lead stroke width.

ENVIRONMENT AND WASTE DISPOSAL

German manufacturers of pencils and colour pencils do not use toxicologically dangerous heavy metals or heavy metal compounds in their products. Such heavy metals or heavy metal compounds could only find their way into those products as pigment impurities or through mineral raw materials.

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There would only be trace concentrations of these substances, well below the prescribed ambient standard. The use and waste disposal of wood-cased pencils is unproblematic as they are made of innocuous raw materials.

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PASTE-INK PENS

Liquid-ink writing instruments are defined as pens, where the writing fluid is transported via a feeder system to the tip and subsequently deposited onto the writing surface.

BALLPOINT PENS
ADVERTISING POSTER FROM THE 50'S

The different types of liquid writing media include highly viscous pastes, inks of lower viscosity and gels.

An ink feeder is either an absorptive reservoir or a storage receptacle with a pressure-compensating regulator.

These writing instruments also differ from each other in their writing tips: The tips are either equipped with a metal ball or a fibre or metal-clad plastic tip.

BALLPOINT PENS

Historical overview

Even before the turn of the 20th century several ideas had cropped up on how to simplify and decrease the cost of the unwieldy fountain pen by using a ballpoint tip. In 1910, Michael Baura from Munich obtained the earliest ballpoint pen patent for his "writing instrument with a rolling tip". However, the inventors at that time were not able to come up with a solution of the main problem, namely producing an appropriate ink.

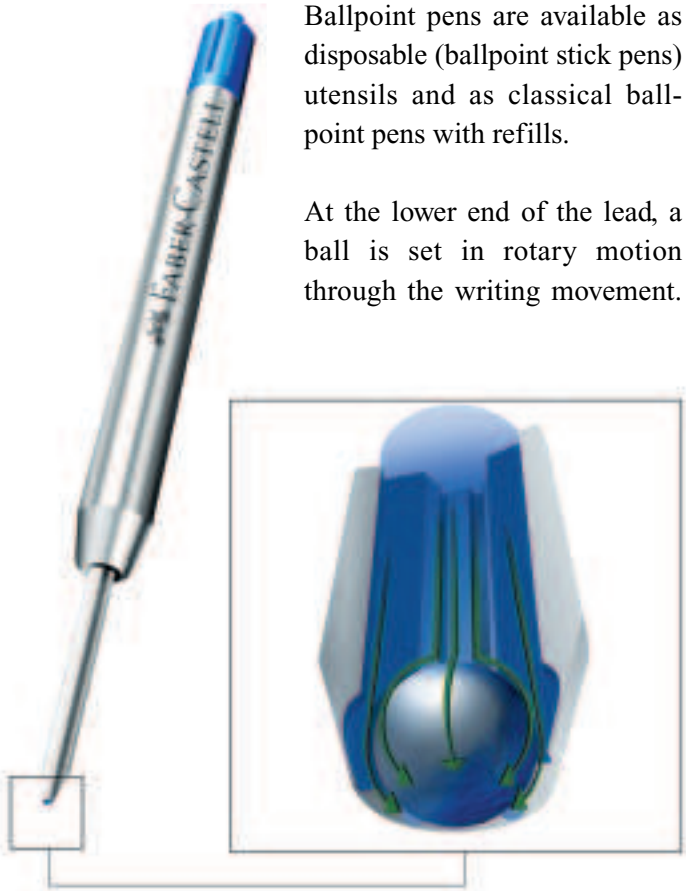
It was only in 1938 that the Hungarian Biró succeeded in manufacturing a suitable oil-based paste and register a patent for the ballpoint pen we know today.

In 1946, the ballpoint pen set off on its victory tour around the world from South America, where Biró had emigrated for political reasons. Today, far more than a billion ballpoint pens are manufactured each year.

Functional principle

Ballpoint pens are available as disposable (ballpoint stick pens) utensils and as classical ballpoint pens with refills.

At the lower end of the lead, a ball is set in rotary motion through the writing movement.



In doing so, it takes up paste from the lead and deposits it onto the paper.

Technical design
The barrels of ballpoint pens are made of either metal or plastic and usually contain a replaceable lead. The lead tubes are made of plastic (mostly transparent or coloured polypropylene) or brass (or nickel silver).

At the tip the ball rolls inside a ball socket and is supplied with the ink-paste via minuscule grooves (so-called paste channels). As the ball provides closure of the lead at the tip, no cap or other device is required to prevent the lead from drying out. Ballpoint pens are ready to write immediately after placing them on the paper.

Ball and ball socket are arranged in a highly precise fashion. Variations in the diameter of the ball must be less than a hundredth of a millimetre.

The lead is sealed at the upper end in order to prevent the paste from leaking.

Special leads exist, where the ink paste is pressed against the ball through overpressure. These leads can be used for writing in space or under water, and even for overhead writing.

The design of ballpoint pens allows them to be used with strong writing pressure and makes them ideal for filling in carbon copy forms.

Ballpoint pen ink pastes
The multi-coloured ballpoint pen ink pastes are highly viscous (thick like honey) solutions. They consist of synthetic dyestuffs, synthetic resins and organic solvents (e.g. phenoxy ethanol and propandiol).

TECHNICAL REQUIREMENTS FOR PASTE INKS AND LIQUID INKS

Indelible writing
The paste must be indelible (safe for archiving and forgery-proof) if the ballpoint pen is to be used in the various areas of official documentation and (cash) accounting. The indelible writing requirements also include light-fastness, so that legibility can be ensured in the long term.

Various international standards provide the basis for testing the indelible writing qualities of pastes and inks. (Ballpoint pen paste: ISO 127 57-2, Ballpoint pen liquid ink: ISO 14145-2)

In order to comply with these standards, the paste or ink must demonstrate unerasability, ethanol resistance, hydrochloric acid resistance, ammonia resistance, bleaching resistance, water resistance and light-fastness within prescribed test parameters as well as guarantee a certain writing behaviour. Only then can a paste or ink be called indelible (“document-proof”).

For the purpose of achieving this indelible writing status, certain highly resistant colourants (colour pigments or dyestuffs) can be admixed to the paste.

Refill leads bearing the ISO logo thus possess a high writing quality and are suitable for indelible writing purposes.

Water resistance
Lines are water-resistant if they remain visually close to unchanged and are not perceptibly

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dissolved after applying a water droplet.

The water resistance of the paste or ink is achieved by the use of water-resistant pigments or the addition of fixing resins.

ISO 12757-2 standard provides the basis for testing the water resistance of pastes and ISO 14145-2 for inks. Refill leads bearing the ISO logo are endorsed for indelible writing.

The advantages of the ballpoint pen

- The ballpoint pen retains a consistent length and is thus always comfortable when held in one's hand.
- Ballpoint pens do not need to be sharpened and thus maintain a consistent line width during writing.
- Ballpoint pens can be used with strong writing pressure, making them suitable for filling in carbon copy forms.
- The stroke of a ballpoint pen is in most cases indelible, i.e. it cannot be erased.
- Ballpoint pens boast a very long writing length.

GEL INK PENS

Historical overview

Although the "ballpoint pen with gel ink" technology dates back to 1993, it did not for a long time play a significant role in the international market.

However, consumers gradually discovered the benefits of gel ink pens, i.e. a pleasantly fluid writing action and substantial coverage even on dark paper. This, however, only applies to certain colours. Gel ink pens made it possible to write in gold and silver.

Functional principle

From a technical point of view, gel ink pens can be classified as a step between ballpoint pens and ink rollers. The secret of gel ink pens lies in their advantageous and special writing qualities: gel is a particular writing medium that combines the advantages of ballpoint pen ink pastes and roller ball inks.

During writing, the ball is set in rotary motion in the tip, just as with ballpoint pens. The rotating ball takes up gel from the lead tube and deposits it onto the paper.

