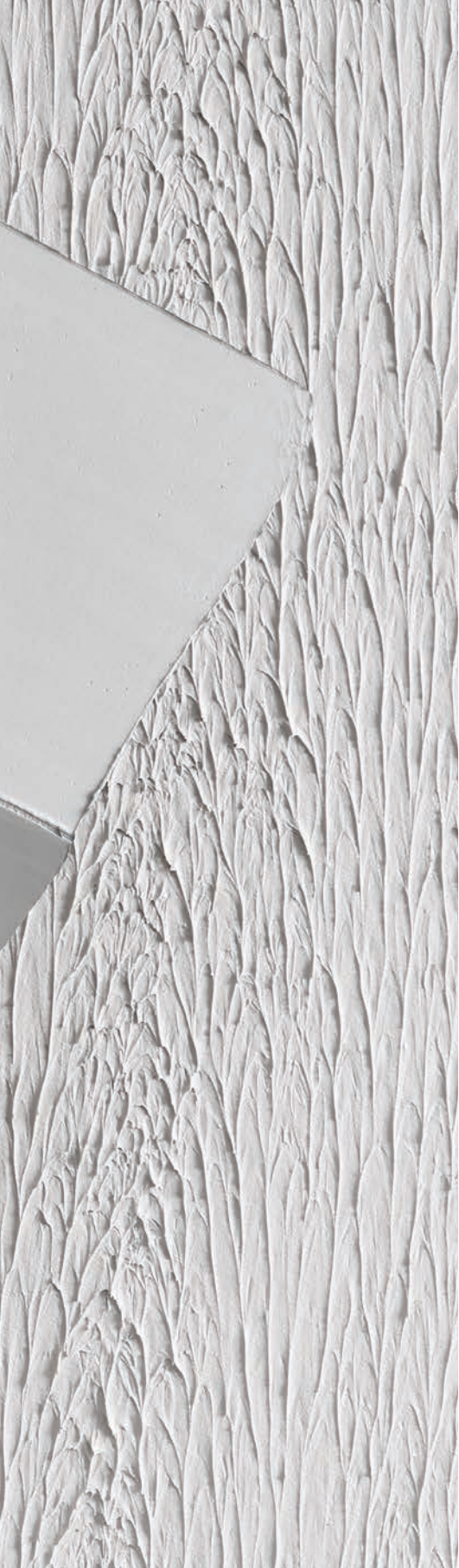


NICE & SMOOTH

A BOOK ABOUT FILLER AND FILLING

Dalapro



Nice & Smooth

A BOOK ABOUT FILLER AND APPLICATION

Many thanks to all employees, customers and suppliers for making it possible for us to produce this book.

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Nice & smooth – A book about filler and application

Whether you have a professional interest or just want to find out more about filler, there is a whole new world waiting to be discovered. Knowledge that will also benefit you in your day-to-day work. The aim of Nice & Smooth is that it will serve as a textbook and a reference with a special focus on filler and application.

This book is intended for those working in the decorating industry: perhaps as professional decorators, decorating consultants, project managers or sales representatives. It is also ideal to use this book in trade schools to educate new painters and decorators. We also believe that this book can add value for architects, specifiers, building engineers and other professional categories in the construction industry.

Nice & Smooth – A book about filler and application is for anyone who wants to expand their knowledge of filler from raw material to finished filler and how it is used. You do not need to read it from cover to cover. It is intended rather to serve as a manual.

Glanshammar, October 2020
Christian Hollsten
Business Development Manager

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Sand filler – a Swedish invention

Construction technology changed in the late 1940s. Brickwork and plaster were replaced by light concrete and concrete cast in situ. This saw the emergence of a need for a smoothing compound to even out differences in levels or different structures on or between different construction materials. It was one such compound, based on sea sand and cellulose adhesive, that the Swedish engineer Gustav Bristol Heijmer developed in the early 1950s. Ready-mixed filler had been invented. It was also during this period that Scanspac started to manufacture filler.

Modern ingredients but the same function

Nowadays we simply refer to it as filler. The sea sand and cellulose adhesive have long been replaced by more modern, environment-friendly filling and binding agents. But the purpose remains the same: to even out differences in levels and differences in structure on or between different construction materials. The filled surface must form a sound basis for the surface treatment of walls and ceilings, primarily indoors.

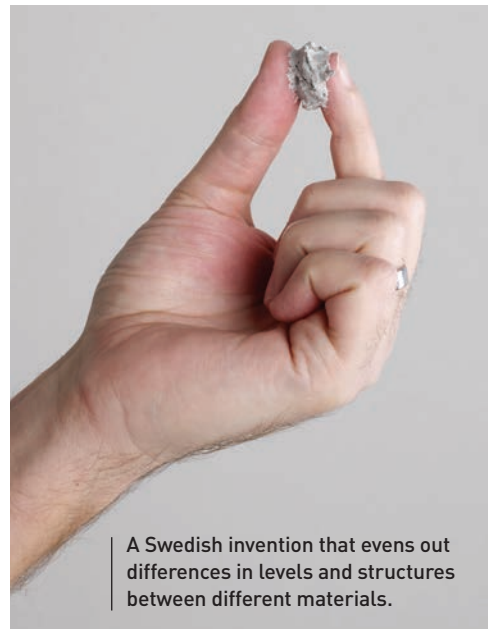
There are special products intended for wet rooms, woodwork and texturing. There are also coloured fillers that simply transform an uneven substrate into a smart decorative wall.

A product that awakens emotions

There are now many different kinds of

fillers, specially adapted for different substrates and work methods. And all the various manufacturers each have their own recipes. Which means that every single decorating firm or painter – both professionals and DIY-ers – can always find their favourites.

Before we come to descriptions of raw materials, properties and technical specifications, we can confirm that many decorators have an 'emotional' relationship with filler. And the experience is highly individual. A filler that one decorator loves working with can get a thumbs down from a colleague. So there are no hard and fast rules or accepted standards that define what the perfect filler should be like.



A Swedish invention that evens out differences in levels and structures between different materials.



Modern work methods such as spray filling appeared as long ago as the early 1960s. But back then lightweight filler had not been invented, and the equipment was much heavier than it is today. It took two people to pour filler from the 30-litre barrel into the spray equipment – a lifting weight of around 50 kilos. In those days the painting crew could have up to six decorators on the same project. Nowadays its more common to have two or three decorators on a project.