A prerequisite for the gel ink pen's mode of operation is the fact that the writing gels liquefy (= decreased viscosity) under the influence of mechanical force, e.g. the ball's rotational motion during writing, and "resolidify" after the cessation of the mechanical force. (Thixotropy: derived from the Greek "thixomai" = I will touch, and "tropé" = change, metamorphosis)

Particularly attractive for the user are the metallic gels that are especially suited for strikingly effectual writing on dark paper.

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Technical design
The mechanical design of gel ink pens is very similar to a ballpoint pen.

The gel is generally located inside a cylindrical, mostly transparent plastic tube (the lead), which is also frequently housed in a transparent casing.

The lead is sealed towards the upper end by means of a silicon "piston-plug". This piston plug sits directly on top of the gel and moves down along the refill towards the tip at the same pace as the gel in front of it gets used up.

Thanks to the high viscosity of the gel, there is no need for a compensating regulator to ensure that the ball receives the correct quantity of gel at any given time.

Systems derived (with minor modifications) from the roller technology are preferred for use as the tip for gel ink pens. The roller tip is made of metal and able to withstand extreme loads, just like with standard ballpoint ink pens. It contains a "TC" (tungsten carbide) ball and provides a pleasantly smooth writing action. As with ballpoint pens, the diameter of the ball affects the stroke width and writing action.

Gel ink pens are available as disposable pens as well as with refills.

There are "cap-less" pens with a retractable system like that of ballpoint pens, or pens with clip-on caps.

Some gel ink pens have a special feature that prevents staining one's clothes when placing the pen inside a pocket. The retractable system responsible for moving the lead back into the barrel is actuated by lifting the clip slightly to insert the pen into one's pocket.

Advantages of the gel ink pen
Gel ink pens are available in many diverse colours. Most colours can be written on dark or even on very light-coloured surfaces. Some colours are also indelible.

Gel ink pens provide a smooth and pleasant writing action.

The gel does not run or spread even on absorptive paper.

The ink level is easily monitored through a transparent barrel and lead tube.

Most gel ink pens are refillable and thus represent a reusable writing utensil for environmentally aware purchasers!

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COMPARISON OF GEL INK PENS WITH BALLPOINT PENS

When compared with ballpoint pens, it can happen that gel ink pens do not immediately start to write and that they have to be "brought back to life" by a few vigorous strokes.

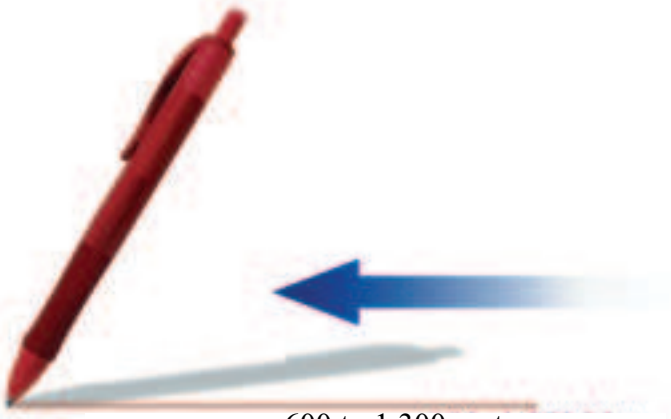
Due to their usually greater ball diameter, gel ink pens deposit more gel on paper than ballpoint pens lay down paste, which is why they need to be refilled much sooner.

The writing length of gel ink pens is therefore significantly shorter than that of ballpoint pens. (Ballpoint pens approx. 10,000 metres, gel ink pens approx. 600 to 1,300 metres depending on the ball diameter). It is recommended to advise customers of this aspect or even offer a spare refill at the time of purchase.

Writing length of a ballpoint pen

approx. 10,000 metres

Writing length of a gel ink pen



approx. 600 to 1,300 metres

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LIQUID-INK PENS

Liquid-ink based writing instruments use two different types of ink feed systems: The absorptive reservoir or storage system and the direct filling system, the latter also known as the "free-ink-system" or "direct-ink-system".

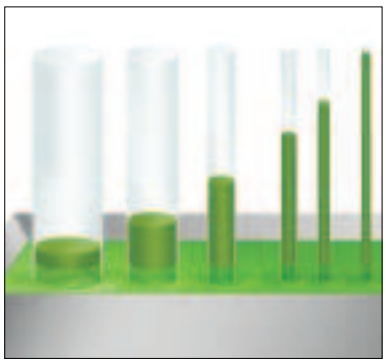
ABSORPTIVE RESERVOIR SYSTEM

Functional principle and technical design of the barrel
In an absorptive reservoir system, the barrel cavity is filled with an absorptive storage space (a "sponge"-like reservoir) containing the ink. Attached to this reservoir is a connecting wick, through which the ink is conveyed to the pen's tip.

The basis for the function of the absorptive reservoir system is the behaviour of fluids in narrow tubes, which is called the capillary effect.

This physical effect can be visualised by immersing tubes of varying diameter in a basin filled with a coloured liquid.

It becomes apparent that the fluid in the tube with the smaller diameter rises higher than in the tube with the larger diameter.



An absorptive reservoir made of synthetic fibres consists of a tube system storing the writing fluid. During the writing process, ink is continuously fed to the paper and since the narrower cavities in the tip cause a greater capillary effect than the larger ones inside the absorptive reservoir, there is a "suction effect" towards the tip.

Thus, upon coming into contact with the paper the ink is constantly redrawn, which explains why the ink flow of a fibre pen is almost never interrupted – even though the fibre tip is briskly moved along the absorbent paper.

Liquid-ink writing instruments with reservoir systems include all types of fibre pens, from children's products to fibre pens for artists, right through to marking pens and text highlighters.

Pen tips in absorptive reservoir systems
Various alternative designs are used in the tips of absorptive reservoir systems.

The stroke width of the pen is determined by the thickness and shaping of the wick. Fibre pens differ in their scope of application and resultant writing tips. Generally, for marking and painting purposes one uses wider tips than with products intended for writing.

The fibre tip:
For longer line widths of more than 0.5 mm the conventional fibre tip is used. This is made of adhesive-bonded fibres shaped into a tip. Fibre tips are mainly used in markers and felt-tip pens for children.

The extruded synthetic tip:
Where finer line widths of upwards of approximately 0.1 mm are desired, the conventional fibre tip cannot be used. Finer fibre tips would break off or kink during use. That is why an extruded synthetic tip is used, reinforced by a metal collar.

(e.g. the tip of the FABER-CASTELL Finepen 1511)

The roller tip:
From a technical point of view, it is the same tip as that of a ballpoint pen. It is used with ink rollers.

Today, the quick drying-out of the uncapped fibre tip is prevented by adding glycols, as they regulate the moisture content in the tip by absorbing moisture from the ambient air.

FIBRE PENS

Historical overview
The first Japanese-made fibre pens came onto the market in the late 50's/early 60's.

Several centuries ago, there were Japanese writing utensils made of a bamboo tube containing a fibrous wick, which fed ink to the writing tip.

The invention of the fibre pen was clearly influenced by the notion of connecting the brush directly with an ink reservoir in order to avoid constantly dipping it into the writing fluid.

To this end, the brush tip fibres needed to be joined together and consolidated in a fibre tip, as otherwise the ink flow to the tip could not be assured (capillary effect).

Thanks to its smooth gliding action on paper as well as the rich colour and luminous lustre of its ink, the fibre pen enjoyed

rapid and triumphant success around the world to the extent that today we could not imagine schools, nursery schools and children's rooms without them.

New variants of writing tips also meant an increased acceptance of this system in the office and home environment.

Functional principle
The tip of a fibre pen basically works like a wick immersed in a sponge-like reservoir.

In order to prevent drying out during periods of non-use, fibre pens and felt-tip pens are sealed with a cap.