Milestones in our history



- 1951** Gustav Bristol Heijmer invents ready-mixed filler.
- 1955** Filler production starts in Sala, using sand as a raw material.
- 1957** Filler production starts in Ludvika (Dala Kemiska Fabrik).
- 1965** A new factory is built in Glanshammar, and filler production starts. The sand is replaced by dolomite.
- 1982** The very first lightweight filler, Dalaspack X, is launched.
- 1983** The Ernström Group acquires Dala Kemiska Fabrik from the Eriksson family.
- 1992** The first sprayable lightweight filler is launched, called Dala Lightning.
- 1992** Roll filler is launched.
- 1993** The product name Dalapro is launched.
- 1999** Merger between Scanspac in Sala and Dalaspac in Glanshammar. Scanspac AB is formed.
- 2007** Saint-Gobain acquires Scanspac AB.
- 2009** Scanspac launches its first product bearing the Nordic Ecolabel.
- 2014** Dalapro Nova is launched.
- 2016** Scanspac AB becomes Saint-Gobain Sweden AB together with Gyproc, Weber and ISOVER.
- 2018** Dalapro's products are given a new packaging design and new recipes.
- 2018** System filler for Habito and X-Ray plasterboard are launched.
- 2019** Dalapro's products have EPDs (Environmental Product Declarations).

About Dalapro and Saint-Gobain

Dalapro® The Dalapro brand is part of Saint-Gobain Sweden AB together with Gyproc, ISOVER and Weber.

Dalapro leads the development of filler in Europe, and we work continuously on innovations in order to develop the next generation of systems for the surface treatment of walls and ceilings.

Sustainability, a guiding principle in all our work

Within Saint-Gobain Sweden AB, we work continuously and systematically to ensure that all parts of our business, from the transportation of raw materials to deliveries of products and services to customers, shall maintain the highest

possible quality, offer the best possible work environment and have the least possible environmental impact. This is why both of our manufacturing units are climate-neutral, i.e. fossil-free, and we are working unswervingly on:

- ▶ Research and development of materials and solutions.
- ▶ Reducing the climate impact of products throughout their life cycle.
- ▶ Offering systems and products that meet current and future requirements.
- ▶ Developing entire product systems that produce a good end result for both decorators and end users.

Do you want to find out more about us? Take a look at dalapro.com



Saint-Gobain was founded in 1665. The company's first assignment was to manufacture glass for the Palace of Versailles near Paris. The company is now one of the world's leading suppliers of construction materials, with operations in around 70 countries.

We spend 90% of our time indoors. So it is important that our buildings are designed for the people who will be spending time in them. Saint-Gobain contributes knowledge and solutions for environments in which people are happy and healthy.



Developed for professional decorators

When we develop and manufacture Dalapro products, we take all kinds of environmental matters extremely seriously: climate impact, the indoor environment and – not least of all – your work environment.

We want to contribute with functional, environment-friendly and user-friendly products and packaging for all professional decorators who work with our products. For example, we were the first to launch lightweight spray filler in the early 1980s, light spray and roller filler in the 1990s, and in the 2000s we were one of the first to offer the market Nordic Ecolabelled filler products.

The quality is high and consistent to produce the best results – every time. Apart from hand filler, roller filler and spray filler for all kinds of substrates and environments, you will find accessories such as corner beads, other special products and tools in our product range.

At dalapro.com you can access content including product information, certificates, environmental documentation and instruction films for our filler products, as well as product data sheets that you can download.

You can recognize the packaging from Dalapro by the special decorative pattern that looks like a sweep of filler. And each product family has a unique colour, making them easy to identify.





Make use of our knowledge

Of course we know a lot about how to manufacture good filler. We also know a lot about how to apply and process the filler in the best possible way. Furthermore, we can offer advice about suitable filler qualities for different kinds of jobs.

This is why we are occasionally hired by decorating contractors, paint wholesalers, decorating consultants, building planners and architects. It might involve complicated, large-scale filling jobs, specific requirements for surface structures or other advice relating to the filler in construction.

We also participate as experts in industry bodies that issue recommendations for the treatment of wall surfaces.





Get in touch!

Do you work in the field of decorating and construction, prescriptive bodies, distribution or vocational education? Feel free to contact our technicians with any questions you may have.

Or drop a line to info@dalapro.com

On our website, dalapro.com, there are also Tips & Advice with everything from information about products and filling methods to calculating consumption and aids such as the Best Finish app.

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-  [dalapro.com/youtube](https://www.youtube.com/dalapro.com/youtube)



What filler contains

This section is about the raw materials and the manufacturing process. Producing good filler that meets our customers' expectations requires knowledge, precision and quality at all levels. Just like the decorator's work.



Many benefits of ready-mixed

Filler can be divided into two main types: ready-mixed filler and powder filler.

Ready-mixed filler, which has many benefits compared with powder filler, is used the most in Northern Europe and North America.

Powder filler requires you to add water to the powder and work it into a smooth, even paste before application. It is time consuming and fairly dirty work, as powder filler generates dust. It also requires precision to make sure that every mixture has the correct properties.

As powder filler is used relatively little in Sweden, in this book we will primarily be dealing with ready-mixed filler.

Raw materials

Ready-mixed filler can contain 10–20 different raw materials, and each component is carefully considered in order to contribute to the product's special properties. Each manufacturer generally has several different kinds of filler, each with a unique recipe. The raw materials can be divided into a few main groups:

- ▶ Filling agent
- ▶ Solvent (water)
- ▶ Binder
- ▶ Thickener
- ▶ Additive

You can read about the different ingredients on the following pages.

There are many benefits of working with ready-mixed filler. You can use hand, roller or spray filler. And you only use just as much as you need.

Raw materials

The main purpose of the filler is to fill joints, cavities and other uneven surfaces in the surface of the substrate. It is logical to state that the filling agent is the dominant raw material in all filler. The filling agent contributes important properties:

- ▶ high filling performance, i.e. minimal shrinkage/sagging
- ▶ workability
- ▶ colour

Lighter weight with microspheres

In a traditional (heavy) filler, the filling agent constitutes about 70% of the weight. Normal sea sand was used in the past.

Nowadays crushed, milled dolomite is the most common raw material, although limestone, chalk and clay are also used.

Light filler was introduced during the 1980s, a product in which the ground dolomite was wholly or partly replaced by small, microscopic, hollow spheres, known as microspheres. The low density creates a product with a weight that is around 30–50% lighter and is good from an ergonomic perspective, as it is easier to both lift and apply.

Let's take a close look at two of the most common filler materials: ground dolomite and expanded perlite.



The filling agent in the filler contributes to a high filling performance and good workability.



Dolomite is a mineral that can be found all over the world. It is crushed and ground for use in the production of filler.

Ground dolomite

Dolomite is a crystalline mineral that is found primarily in sedimentary layers in the form of dolomite rock and dolomite marble, and can be found all over the world. In Sweden, it is extracted in locations including Tistbrottet in Västmanland County and Björka in Örebro County.

Dolomite is a very useful filling agent. It is used not only in filler, but also in the manufacturing of plastic, paint, glass and mineral wool. Both dolomite and limestone are often sold under the designation of limestone, and there will often be no differentiation between the two minerals. And in many industrial applications the difference is of no or very little importance. But when it comes to use in a decorating filler, crushed and milled dolomite, also known as ground dolomite, is preferable as it is harder than limestone. The particles in the ground dolomite have an angular shape, with dimensions of between approximately 0.003 and

0.3 millimetres. The density is approximately 2.85 kilos per cubic decimetre.

Expanded perlite

Perlite is a natural volcanic glass material. It has a high water content that causes it to expand like popcorn up to 20 times its original volume if you heat up the raw stone quickly to approximately 900 °C. When the water evaporates, small bubbles are formed in the material, making it extremely light.

Expanded perlite has a bulk density of approximately 100 kilos per cubic metre, compared with approximately 1,100 kilos per cubic metre before expansion. In the course of this process, the raw material is transformed from being grey/black into a glistening white.

Common areas of application include as a light filler for the construction industry and as insulation material. Expanded perlite is also used in plant cultivation to aerate the soil.



A microscope is an excellent tool for the analysis of raw materials and products, formulation and development work.

Solvent

Many chemical products contain solvents. As a general rule, the solvent brings together two important properties: dissolving other substances and evaporating quickly at room temperature.

When it comes to solvents for decorating products, they are often associated with substances that are harmful to health and must be handled with great caution. Filler, however, is a water-based product, i.e. water is used as a solvent.

Water from different origins has different character and quality, which is important for its usability. When manufacturing wet ready-mix filler, the most important consideration is that the water is free of contaminants and has a low microorganism content. Otherwise, there is a risk of mould developing while it is being stored.

Binder

To bind together the main components in filler, you need what is known as a binder.

The most common binder is polymer latex (acrylate, styrene acrylate, polyvinyl acetate, etc.). This can also be supplemented by the use of alkyd, lime and alkali silicate. Cellulose derivatives used in thickeners are also used to some extent as binders.

Thickener

The consistency of a product is important for ensuring that it has the right workability. Two terms used to describe a product's consistency are viscosity and rheology. Viscosity defines the ease of flow at a given set of conditions, whereas rheology describes how that flowability changes under varying conditions.

Common thickeners are cellulose derivatives, water-swellable clays and acrylate thickeners.

The combination of several thickeners gives each recipe its own special feel – often adapted to how the product is to be applied, for example by hand, or using a roller or spray.



There are strict demands on the product's adhesive properties. We monitor the quality by means of precise tests.



Advanced instruments provide information about the product's working properties and are very important for being able to give the product the right feel.

Additives

In addition to the basic raw materials we mentioned before (filler, solvent, binder and thickener), a number of other additives are also needed in order that the filler will meet the demands made of it. An additive is a chemical substance that is added in a small amounts, making it possible to customize the product's properties.

Here are a few examples of additives:

- ▶ Defoamer – reduces air content during manufacturing.
- ▶ pH regulator – makes sure that the desired pH level is achieved.
- ▶ Film former – makes the binder harden at low temperatures.

- ▶ Pigment – provides the desired shade and covering performance.
- ▶ Wetting agent – helps to moisten every single particle during the blending process.
- ▶ Dispersant – counteracts so-called agglomerating (formation of lumps).
- ▶ Preservative – prevents microbiological growth while in the packaging.
- ▶ Anti-mould agent – long-term protection against mould in the finished (dried) layer of filler.

Our filler manufacturing process

The main raw material, dolomite, is extracted in mines and then processed in a crushing plant, where it is crushed,

ground and sifted into various particle sizes. The ground dolomite is then transported to the filler factory, where it is stored in silos. Other raw materials, such as other filling agents and binders, are delivered to the factory by truck and are first checked before being emptied into silos or tanks. The raw materials are blended in what is known as a disperser. This consists of a large vessel in which a paddle moves around, working together with a screw to force the mass down and around, while at the same time a dissolver, i.e. a rotating disc with sharp blades, disperses the mixture to create an even consistency.

The recipe decides. The computer controls

The manufacturing process is largely automated. The raw material dosage is controlled by a pre-programmed recipe and all doses are logged in a database for traceability. The order of dosage and mixing time are controlled entirely by the recipe.

After a mixing time of around 30 minutes, the filler is ready.

A touch of craftsmanship

Each batch is checked for a number of parameters, depending on the product's specification.

Viscosity, dry matter content, density and pH level are examples of values that are defined in advance and must be approved at quality control before a batch can be allowed to proceed in the process. When it is finally approved, the filler is emptied into a collection vessel (tub), from where it is pumped out and filled into packaging containers.

In-house production lines

Each type of packaging, bucket, sack or tube, will as a rule have its own production line. The most common packaging items

for professional use are 15 litre bags and 10 or 15 litre buckets. For DIY consumers, 1–5 litre buckets and 200–400 ml tubes are the most common options.

Each item of packaging is marked with a batch number, which makes it possible to trace the manufacturing date, production line, test data from quality control, dosing parameters, raw material information, etc. After being marked, the filled packages are loaded onto pallets with the aid of robots.