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DIRECT FILLING SYSTEM

Functional principle and technical design
This system incorporates an ink feed mechanism, similar to that of fountain pens, which ensures that the ball receives as much ink as is needed for writing at a given time, by allowing the same amount of air back into the tank as the amount of ink released. The frequently clearly visible lamellae of the ink feed mechanism virtually double up as a buffer system, where the ink can accumulate when not required at the tip.

COMPARISON OF THE ABSORPTIVE RESERVOIR SYSTEM WITH THE DIRECT FILLING SYSTEM

Ink flow:
The direct filling system ensures a generally constant ink flow throughout the entire writing length. One of the disadvantages of the absorptive reservoir system is the fact that continuous writing becomes compromised in the course of its progressive depletion, as the ink requires increasingly more time to accumulate in the tip.

Ink fill quantity:
In direct filling systems the entire ink fill quantity is usable, while a reservoir system only utilises 80%.

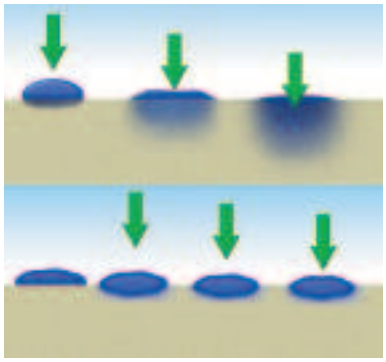
Ink level monitoring:
In most direct filling systems it is possible to monitor the ink level through a level viewing window. Reservoir systems do not allow any monitoring of the ink level.

Leaking of the cartridge due to pressure differences:
Direct filling systems are never completely filled, which is why, unlike in absorptive reservoir systems, there is the possibility for both ink and air to expand during changes in pressure (e.g. on an airplane) or temperature without leaking at the pen's tip.

COMPARISON OF INKS WITH GELS

In conventional fountain pen or ink roller inks, the dyes that make up the ink colour are entirely dissolved in a liquid.

Therefore the ink has a very low viscosity and penetrates paper quickly and easily, which in the case of some paper categories may result in the ink smudging or permeating the paper.



Unlike ink, most gel types contain pigments. (These are small coloured "granules".)

Due to their coarseness, pigments do not penetrate paper so easily and thus remain predomi-

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nantly on the paper surface. Smudging and/or permeating of the gel is thus generally not an issue.

Furthermore, pigments have the advantage of not colour-fading as readily as dyes when exposed to UV light – for the most part, they are more light-resistant.

Moreover, gels can also be lustrous, fluorescent or indelible.

Due to their higher viscosity gels have a stronger propensity for drop formation (blots or blobs) than inks.

The metallic ingredients of the metallic colour gels tend to sediment, i.e. they accumulate after extended "tip down" storage, resulting in a non-homogenous colour release.

INK ROLLERS

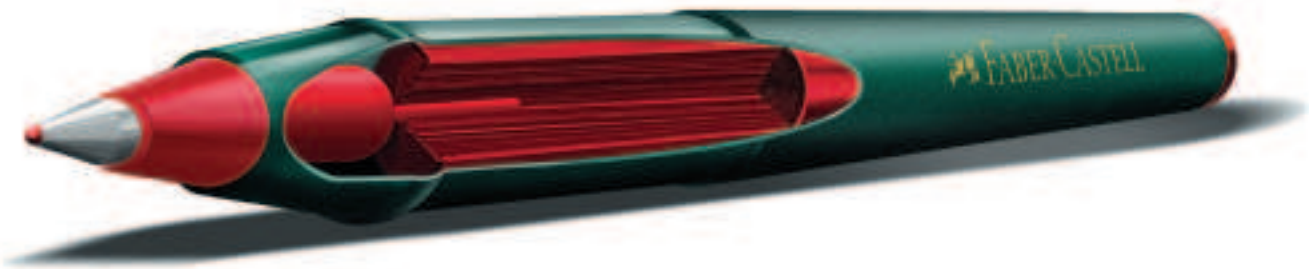
Historical overview
The ink roller was invented in Japan in the early 80's and was soon enthusiastically accepted by consumers due to their smooth sliding writing action.

Functional principle and technical design
From a technical point of view, the ink roller combines the advantages of the ballpoint pen and fountain pen. The roller tip is made of metal and able to withstand extreme loads, thus allowing intense writing pressure e.g. for carbon copies. At the same time, the even ink flow provides an agreeable writing action.

As the ink roller can dry out quickly, it is necessary to always recap it during non-use periods or to equip it with a cartridge-retracting mechanism that also seals the tip.

In addition, ink roller cartridges have a considerably shorter writing length than, for instance, ballpoint pens.

It is recommended to advise customers of this aspect or even offer a spare refill at the time of purchase.



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MARKERS AND HIGHLIGHTERS

DRY MARKERS

Dry markers look like colour pencils and are designed in the same way.

However, the leads contain luminous pigments, thus ensuring a particularly strong emphasis of the highlighted text.

Dry markers are sharpened just like normal colour pencils.

LIQUID MARKERS

Historical overview
As the felt-tip pen gained more and more acceptance, an increasing number of specialised product variants became part of the commercial assortment.

The consumer realised that fibre pens could be conveniently used to mark text passages in all kinds of publications.

The tip design and inks of the fibre pens were then adapted to various application purposes. The "Marker & Highlighter" was born.

As the name indicates, this product is better suited for marking rather than writing.

Functional principle and technical design
Liquid markers work according to the same physical principles as felt-tip pens.

For liquid markers, manufacturers also utilise the physical behaviour of fluids in narrow tubes, the capillary effect, by using a tip composed of a large number of polyamide or polyester fibres and thus creating thousands of capillary channels.

The casings and caps are made of aluminium or plastics (PP and PS).

The ink reservoir consists of a capillary reservoir (polypropylene fibres, polyester fibres or cellulose acetate).

Plastics such as polyethylene or polyester are used as materials for the tip.

The ink is water-based or based on organic solvents. In both systems, either colourants are dissolved (dyestuff inks) or pigments are dispersed (pigmented inks).

The filling quantity is up to approx. 7 g for some models.

At present, markers are available with 3 different ink types:
- Markers with xylene/toluene-based inks
- Markers with alcohol-based inks
- Markers with water-based inks.

Markers with xylene/toluene-based inks are principally used for outdoor application purposes, i.e. wherever weather-resistance is paramount. However, the drawback of these inks is that the two solvents xylene and toluene present a severe odour nuisance and are detrimental to people's health. For this reason, alcohol-based inks are also increasingly used for this application purpose, as they are almost odour-neutral and less harmful.

The safest markers are those with water-based inks, and they are also almost odour-neutral.

The tips of markers are frequently designed in such a way that it is possible to create strokes of different width, depending on which side of the tip is used.

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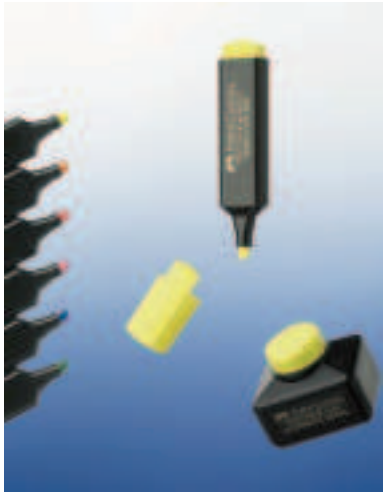
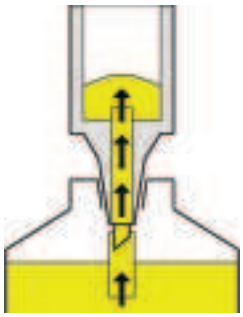
TEXT HIGHLIGHTERS

These are markers for brightly highlighting text passages. They can be universally used on all different types of paper.

The FABER-CASTELL Textliner 48 offers a particularly environmentally friendly refilling system that assists in significantly reducing plastics waste in large organisations.



After uncapping, the Textliner is inserted into specially designed ink-pot. The content (30 ml) is sufficient for at least 8 refills.



For the refill process, too, the capillary effect is utilised. The ink automatically rises from the ink-pot through the capillaries of the tip into the Textliner and can be used again soon afterwards. Overfilling the Textliner is not possible as it only accepts as much ink as has been depleted from its reservoir.

This procedure can be repeated about eight times before the Textliner must be replaced with a new one.

OHP MARKERS

Originally developed for writing on overhead transparencies, OHP markers (FABER-CASTELL Multimark) are enjoying increasing popularity as a pen for writing on all smooth surfaces.

The millions of CDs that are burnt and need to be labelled have especially boosted the demand for this type of pens.

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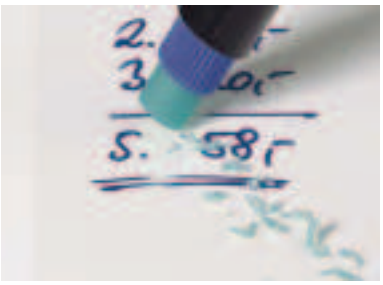
A special feature of the FABER-CASTELL Multimark is the green eraser at the top of the pen which erases anything that has been written with it.



The two different types of ink are non-permanent (can be wiped off with water) and permanent (water-resistant).

The non-permanent inks are water-based, while the permanent type is alcohol-based. The non-permanent inks are not as lightfast and therefore not suited for long-term documentation. They can be wiped off with a moist cloth.

Permanent, alcohol-based inks are more wipe-resistant. In recent times, permanent water-based inks have also been introduced. Synthetic resins that become water-resistant after drying are used as binding agents.

Water-based inks require the admixture of preservatives in order to prevent the growth of micro-organisms.

For the purpose of distinguishing between the two types, permanent pens have a black barrel and non-permanent pens a grey barrel.

FLIPCHART MARKERS

These markers are used for large-scale writing on flipcharts. The leading German manufacturers exclusively use water-based inks. Both dyestuffs and pigments are used as colourants.

WHITEBOARD MARKERS

Whiteboard markers are used on specially coated white boards or sheeting that can be wiped clean again with a dry cloth.

The most commonly used inks today are alcohol-based. In addition, there are also inks with a more intensive odour, that are made with esters (e.g. butyl acetate) and ketones. As of recent, water has also been used as a solvent. Pigments are used as colourants. Water-based inks are preserved in order to prevent micro-organisms from taking hold. Synthetic resins that become water-resistant after drying are used as binding agents.

Water-based inks do not penetrate through the paper, unlike alcohol-based inks!

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PAINT MARKERS

Paint markers are suited for water-resistant writing, painting and marking on nearly all materials.

They are predominantly used in the private domain (hobby, greeting & congratulatory cards etc.), but also in industry and in storage management (marking on dark backgrounds).

Essential ingredients
Paint markers contain a water-resistant ink with a high pigment content that provides a lacquer-like coverage. Metal powders are used as pigments to create gold and silver shades. Further components are water or organic solvents as well as binding agents.

Properties, quality attributes
Paint applications of paint markers dry quickly. The drying times depend on the quantity of applied paint, the surface and the solvent contained in the paint marker ink. Following the drying process, the applied paint becomes a wipe-resistant and water-resistant or permanent adhesion on many dark, transparent or smooth backgrounds like paper, cardboard, papermaché, wood, glass, stone, ceramics, plaster/gypsum, candles, metal, plastics, synthetics, cork and rubber. Paint markers are also heat-resistant. They provide very substantial coverage due to their high pigment content. The appearance of the writing is characterised by sharp outlines, and the light-fastness is very good. Paint markers are low in odour.

The ink consists of large, densely grouped pigment particles designed to achieve good coverage. Paint markers can therefore not be based on the capillary effect principle. Paint markers contain their ink directly inside the barrel and the ink flow is regulated via a valve system.

The paint is applied directly with the marker. No brushes or similar utensils are required. Valve system: Pressure on the tip opens a valve and releases ink from the tank (these models do not have an ink reservoir) to the tip, which is thus soaked from the inside through to the outside.

Valve system handling
Shake marker with cap closed prior to use, open cap, pump and begin to write on an absorbent surface to prevent blotting. Write until the tip is empty, prior to renewed pumping.

Environment and waste disposal
The waste disposal of empty paint markers should occur as with other hazardous waste or by returning them to the manufacturer. In most cases, it is just about impossible to remove stains on textiles.

Presentation, packaging
Paint markers are available in many colours as well as metallic colours and white, in different sizes and barrel diameters, with different tips (fine, medium, wide, calligraphy tips) for creating various stroke widths. They are available as disposable items as well as with a refill cartridge system. With many paint markers, foil seals guarantee the unused condition of the product. In many cases the writing tips are replaceable, even in disposable markers.

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TECHNICAL DRAWING INSTRUMENTS

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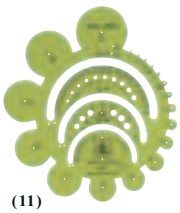
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Technical drawing is also referred to as the "language of sight". Language is our most important means of communication, but not always the most suitable when precise factual situations need to be expressed.

Technical drawing represents a "language" that can be learnt to illustrate objects, functions or arrangements unambiguously and clearly. On the basis of those drawings, the object can be reproduced at any time or tools be produced for manufacturing the object.

Admittedly, in the computer era, technical drawing does not play the same role as in the past. However, the rules for putting technical drawings on paper continue to apply today.

Paper (1) is the receiving medium for a sketch or a drawing.

The most important tool is the **pencil** or **fine-lead pencil (2)** in its various forms and grades of hardness. It is used to prepare the drawing.

The **eraser (3)** is used to delete (erase) what has been drawn.

The linear guidance of the pencil is attained with the help of the **ruler (4)**, which has a millimetre scale.

On a **drawing board (5)** the ruler ensures parallel guidance.

For drawing lines at certain angles **set squares (6)** are used. They are commonly available with 45° and 60°/30° angles.

A **goniometer (7)** should be part of the basic equipment for drawing any type of angle.

For drawing in exercise books, so-called **geometry set squares (8)** of various designs and sizes are available.

Circles, curves and segmentations are carried out with a solidly built pair of **compasses (9)**.

Ink drawing pens (10) serve to further develop and refine the pencil draft.

For drawing repetitive shapes **templates** and **stencils (11)** are used.

INK DRAWING PENS

Instruments for technical drawing and associated fields of activity include ink drawing pens, technical liner pens, draw-

ing inks, fine-lead pencils and clutch pencils, (special) erasers, drawing boards, drawing templates and set squares.

Historical overview

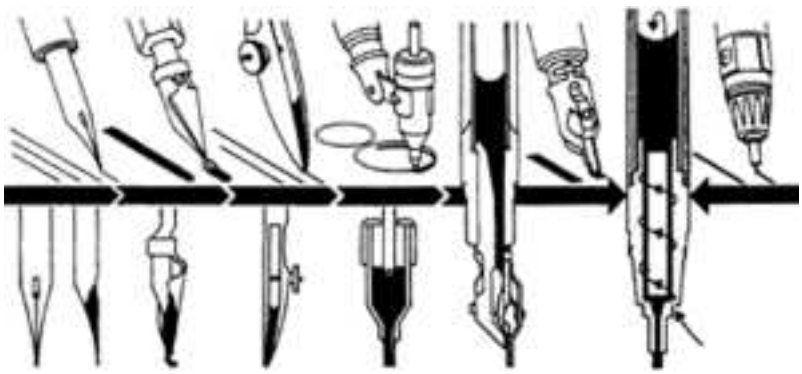
Drawing ink and associated writing utensils are ancient tools of humans for drawing or writing. Drawing ink was invented in ancient China as long as 5,000 years ago. It consisted of oil, soot, glue and various tinctures, but their exact composition was a strictly guarded secret.