Wear-resistant, sealed packaging

There are also strict demands on the packaging. From a user perspective, it is important that all packages are easy to handle. The buckets must withstand the weight from the packages placed on top of them during transport and storage. And no air must be allowed to escape through the lid.

The final step of the production process is that the pallets bearing the finished filler are wrapped in plastic and moved to a finished goods warehouse.

Quality at all levels

There are strict demands on filler and the quality must be consistent. This can only be achieved through extensive work on quality.

To be able to monitor the quality over the lifetime of a product, a reference sample is also saved from each batch for twelve months. Random samples are taken from these to check that the filler is stable when stored and that it has not been contaminated, i.e. affected by microbiological growth. Microbiological growth can cause discolorations, odor, or degradation of performance to occur in the package. Tests are conducted on the products continuously to make sure that they correspond to specifications, authority requirements and the customer's preferences.



Manufacturing and environmental work at Dalapro

Buildings must be healthy not only for those working on their construction, but also for the people who live and work there. And naturally with minimal impact on our shared environment.

Climate impact

We strive continuously to ensure that our products will have as little impact as possible on our shared environment. The aim is that the environmental impact of the products shall be as little as possible throughout the entire life cycle.

Dalapro filler is manufactured under the auspices of the ISO 14001 environmental management system. This involves us working to map our environmental impact and to follow up on this with action and improvements. We maintain a keen focus on environmentally smart choices of raw materials, efficient energy utilisation and making sure that as far as possible we minimise volumes of spillage and waste.

Fossil Free Sweden

Scanspac has been a member of Fossil Free Sweden since 2018. This means that we – and all other actors involved in the initiative – share the perception that the world must become fossil-free and that Sweden must lead the way in this work.

Through this declaration, we also commit ourselves to being able to present tangible measures for reduced emissions. One example of measures we have

undertaken is that we have converted our production plants to be totally fossil-free. This means that the heating and operation of the machinery in our plants take place exclusively using renewable sources of energy such as the sun, wind, water and biofuel.

EPD

Life cycle analyses enable us to assess the climate impact of our products throughout their entire life cycle. In 2019 we launched our first EPDs (Environmental Product Declarations) onto the market. These are effective tools that we also use internally in order to identify and work with those environmental improvements that have the biggest impact.

Nordic Ecolabel

To further enhance our environmental work, we work with the Nordic Swan Ecolabel. This label represents proof that our products contain low levels of substances harmful to the environment and health, have low emissions to air, and are efficient and meet tough functional requirements.



An EPD (Environmental Product Declaration) reports the results of a product's environmental impact throughout its entire life cycle. Reporting takes place in different phases, most commonly

phases A1 to A4. An EPD allows you to determine the environmental impact of a product in carbon dioxide equivalents per kilo of product used.

- A1:** Assesses the climate impact that takes place in connection with extraction of raw materials.
- A2:** Transport to our factory.
- A3:** Presents the report of the climate impact from our manufacturing of the products.
- A4:** Estimates the climate impact from transport to the construction site where the product will be installed.

All of our EPDs are third-party verified by an independent expert and comply with industry standards.

You can find our EPDs on our websites, dalapro.com and epd-norge.no



Are you working on a project that has to be certified in accordance with the Sweden Green Building Council's rating, BREEAM-SE, LEED or the Nordic Ecolabel? Go to Saint-Gobain Sweden AB's website hallbartbyggande.se for help in finding products and solutions that can contribute points in the different certification systems. This is also where we have compiled all the documentation required as evidence in the different criteria.



Products

In this section you can read about, among other things, different kinds of filler, what you should demand of a good filler and about complete system solutions that exist for different types of work. We also offer advice about when, how and why you should choose filler with certain properties.

What is required of a good filler?

Filler has different properties depending on which raw materials are used in manufacturing and in which proportions they are mixed. So there is no universal filler that suits all materials and

High, consistent quality

For professional users in particular, it is important that the filler's properties are always the same. Ready-mixed filler maintains high, consistent quality and is ready to use straight from the packaging.

Workability

The filler must be easy to apply and spread to provide the best ergonomic performance and efficiency. It must have internal resistance that is low, but not too low. Scientists and researchers talk about rheology. Decorators tend instead to use expressions like 'workable', 'buttery' and 'body'. Whatever you call it, this is a very important property.

For spray filler there are also demands for sprayability, i.e. the filler must be easy to pump.

Open time

It is important that the filler has a sufficiently long 'open time' for smoothing. If the filler starts to 'set' (dry) during application, there is a risk of bad adhesion to the paper tape, for example. If the filler tends to dry too quickly on the surface,

substrates. It is therefore important that you select a filler that is adapted for the substrate, for example plaster, concrete, wallpaper or fabric.

it will be difficult to achieve a satisfying end result. A longer open time increases the drying time a little, but there is less waste.

Filling capacity

An effective filler fills well, i.e. it shrinks as little as possible. This is an important property in a filler.

Sandability

Filler must be easy to sand, while at the same time it must not be scratched by the sandpaper. The dust must fall quickly to the floor and not swirl around in the air.

Adhesion

The filler must adhere well to most kinds of substrates, ideally without the need for any special preparation like for example priming.

Strength

The dried filler must provide a stable substrate for further processing. It must not absorb too much or be dampened by subsequent filling, wallpapering or painting.



DID YOU KNOW?

The average decorator is able to: fill 250 square metres a day by hand, or apply 400 square metres of roller filler a day, or apply 500–1,000 square metres of spray filler a day.



A good filler must have many good properties. These include good filling performance and being easy to work with.

Drying time

Once the filler is in place, it must dry quickly without cracking. The drying time varies, depending on factors such as layer thickness, temperature, humidity and absorption in the substrate.

Light weight

Filler is often applied at an inconvenient working height – high up on ceilings and low down on walls. Bags or buckets also have to be transported to and within the construction site. Light weight makes this work easier and eases the load on both back and shoulders. In a longer perspective, lighter weight also means reduced transport costs and environmental impact.

Whiteness (covering performance)

Filled surfaces that represent the final treatment, usually structured surfaces, must cover the substrate, conceal any differences in shade and be perceived as “white”.

Environmental impact

The environmental impact of the filler throughout its entire life cycle – from manufacturing and application to its period in use and destruction – must be as little as possible.