The Chinese also invented the brush as a writing and drawing utensil. In our part of the world, following numerous developmental stages, the so-called "writing tube" (reed quill) was used until the early middle ages, a thin bamboo tube fashioned in the shape of the later feather quills and split at the tip.

It was only in the 17th century that the first slate-pencil-like shanks with attached steel nibs appeared, to be later replaced by the ruling pen for technical drawing. However, working with this drawing instrument had considerable disadvantages, especially for the inexperienced.

The by no means straightforward instilling of drops of ink between the tongues of the nib had to be frequently repeated during the drawing process.

The development of tubular writing instruments began in the 30's. The first stylographic ink pen with a tubular system was launched under the name of ink biro. The system was continually improved. Further developments and technical improvements eventually made it possible to fill the pen with drawing ink for technical drawing purposes.



Functional principle and technical design

These precision drawing utensils have a relatively complex design due to their various applications.

They essentially consist of plastics like PP, PE, ABS and POM.

The drawing tip casing, adjusting filament wire, wire weight and other parts critical for function and precision are made of metal.

Ink drawing pens are available with a refill reservoir or disposable refill cartridges.

Drawing inks ensure that drawings can be archived for long periods. In the case of water-based drawing ink, the light-fastness required for archival purposes is assured by appropriate pigments. (black: Carbon black)

The ink's adhesion to paper and foil/film is effected by shellac or synthetic binding agents. In addition, partly modified, low-viscosity gelatine is used to stabilise the pigments. The solvent used is water, to which polyhydric alcohols are added to ensure the ink drawing pen's functional readiness. Phenol is one of the substances used to preserve drawing inks.

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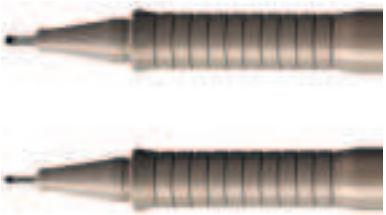
TECHNICAL LINER PENS

Technical liner pens are available for various line widths. The composition of technical liner pens is similar to that of the Fineliner and its inks.



DRAWING BOARDS

The classical drawing base for all types of technical drawings was the wooden drawing board in various standard formats.

A T-square was used as an aid when drawing on these boards. Adhesive strips were mainly used to fix the drawing paper on the board. Some manifest flaws of this utensil, which was considered old-fashioned by many, were always considered to be a nuisance, particularly for training purposes:

- Unwieldiness and heavy weight during transport
- Method of fixing the drawing paper
- Transport of the awkwardly shaped and bulky T-square

Soon after the war the idea was thus born to develop a lighter drawing board (A4) made of densified particle board, which allowed the paper to be fastened by a wooden strip with clamping screws instead of adhesive strips.

Advances in plastics engineering were accompanied by continuing developments of this principle, until the relatively primitive wooden board was transformed into a plastic version which did away with most of the board's drawbacks for the DIN A4 and DIN A3 formats.

Functional principle and technical design

Drawing boards allow the fixing of paper in such a way that it does not slip. Parallel sliding rulers as well as drafting heads with adjustable angles facilitate the precise drawing of parallel lines and angled lines.

Drawing boards must be torsion-proof and dimensionally stable in order to guarantee precise drawings.

They essentially consist of plastics (PS, PAN, POM, PA and others). Fittings and clamping components are also made of plastic.

The drawing surface is light-coloured, scratch-proof and resistant against compass punctures. Guide grooves and rails on all four sides enable the precise sliding of the parallel drafting arm with a single-handed lock and release mechanism for use during drawing.

Good sliding action between board and drafting arm ensure effortless handling and positioning.

Most drawing boards are made of impact-resistant plastic and are resistant against compass punctures.

The board size is designed in such a way that even untrimmed DIN formats can be used without any problems.

A releasable sheet tensioning rail and a sheet clamp facilitate the easy insertion and removal of drawing paper while ensuring

a secure and damage-free fit of the paper.

The dual guide design achieves a smooth, even gliding of the parallel ruler. Non-slip rubber feet ensure firm positioning on the work surface.

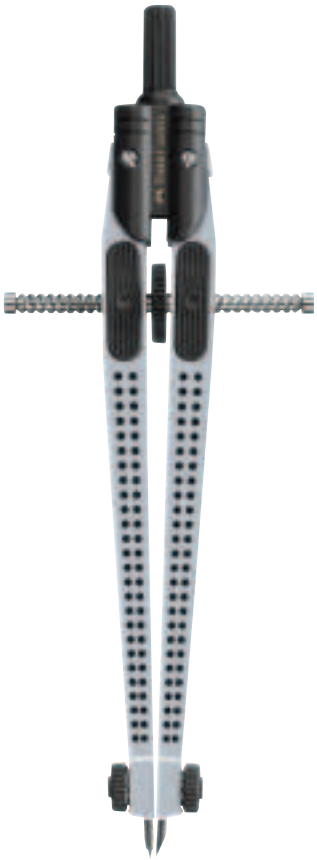
COMPASSES

Compasses have been known since antiquity as instruments for the accurate drawing of circles. They consist of two articulated legs of equal length which allow them to be spread open at various angles. The opening width determines the radius of the circle to be drawn.

Functional principle
Generally, one leg is equipped with a steel needle to be positioned on the centre point, while the other leg accommodates either an obliquely sharpened pencil lead or a technical drawing pen (attached via an adapter).

Most compasses are made of metal (die-cast aluminium). To guarantee performance capability and durability, the surfaces are varnished, nickel-plated or chrome-plated. Glass fibre reinforced plastics are increasingly used for the manufacture of smaller parts.

Important quality attributes include:



- Precise leg action free from play
- Smooth mechanism of the hinged legs
- Securely clamped lead and needle
- Surface protection against corrosion
- Specially designed accessories for functionally appropriate use

Compass head
The compass head allows the user to control the movement of the compass legs in a precise manner. Different design models are available. The most common ones are:
- Friction head system (standard)
- Spring-bow head system (conventional)

Explanatory notes regarding DIN standards
DIN standard 58502 distinguishes between 2 series of drawing & drafting instruments:

Series “S” standard drawing instruments for school use
- Extension neck diameter of 3.5 mm

Standard drawing instruments are designed in accordance with school purpose requirements in relation to performance, quality and durability. They differ from precision drawing instruments in their simpler construction.

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Series "P" precision drawing instruments for professional use

- Extension neck diameter of 4.0 mm (11.5 mm neck length)
- Extension neck diameter exception: 3.5 mm (8.5 mm neck length)

Precision drawing instruments are designed in accordance with the most stringent requirements in relation to performance, quality and durability and are thus predominantly suited for professional applications.

The use of the extension bar extends the operational radius by up to approx. 150 mm. The extension bar can be attached to all compasses with an extension neck diameter of 4 mm.

Compass needles

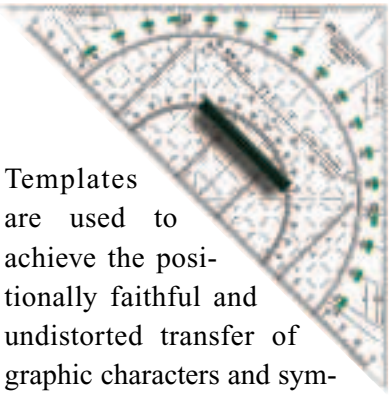
Depending on the size of the compass, thickness of the leg profiles and type of bushing, the needle diameters range from 1 to 2 mm. Irrespective of the thickness, there are essentially four model types.

Compass leads

With oblique or round tip; 20 mm long; Grade of hardness: 2H

TEMPLATES & STENCILS, RULERS, SET SQUARES

Templates & stencils, rulers, set squares are made from plastics, metals or wood.