Packaging

You may not think the packaging is also important. In addition to being easy to carry, a good package needs to be easy to empty, easy to recycle and have the least possible environmental impact.

Good packaging must also be airtight and easy to reseal in order to give the filler good durability and also to enable it to withstand knocks and bumps.

Price

It might be tempting to choose a low-cost filler. But watch out! Buying cheap can be expensive!

Ultimately, it is the grand total of all costs that counts = TIC (Total Install Cost), i.e. the total cost of products and labour. So choose a filler that improves productivity in order to improve overall costs.

Choosing a filler that is adapted to the substrate and an application method that is best suited to the projects size will produce the most cost efficient filling job.



Good packaging is easy to handle and protects the contents.

Filler recommendations in Sweden

As a substrate specialist, you naturally want to see the best possible end result. There are a few different legal texts and industry council recommendations available to offer assistance.

AMA Hus is the construction bible and the basis of everything in the field of building construction. Its contents include rules and various processing regulations in the area of decorating. AMA Hus refers to YBG for execution.

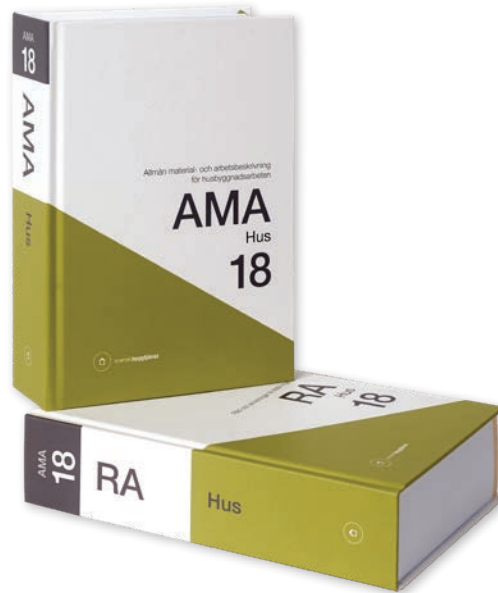
RA Hus, which includes advice and guidelines for decorating jobs, is currently the most important book when it comes to describing decorating.

Målarmästarens referensytor (The master decorator's reference surfaces) is a guide that shows what the end result should be and allows the contractor to decide which treatments are to be performed.

YBG Branschråd (YBG Industry Council) is a partnership between filler, paint and plasterboard producers who have worked together to produce descriptions of how the work is to be carried out. YBG stands for Yrkesmässig Behandling av Gipsskivor (Professional Processing of Plasterboard). Documents are distributed to the association's members and can also be downloaded at ybg.nu

YBG class (quality classes)

There are four quality classes in Sweden, Q1-Q4.



Remember to follow your local regulations on how to finish plasterboards and concrete. Below you will find the most common standards in Europe.

- ▶ VOB – Tyskland Vergabe- und Vertragsordnung für Bauleistungen
- ▶ BS - British Standards
- ▶ ÖNORM - Austrian Standards International – Österreichische Norm
- ▶ Swiss Norm – Schweiz Norm
- ▶ WTCB – Belgien Scientific Technical Center for the Building Industry

TIP

You can use the Best Finish app to see how important it is to use the right filler to avoid visible joints. It also shows how durable corners are if you use corner beads and high-quality filler. dalapro.com/best-finish

The most common construction materials today are plasterboard combined with concrete.

It is a common misconception that plasterboards are perfectly smooth, but unfortunately they are not. So make sure you adapt the preparatory treatment according to the conditions that apply for your particular project. And keep in mind that the jointing paper tape is only there to reinforce the filler in the joint, and not to hold an entire building in place.



Apply a layer of filler on top of the tape immediately after mounting the paper tape, so that the tape has the same drying process on the front and back. Allow to dry.



When filling joints in plaster you should check that the plaster has been applied in accordance with YBG's instructions and directives. Always document deviations and inform the plasterer of any measures before you start filling.



The second application of joint filler should be at least 25 cm wide. Allow to dry.



Fill the entire joint with filler approved for paper tape in accordance with EN-13963.



The third application of joint filler (for a Q3 class surface) should be at least 35 cm wide. Allow to dry.



Place the paper tape in the damp filler, avoid pressing too hard on the tape as you then risk pressing down the filler behind the tape, resulting in blisters and leaks...



To achieve Q4 class, the whole surface must be fine smoothed with a minimum layer thickness of 1 mm.

The most common types of filler

In the past, filler was divided into groups based on grain size: fine filler, medium filler and coarse filler.

Fine filler was a fine-grade, smooth filler that was suitable for the final filling process when you needed a premium end result.

Medium filler was a mix of fine- and medium-grade filler that met the requirements of an all-round filler.

Coarse filler was coarse-grade and was not suitable as a finished surface. The name still exists to some extent, but the product has been improved. Nowadays, a coarse filler is a filler that fills particularly well and works as a surface finisher that leaves a ready-to-paint surface.

Filler also used to be divided into groups based on density: light, semi and heavy. The density varies, depending on raw materials, dolomite and microspheres. This breakdown is also used nowadays, although the trend is moving towards light fillers, i.e. products that weigh 1–1.2 kilos per litre. Lightweight fillers have several benefits. They contribute to better workplace ergonomics, have better performance and offer benefits during transportation, storage and handling.

Hand, roller and spray filler

Nowadays we divide filler into three groups: hand filler, roller filler and spray filler. Within these categories there are different kinds that are suitable for different substrates, application methods,

surface size to be filled and required end finish.

These are the different variants of filler:

- ▶ dust-reducing
- ▶ easy-to-sand
- ▶ white
- ▶ grey
- ▶ light grey
- ▶ blue, i.e. wet room filler
- ▶ low shrinkage
- ▶ all-round
- ▶ special filler for woodwork, outdoors, joints, corner beads.

Which filler should you choose?

All filler qualities have EN code 13963 or 15824. This provides a guideline on which filler you should use for each application.

EN-13963 is a filler that is approved for use in plasterboard joints together with a paper tape, but also for installing corner beads of the Habito type. EN-15824 is normally only used for the thin smoothing of ceilings and walls, but is also excellent for texturing ceilings.