Templates are used to achieve the positionally faithful and undistorted transfer of graphic characters and symbols onto a surface, usually with the aid of a technical drawing pen. They are generally made of PMMA, PP, PS and cellulose compounds.

In addition to rulers and set squares, there are trim rulers designed with steel edges.

DRAWING INK

Drawing inks are available in various compositions adapted to the respective drawing surface media (paper, foil etc.). The principal components are: water, carbon black and shellac. For technical drawing purposes, black drawing inks are predominantly used.

Their special properties are:

- high-contrast
- fast-drying
- water-resistant
- erasure-proof against lead pencil erasers (free of abrasive material)
- lightfast
- can be used in reprography

In addition to the above, colour inks and foil inks as well as etching inks for uncoated glass-clear foils are available.

DRAWING SURFACE MEDIA (PAPER, FOIL ETC.)

Drawing paper

The principal components of drawing paper are cellulose with additives such as glue, fillers and dyestuffs as well as water.

Drawing foil (polyester film)

Drawing foils generally consist of a glass-clear polyester carrier film, an adhesion promoter, a lacquer/pigment coating and a lacquer topcoat.

WRITING STENCILS

Writing stencils are important implements for writing and lettering on technical drawings in particular. The graphic charac-

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ters must have a high degree of precision and cleanness. International cooperation is on the increase in all areas of the economy. Companies are increasingly collaborating in various countries on the same projects. Therefore, technical drawings must be exchanged between organisations, as well as enlarged or reduced in size. Based on these requirements, an internationally standardised lettering type has been introduced. (The line width always corresponds to one tenth of the letter height.) The lettering DIN standard 6776 and the international ISO 3098 standard are identical these days.

Functional principle and technical design

Move the template parallel to the backrest or leading edge.

Guide the ink drawing pen to the edge profiles of the template.

Align and superimpose the letter, that precedes the next letter to be written, on top of the last written letter.

Change template from one line to the other, turn over.

The slot width and paper clearance of writing stencils is always designed to adapt to specific writing instruments.

Most of the supply of writing stencils is designed for the different line widths of technical drawing instruments.

Standards

The accuracy of fit, regardless of the brand, between template and technical drawing pen is regulated by standards:

DIN 6775

Drawing tip casings for technical drawing instruments, measurements/dimensions, labelling. This DIN standard also includes the colour-codes for technical drawing pens:

Colour	Stroke width
purple	0.13
red	0.18
white	0.25
yellow	0.35
brown	0.5
blue	0.7
orange	1.0
green	1.4
grey	2.0

DIN 6778

Writing stencils and drawing templates, measurements/dimensions, labelling.

Drawing templates

Drawing templates include frequently required symbols and signs from all areas of construction and drawing technology.

Complicated symbols are dissected into sequential single elements on the template and are equipped with auxiliary lines for exact positioning.

During drawing the symbol elements are reassembled by parallel shifting.

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Design and function
Drawing templates are generally designed for two types of writing instruments.

1. Clutch pencil (lead pencil), fine-lead pencil for preparatory drawing, the template must be placed flat.

2. Technical drawing pen for final drawings. The required paper clearance is due to the turning of the template on the knobbed side (only possible with symbols that can be represented homologously).

Set squares
Different designs of set squares are available for geometrical and technical drawing. The size of the set squares is expressed in cm (mm) as the hypotenuse length for right-angled squares and as the length of the long leg for acute angle squares.

ARCHITECT & ENGINEER SCALES

Architect & engineer scales are part of the indispensable equipment for technical drawing.

Architect & engineer scales facilitate the true-to-scale transfer of the dimensions of the object to be represented on the drawing paper. As the original items are mostly larger than the drawing format, the objects must be represented at a reduced size in a corresponding ratio.

Testing under polar and tropical conditions verified that FABER-CASTELL architect & engineer scales withstand even extreme heat and cold without dimensional variations.

Functional examples:
If the 10 cm long edge of an object is to be drawn at a 1 : 2 scale, the required line length is marked with the number 10 on the 1 : 2 scale of the architect scale, which corresponds at this reduction ratio to a drawing length of 5 cm (10 divided by 2).

Triangular architect & engineer scales are available in a variety of division combinations that meet the requirements of all professional fields.

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ERASERS

HISTORICAL OVERVIEW

The "first" eraser was most probably used by an Italian painter who advised his students in the 16th century to wipe out pencil strokes with bread. Then in 1770 the British naturalist Priestly pointed out that rubber (caoutchouc) cubes were ideally suited for erasing.

He thus called this substance "Indian Rubber". Although the "rubber" came from America, it was customary at the time to label everything coming from America as Indian and this inaccurate name remains with us today.

Rubber is still being referred to as Indian Rubber, however, the term has somewhat more credibility now, as the rubber comes from East Asia.

FUNCTIONAL PRINCIPLE

During the erasing motion, small particles (so-called "crumbs" or shavings) are abraded and fill up ("saturate") with graphite, thus effecting the cleaning process. Each erasing motion generates additional crumbs that detach the preceding ones and reinforce the cleaning action.

NATURAL RUBBER ERASERS

Material composition

The principal component of the natural rubber eraser are:

- Natural rubber
- Factice
- Sulphur
- Quartz powder and
- Fillers

Natural rubber

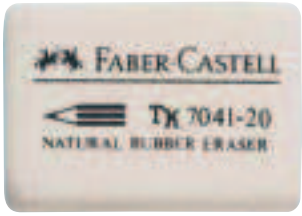
"Caoutchouc" is an Indian word which translates as "weeping tree". The eraser's principal ingredient was originally extracted from the latex milk (sap) of a tropical tree (Hevea brasiliensis) of the Amazon region as so-called "wild caoutchouc".

Since the end of the 19th century, this Brazilian tree has also been cultivated in Asia, where so-called plantation rubber is extracted in large plantations in a way that ensures the economical use of resources.

RED ERASER FOR PENCILS AND COLOUR PENCILS

These trees are grown as a renewable resource in large rubber plantations and regularly pruned for seven years, so that they can be used as mature trees for rubber extraction for a period of 13 years. After a total of 20 years, the "old trees" are processed as timber for the furniture industry.

The major producing countries in the East Asia region are Indonesia, Malaysia, Thailand and Sri Lanka.



WHITE ERASER FOR PENCILS

The rubber milk, which is called latex, is extracted by cutting V-shaped grooves into the bark of the tree. The latex milk is exuded in drops and collected in receptacles attached to the tree trunks. The yield is collected

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daily. The latex milk consists of one third of rubber, in which fat droplets deposit like cream at the top and separate from the latex serum.

Composition of latex
65–70 % water
25–30 % natural rubber
1–2 % protein
1 % minerals

COMBINATION ERASER FOR PENCILS, COLOUR PENCILS AND INK

The viscous rubber mass is sheeted out with great quantities of water, cleaned and pressed into large bales. The drying process of the latex crêpes is also accelerated by heat (open fire). This results in a darker colouring of the rubber mass.

Factice
Factice is a whitish-yellow substance extracted from rape-seed oil. Factice is the most important ingredient of the eraser, as it is the substance that absorbs the graphite (i. e. it is the erasing material).

Sulphur
By admixing sulphur and heating the mixture under pressure to 140–160° C, the kneadable and sticky rubber mass turns into an elastic material that is rubber. Through this process, also known as vulcanisation, the rubber is changed from a plastic to an elastic state.

Quartz powder
and other fillers such as chalk and pumice powder, depending on the eraser's application purpose.

Colour
of the eraser is determined by various colourants. Lithopone is used for white erasers, while red erasers contain Chinese vermilion or iron oxide and antimony red (antimony (V) sulphide). Additionally, ultramarine blue, zinc white (crude zinc oxide) and many others are used.