Select the filler on the basis of which final surface you want. If walls and ceilings will be exposed to a lot of raking light, to avoid flashing joints it is usually necessary to apply a thin smoothing to the whole surface.

The same applies if walls or ceilings are to be painted with a high gloss paint in a darker shade.



DID YOU KNOW?

Filler is available in different colours. But the colour has nothing to do with its function, area of application or quality, apart from in wet room filler, where the colour denotes its use for wet rooms. In Scandinavia we often use grey filler, while in the rest of Europe they mostly use white filler.

Powder filler



In the Nordic region we usually use ready-mixed filler. But in the rest of Europe they still mainly use powder filler.

Powder filler can be divided into two categories: air-drying and chemically hardening products. Air-drying products often have a drying time of 4–8 hours, and self-hardening products have hardening times from 5 to 90 minutes.

It is useful to use chemically hardening products if you have to fill several times on one day so that you can paint the next day. Certain powder products are also approved for paper tape in accordance with EN-13963. This makes it easier when you have to fill plaster-board joints.

When using powder products, it is important to follow the supplier's recommendations when it comes to preparation and mixing conditions, otherwise there can be problems such as poor adhesion. Dalapro's powder fillers, known as DM products, are chemically hardening and available with hardening times of 20, 40 and 60 minutes. They are also reinforced with extra binders that provide very good adhesion to the substrate.

FIRST AID

Repair holes in plasterboard walls with plasterboard patches and Dalapro DM powder filler. Smaller holes can be repaired with powder filler only.



Wall adhesive

When you have to hang wallpaper, it is important to choose the right adhesive that is suitable for the material.

The Swedish Wallpaper Industries' Council (STB) has produced a standard and a label to help you choose the right product for different kinds of paper-based wallpapers and wet room wallpapers. You will find the label on the adhesive's packaging.

Help to choose the right type of adhesive

	Dalapro® Allround	Dalapro® Extra	Dalapro® Hydro	Dalapro® Wallpaper
Wallpapers	●		●	●
Fibreglass fabric	●	●	●	
Fibreglass-free fabric	●	●	●	
Textile	●	●	●	
Paper	●		●	●
Vinyl wallpapers		●		
Wet rooms			●	
Extra strong		●		
White	●	●	●	
Transparent				●
Nordic Ecolabelled	●	●		●

Paper-based wallpapers are divided into the following groups:

- ▶ Paper wallpapers
- ▶ Structured vinyl wallpapers
- ▶ Structured acrylic wallpapers
- ▶ Smooth vinyl wallpapers
- ▶ Textile wallpapers

Four products

The Dalapro product range has four adhesive products of professional quality, produced with a focus on user-friendliness and a perfect end result with smooth surfaces.

Dalapro Allround Adhesive is a Nordic Ecolabelled all-round wall adhesive for paper and non-woven wallpaper, fine-structured glass fibre and CP fabric.

Dalapro Wallpaper Adhesive is a Nordic Ecolabelled, water-based starch adhesive for paper wallpapers and wallpapers made of acrylic or vinyl with a paper reverse side.

Dalapro Extra Adhesive is a Nordic Ecolabelled, water-based starch adhesive for glass fibre fabric, jute fabric, textile structure and vinyl wallpapers with a paper reverse side.

Dalapro Hydro Adhesive for wet rooms is a water-based starch adhesive for glass fibre fabric, vinyl wallpapers with polyester, glass fibre or fabric reverse side up to 0.6 millimetres.




Reinforce for smooth surfaces

Sometimes you need to reinforce in order to create smooth surfaces in ceilings or walls. In this case you use a reinforcement covering that is used primarily for the reinforcement of filled and plastered walls and ceilings indoors. Glue the reinforcement covering to the dry, solid and cleaned surface.

Dalapro's Dalatex reinforcement covering is glass fibre-free fabric manufactured in soft cellulose/polyester fibres to make it gentle on the skin and airways, easy to work with, and create a dust-free work environment. The result is a hard, even and uniform surface that is easy to process. Follow YBG's instructions with regard to the mounting of fabric/reinforcement covering.

Systems

Here is an example of a system taken from the Dalapro product range and other manufacturers within our Saint-Gobain Group.

Durable corners and joints		
	CORNERS	JOINTS
For installing paper tape and corner beads		
Accessories		
Tools		
Second and third filling. Also for thin smoothing.		



Feature filler with unique properties in Saint-Gobain systems

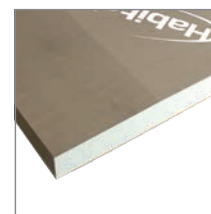


Extra strong walls

In certain environments it is a requirement that walls can withstand particularly strong loads, for example in pre-schools, schools, hospitals or homes.

Gyproc Habito® is a complete internal wall system with revolutionary fixability

and durability. You can fix things to a Habito wall using a standard wood screw without plugs or expanders. The Habito screw is specifically designed for mounting the Habito board on steel studs, which is only important to make installation of the Habito board easy and robust.



Habito plasterboard



Habito screw



Habito filler

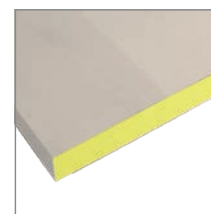


Habito corner beads and joint tape

Protection against X-rays

In hospitals, dental clinics and at veterinarians, protection is required from X-ray radiation in certain areas.

Gyproc X-Ray Protection consists of a lead-free X-ray protection panel which, combined with Promix® X-Ray Protection hand filler, constitutes a system that provides protection against X-rays and CT scanners.



X-ray protection panel



Promix X-Ray Protection filler

Withstands moist environments

In certain environments where there is major wear or where there is a risk of moisture or mould, for example indoor swimming pools, car parks and stores,

special solutions are required. Aquaroc is a system that meets these requirements. It consists of Aquaroc™ Cement Board and Promix® Hydro, which is a special filler for wet rooms.



Aquaroc™ Cement Board



Promix Hydro filler

Choose the right filler and adhesive

- Good choice
- For the best results

	Dalapro® Nova	Dalapro® Max Plus	Dalapro® Joint	Dalapro® Premium	Dalapro® Hydro	Dalapro® Airless Nova	Dalapro® Airless Spray
Ready-mixed filler	●	●	●	●	●	●	●
Powder filler							
Adhesive							
Sealant							
For plasterboard	●	●	●	●	●	●	●
For concrete	●	●	●	●	●	●	●
For fabric and wallpaper	●	●		●	●		
Woodwork							
Wet rooms					●		
Surfaces outdoors							
Corner bead and joint	●		●	●	●	●	
Approved for paper tape	●		●	●	●	●	
Repair filler							
Low shrinkage		●		●			
White				●		●	●
Grey	●	●	●				
Transparent							
Nordic Ecolabelled	●	●	●	●		●	●
Hand	●	●	●	●	●		
Roller	●	●	●	●	●		
Spray	●	●	●	●	●	●	●

Choosing the right filler based on the substrate and desired outcome can produce major benefits in the form of time, ergonomics and costs. Compared with hand filling, roller filling offers a time saving of 40% and spray filling more than 50%. Both filling and sanding processes are faster, as it is

much easier to sand a completely filled surface evenly. If you fill the joint twice and then end with thin smoothing once, as a rule it uses only 0.2 litres of extra filler per square metre compared with filling the joint three times – which requires 0.3 litres per square metre.

	Dalapro® S	Dalapro® Deco	Dalapro® Wood Finish	Dalapro® Facade	Dalapro® Habito Joint	Dalapro® DM	Dalapro® Allround Adhesive	Dalapro® Extra Adhesive	Dalapro® Hydro Adhesive	Dalapro® Wallpaper Adhesive	Dalapro® Flex
Ready-mixed filler	●	●	●	●	●						
Powder filler						●					
Adhesive							●	●	●	●	
Sealant											●
For plasterboard	●	●			●	●	●	●	●	●	●
For concrete	●	●		●	●	●	●	●	●	●	●
For fabric and wallpaper		●				●	●	●	●	●	●
Woodwork			●								●
Wet rooms								●			
Surfaces outdoors		●		●							
Corner bead and joint					●						
Approved for paper tape					●	●					
Repair filler				●		●					
Low shrinkage						●					
White	●	●	●			●	●	●	●		●
Grey				●	●						
Transparent										●	
Nordic Ecolabelled					●		●	●		●	
Hand		●	●	●	●	●	●	●	●	●	●
Roller							●	●	●	●	
Spray	●						●	●	●	●	



Mechanisation is becoming increasingly common. Filler is delivered in bigger packaging, spray equipment is connected directly to a 500-litre filler box and application is performed by a robot. Automatic application will be introduced first of all in the prefab industry. It will then become a reality at a new construction site near you.

The filler of the future

The development of filler is affected by the demands and preferences of decorators, laws, regulations and environmental impact. These demands are also affecting the packaging of the future, for example, buckets and bags made of recycled plastic, fibre-reinforced plastic or plastic from the sea.

The most common preferences from professional users are better filling performance, i.e. less shrinkage and sagging, improved workability and short drying time, lighter weight and minimisation of airborne dust.

There is also an interest in products with unique properties adapted for joint tape, wet rooms, mineral substrates and feature fillers that not only smooth the surface, but also offer additional functions in the form of fire protection, acoustic properties and thermal properties.

Better ergonomics and higher efficiency

The choice of application method is determined by the surface you have to fill, the type of filler and how many square metres are to be filled, as well as the availability of surfaces during new construction or renovation.

Traditionally, hand filling has been a major feature of the decorator's everyday life, but that is a method that is both outdated and ergonomically unfavourable. Developments have therefore been driven towards more efficient working methods. Roller filling, which is one of the latest, innovative filler solutions of the modern



age, is a method of applying filler to the wall that is both ergonomic and efficient. Spray application will presumably become much more common in the future, particularly in large construction or renovation projects. It is the most efficient and ergonomic work method, compared to hand or roller filling. The equipment will probably also become both lighter and easier to use.

The filler of the future will be more than just a smoothing product. It will be able to offer aesthetics, comfort and safety. The question is not whether – but when – the filler and application methods of the future will be introduced.

Filling

In this chapter you can read about topics including the most common tools and accessories, preparation work, choosing fillers for different substrates and about different filling methods and application methods. You will also pick up tips on how to create fine, smooth corners. But first of all, a section about your work environment.



Work environment

Filler is a fairly harmless product, and in all products from Dalapro we use water as a solvent. But it can still present certain problems if you work with filler. Not the least if you are a professional decorator and spend a lot of your working time filling, spraying and smoothing, you should make sure that you protect yourself in order to avoid occupational injuries.

Better ergonomics

Filling is one of the heaviest job that you will perform as a decorator. So it is important to use methods that make the work easier.

One method that has seen tremendous growth in recent years is roller application. It not only speeds up the filling process, it also makes the job of filling more ergonomic compared with hand filling. Studies report a time gain of at least 30–40%. Furthermore, nowadays most of Dalapro's products are light-weight filler, which means that the filler itself is 30–40% lighter than the filler of previous generations.

Protect yourself against sanding dust

When you have finished filling, the walls will of course have to be sanded. For this, you can use a sanding machine with accompanying vacuum cleaner. It reduces the volume of airborne dust and leaves the surface virtually dust free. This is precisely why it is presumably the most widely used method of sanding at present. Always check the filter in the vacuum