The eraser's hardness is determined by the mixing ratio of the various raw materials. A high factice content makes for soft erasers, while hard erasers contain a high proportion of sulphur and filler.

Soft erasers are used where the colour mark to be erased adheres only to the paper surface (pencil and colour pencil strokes). Hard erasers are used to remove strokes that have penetrated further into the paper. In this case an abrasive medium (e. g. quartz powder) is admixed to the rubber, enabling the eraser to scrape off a thin paper layer.

How to erase correctly
When cleaning large areas of graphite, particularly several lines of writing or areas filled with strokes, even the best eraser may begin to "smudge". This is due to the fact that an attempt was made to clean too fast and the eraser particles had to absorb too much graphite.

The eraser can fulfil its task only when the erasing motions are done in a way that there is a balanced proportion between the graphite-free and graphite-containing areas. The eraser must not be "oversaturated"!

Erasing parallel to the stroke: The area becomes unclean and the erasing process is needlessly delayed!

Erasing obliquely to the stroke: By employing this "piecemeal" erasing mode a rapid and impeccable cleaning result is achieved!

INCORRECT

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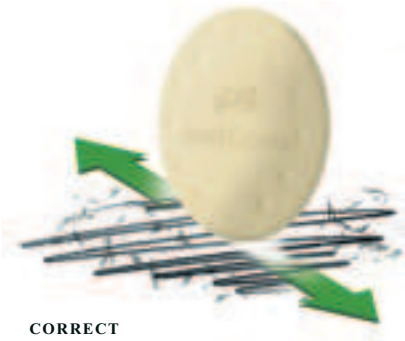

CORRECT

SYNTHETIC ERASERS

So-called plasticizers are admixed to the synthetic base material and thus provides these erasers with their erasing quality and rubber-like elasticity.

With products containing plasticizers there is a possibility of plasticizer migration.

This means: Through the direct contact of these products with other synthetics, the plasticizer is transferred to them.

To rule out this undesired effect, FABER-CASTELL synthetic erasers are sealed inside a cellophane wrapping.

Synthetic erasers are encased in a sleeve, so that they can be held more easily during use.

ERASER FOR CORRECTING ON INK AND OVERHEAD TRANSPARENCIES

ERASER FOR THE TECHNICAL OFFICE; FOR CORRECTING PENCIL LINES, PARTICULARLY FOR CLEANING UP DRAWINGS; INK LINES ARE NOT BRIGHTENED.

COMBINATION ERASER FOR CORRECTING INK AND PENCIL LINES; SOLVENTS ENCAPSULATED IN THE ERASER DETACH THE INK FROM THE DRAWING SURFACE. THE REMOVED INK IS ROLLED INTO THE ABRASION DUST.

The advantage of synthetic erasers is the large crumbly abrasion which does not tend to adhere to the drawing surface (paper), unlike the dust-like abrasion of natural rubber.

The strokes to be erased are "rolled up" into the abrasion without damaging the writing or drawing surface, and they are easily removed afterwards.

FIBRE GLASS ERASER TWIST PEN

Contains glass fibres as an erasing medium. Erases ink on tracing paper and removes minor rust stains; e.g. on cars and in the home.

STEEL ERASERS (ERASING KNIVES)

For precise, detailed correcting, particularly in the technical and graphic sector.

ERASER PENCILS

These wood-cased pencils are 175 mm long and contain a round eraser lead. A most practical application purpose is the pinpoint accuracy erasure of typewritten script.

NATURAL RUBBER ERASERS:
COMBINATION ERASER FOR PENCILS, COLOUR PENCILS AND INK

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SHARPENERS

Since pencil leads and colour pencil leads will wear in the course of being used and their radius will thus steadily increase, they need to be constantly re-sharpened to ensure precise drawing or legible writing.

Specialised sharpeners exist for the various types of pencils and leads, from the plain manual sharpener (with or without shavings receptacle) to sophisticated sharpening machines.

Manual sharpeners
They are used for sharpening wood-cased pencils and colour pencils. Manual sharpeners are made of plastic or light metal (magnesium) and are dimensioned to adapt to the miscellaneous diameters and pencil profiles.

Tub sharpeners
(= manual sharpeners with a shavings receptacle)
Tub sharpeners have proven very useful as appliances combining a sharpener with a small receptacle for shavings and lead dust. Due to their larger shape, they have the added advantage of being especially comfortable when held in one's hand.

Sharpening machines
Sharpening machines are ideally suited for conveniently sharpening larger quantities of wood-cased pencils Most have adjustable settings for different sharpening requirements. The pencil is held and inserted into the sharpener by means of a chuck mechanism; the actual sharpening action is achieved by manually rotating the handle. Many sharpening machines are equipped with a handscrew clamp which makes it possible to attach them to a desk.

The problem-free use of pencils and leads depends to a certain extent on the quality of the sharpener. For example, softer pencils and leads should be shaped into a somewhat blunter tip.

Blunted cutters and knives (manual sharpeners) wear out after a while and must be replaced without undue delay.

SHARPENERS FOR PENCILS AND COLOUR PENCILS

Pencil tip
When looking at a sharpened pencil, we see a long tapered tip. The tip can be used for writing or drawing fine lines for quite some time, until it becomes blunt and requires resharpening.

Being substantially softer, a colour pencil lead must be sharpened differently from a (harder) pencil lead. The tip of a brand new colour pencil initially appears to be just like a pencil tip. Only a closer inspection reveals a small additional tip. This is designed to prevent the lead from breaking while the product is being delivered to the customer. (Is used by FABER-CASTELL for the Polychromos and Albrecht Dürer artists' pens.)

Some colour pencil leads (e.g. pastel pencils) are so soft that a

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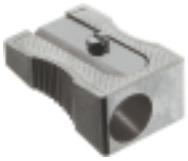
long conical tip would keep breaking off during use. Therefore, colour pencils are sharpened to a short conical tip.

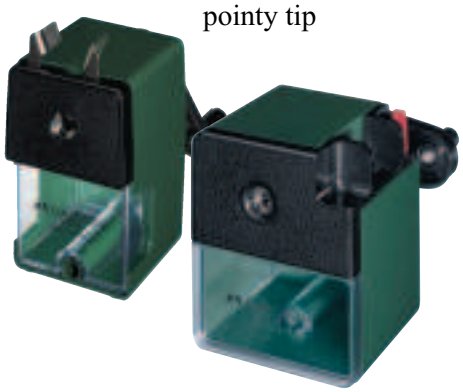
From a geometrical point of view, the short tip is stronger than the longer tip. In practice, however, this means more frequent resharpening.

- Single hole sharpeners for pencils



- Dual hole sharpeners for normal strength and thick pencils; up to Ø 10 mm dual hole sharpeners for colour pencils and special pencils

- Sharpening machine for pencils up to Ø 12 mm sharpening, selectable from blunt to pointy tip



SHARPENERS FOR LEADS

- Emery boards for universal sharpening (blunt, pointy, wedge-shaped) as well as for various lead diameters.

- Lead sharpeners for leads up to Ø 2 mm

- Lead sharpeners for leads up to Ø 2 mm and 3.15 mm, as well as with receptacle

- Lead sharpeners for clutch pencils up to a barrel diameter of 8.4 mm and 2 mm leads; Sharpening selectable for blunt or pointy tip

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FABER-CASTELL PRODUCT KNOWLEDGE 3

THE GOOD SALESPERSON 4

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THE GOOD SALESPERSON

THE GOOD SALESPERSON IN THE RETAIL TRADE

SHOPPING IN GERMANY

- Shopping is a far cry from the much-vaunted exhilarating **shopping experience**!
- Unfortunately and all too often shopping continues to be a **stressful experience**!
- The papers and magazines are awash with articles about the German "**service wasteland**".
- Increasingly, customers base their purchase decisions solely on **price** criteria.

THE TRADE IS FACING A DIFFICULT SITUATION

- **Profit margins are falling, while costs are on the rise.**
- Consumers demand an increasingly **higher standard** of product range and service.
- However, the trade's performance ability is weakened by **cost savings**.

THE TRADE OF THE FUTURE NEEDS ...

... *good salespeople*

THE TRADE OF THE FUTURE NEEDS:

- ☐ Brands and products enabling it to achieve the required **margins** and to get the edge on competitors.
- ☐ A fundamentally new mindset in relation to **customer service and quality of salesmanship**.
- ☐ Salespeople who are capable of selling products in accordance with **strategic requirements**.

ONLY 25% OF CUSTOMERS CHANGE ...

- … because **the product range does not appeal** to them.
- However, **75%** of customers changed their place of purchase because they were **not happy with the service**.
- **51%** of customers were dissatisfied with the **salesperson's product knowledge**.

THE ONLY INCONVENIENCE IS THE CUSTOMER!

Preconceived ideas:

- ☐ *Customers* never turn up when you need them.
- ☐ *Customers* never show up in sequence, but always at the same time.
- ☐ *Customers* know everything better.
- ☐ *Customers* never have time.
- ☐ *Customers* touch everything.
- ☐ *Customers* don't know what they want.
- ☐ *Customers* treat salespeople like servants.
- ☐ *Customers* always want to haggle.
- ☐ *Customers* are not loyal.
- ☐ *Customers* are ungrateful.

Customers are the only reason for the trade to exist!

WHO IS A GOOD SALESPERSON?

- Not the one who sells a lot, but the one who **sells the right stuff**!
- The salesperson who engenders a **bond between regular customers and the store**.
- The salesperson who is able to **provide assistance even in problematic cases** and stays in control.

WHAT MAKES A GOOD SALESPERSON?

- ☐ Enjoying one's occupation.
- ☐ Interest in human interaction.
- ☐ Interest in the customers' wishes.
- ☐ She/he loves his/her products.
- ☐ She/he to work prepared.
- ☐ She/he has sound arguments to put forward.
- ☐ She/he is self-confident without being arrogant.
- ☐ She/he has a good general education.
- ☐ She/he is well informed about the world and current affairs.
- ☐ She/he is polite without being servile.
- ☐ She/he knows the competition.
- ☐ She/he admits to making mistakes.
- ☐ She/he takes steps to further his/her knowledge and skills.

THE GOOD SALESPERSON OF TODAY IS A CONSULTING MANAGER

- The salesperson of today is no longer the "snake oil salesman" of yesteryear who **sold anything to everyone at any price**.
- She/he is the customer's "**consulting partner**", who assists the customer in reaching satisfactory outcomes.

SUCCESSFUL SELLING CAN BE LEARNED

It's just like in sports:

Learning by watching how successful people do it and following certain rules will lead to a better outcome and advancement to the professional league.

THE OBJECTIVE OF EVERY SALES TALK …

- … must be for the customer to eventually regard the merchandise **as more desirable than his/her money**!

- That is why a good salesperson must not only be of benefit to the purchaser (problem solving!), but must also **rouse the customer's emotions**. Pleasure and enjoyment are frequent and legitimate reasons to purchase.

THE GREETING

- ☐ The first six seconds of their initial encounter will decide whether two people **take a liking to each other** or not.
- ☐ Greet your customer **by name**, if known to you.
- ☐ Look the customer in the eyes and **smile**!

THE GOOD SALESPERSON KNOWS ...

... that she/he never serves a particular customer in isolation, even if she/he deals with only one person at that moment.

THAT PERSON HAS:

- ☐ a partner
- ☐ relatives
- ☐ acquaintances
- ☐ work colleagues

THE GOOD SALESPERSON DOESN'T JUST START TALKING AWAY!

- The good salesperson doesn't just start talking away, but **listens attentively** to what his/her customer has to say.

- She/he explains to the customer step by step, **why a particular product** is exactly the one to match the customer's expectations – just as a lawyer develops his/her arguments in the course of addressing the court.

THE GOOD SALESPERSON

"You see, as the customer, you are looking for … That is why I recommend for you to …"

- The good salesperson must convert the **product's advantages to customer-specific benefits**.

  The customer's wishes and the salesperson's arguments must interlock like a rack and pinion in the customer's mind. That is how the customer is guided to the right decision by way of his own wishes.

PHRASES THAT ARE NO LONGER UTTERED BY THE GOOD SALESPERSON

- ☐ **I don’t know.**
- ☐ **I can’t tell you.**
- ☐ **I don’t know when.**
- ☐ My **colleague** deals with that.
- ☐ That’s **useless**.
- ☐ I’m on my **break**.

THE GOOD SALESPERSON HAS A STRATEGY

This means that she/he first works out which product to present first and which items provide upward and downward evasive action with regard to pricing.

It is sometimes better to introduce the product that one really wants to sell … a little later in the process.

THE GOOD SALESPERSON SETS PERSONAL TARGETS

Setting targets is one of the secret recipes of success for many outstanding salespeople.

THE GOOD SALESPERSON SETS PERSONAL TARGETS …

- ☐ Today I shall sell the …
- ☐ This week I shall be selling …
- ☐ This month I will sell all those products that have been on the shelf for more than …

THE GOOD SALESPERSON'S INDIVIDUAL TASTE TAKES A LOW PROFILE ...

- ☐ She/he **accepts** that others have different experiences and priorities.
- ☐ She/he **won't get upset** when others don't share his/her views.
- ☐ She/he tries to convince by presenting **sound arguments**.

THE GOOD SALESPERSON ALWAYS MAKES POSITIVE STATEMENTS!

She/he doesn't say: "This item has a lengthy delivery deadline…"

She/he says: "There is such a great demand for this product that the manufacturer needs four weeks to supply the product at the usual quality standard."

THE GOOD SALESPERSON MAINTAINS A CUSTOMER FILE AND USES IT!

Customer file

NAME

ADDRESS

TELEPHONE (OFFICE HOURS)

DATE OF BIRTH

REMARKS

DATE OF PURCHASE

PURCHASE ITEM

THE SALESPERSON'S DEADLY SINS PART 1

- ☐ **Ignoring** the customer, when she/he enters the store.
- ☐ **Not listening** to what the customer wants.
- ☐ Pursuing **other activities** during the sales talk.
- ☐ Being **arrogant** and **pretending to know better**.
- ☐ Making **false statements** about the product.
- ☐ **Being unfamiliar** with the store.
- ☐ Only letting **one's own taste** prevail.
- ☐ **Shouting for one's colleague** for everyone in the shop to hear.
- ☐ Fouling one's **own nest**.

THE SALESPERSON'S DEADLY SINS PART 2

- ☐ **Arguing** with the customer.
- ☐ **Referring** the customer **elsewhere**.
- ☐ **Showing** the customer **too many** items.
- ☐ Addressing the customer by the **wrong name**.
- ☐ **Not knowing** which products are on display.
- ☐ **Not knowing the prices.**
- ☐ Allowing one's **stress** to have a bearing on the customer.
- ☐ **Rushing past the customer** without looking at him/her.
- ☐ **Not realising** when the customer wishes to make the purchase.

THE SALESPERSON'S DEADLY SINS PART 3

- ☐ **Rushing** the customer **from one shelf to the next**.
- ☐ **Not asking** the customer **whether she/he requires product accessories** (ink, paper, batteries etc.).
- ☐ **Badmouthing the competition.**
- ☐ **Making disparaging remarks** about particular product makes.
- ☐ **Forgetting about repairs.**
- ☐ **Lying** to the customer.
- ☐ **Not letting** the customer **touch** anything.
- ☐ Claiming that the customer **can't afford** the item.
- ☐ Saying **"It's knock-off time"**.

THE LORD FORGIVETH!

THE CUSTOMER NEVER DOES!

APPENDIX 5