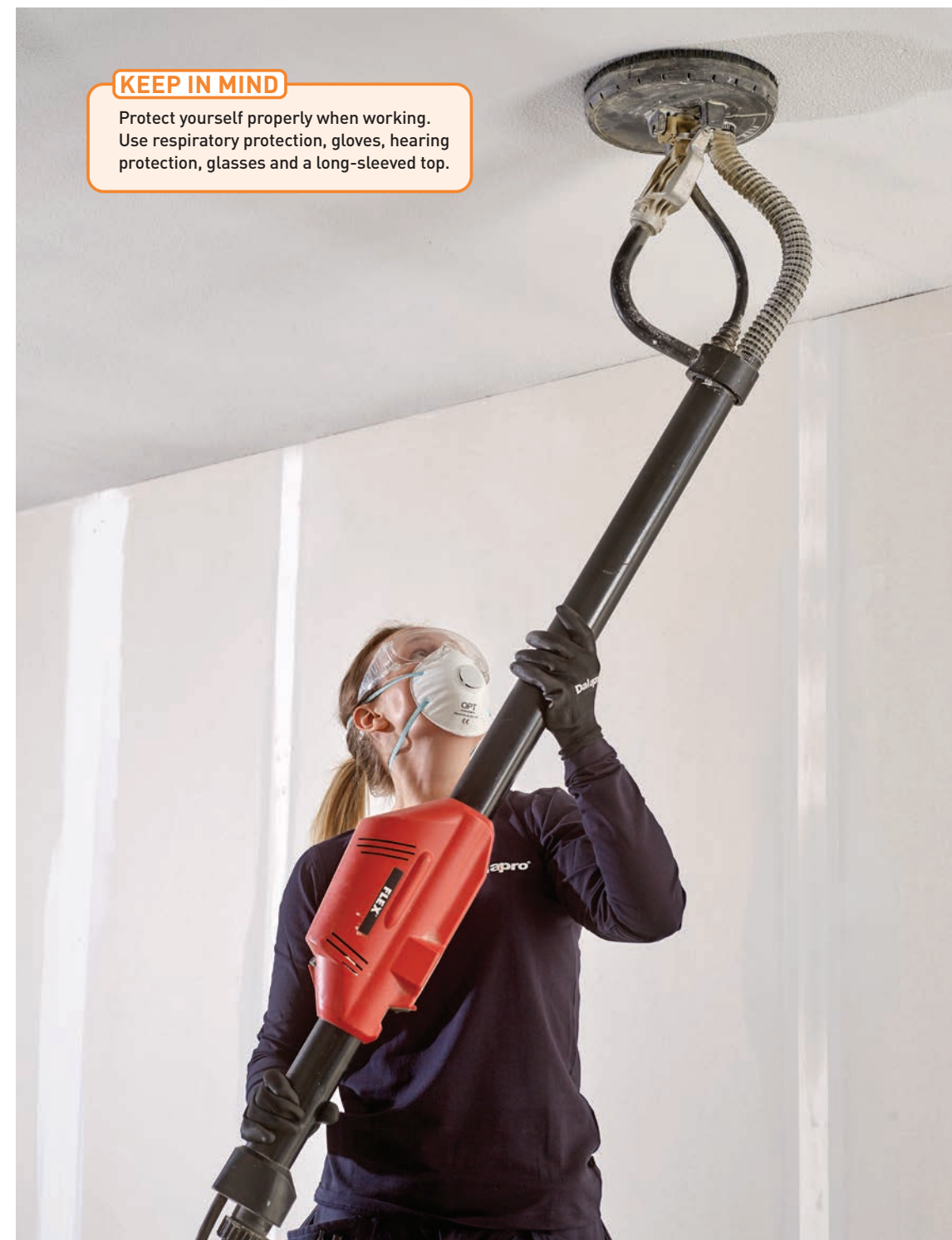
cleaner to make sure that it is suitable for sanding filler. Keep in mind that a more fine-grained sandpaper produces less dust and also a finer end result. Adapt the speed of the sanding machine so that you do not risk polishing the filler instead, which is often the outcome when you have used too high a speed and sandpaper that is too coarse.

Causes dry skin

Filler has a pH value of around 9 and therefore causes dry skin. The preservative contained in the filler can be allergenic. So avoid direct skin contact and use full-body clothing and protective gloves when working on filling jobs.

Remember hearing protectors

When you are spraying filler and using a sanding machine, this always generates a certain amount of noise. Make sure you use hearing protectors that are suitable for the purpose and also glasses, for example if you are sanding above eye level. Always follow the recommendations for the specific process you have to perform.



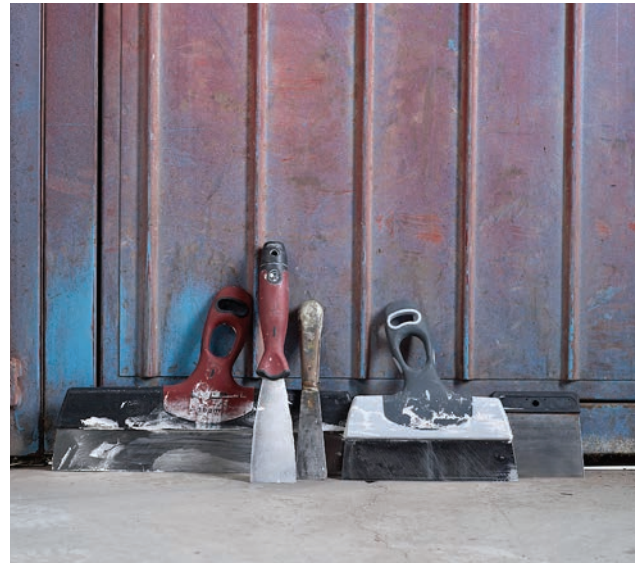
KEEP IN MIND

Protect yourself properly when working. Use respiratory protection, gloves, hearing protection, glasses and a long-sleeved top.

Tools and accessories

Having the right tools of good quality and smart accessories makes your work easier and is a precondition for a good end result.

Here are some examples of the most common and most important tools and useful accessories.



Steel filling knife. The decorator's best friend. A universal tool with many areas of application.



Filling tools. A typical Scandinavian putty knife manufactured in lightweight material and ergonomically designed with a width of 10–60 cm.



Finishing knife. American style.



Corner filling knife. Special tool to help when filling ceiling and wall angles.



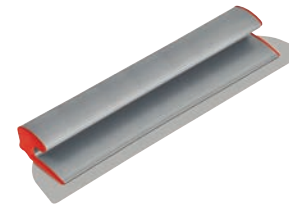
Half-moon knife. for filling behind plumbing, internal corners or other hard to reach areas.



Steel scraper. A tool for removing wallpaper, paint, etc. The angle of the blade makes all kinds of work easier.



Multi-purpose tool. Hammer, screwdriver and pliers, all in one single tool. Also useful when cleaning rollers and brushes.



Speed smoother. For smoothing walls and ceilings when spraying or rolling filler.



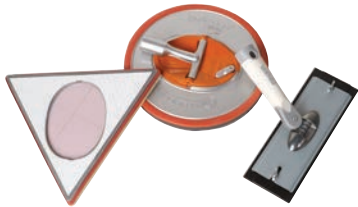
Adapter for speed smoother.



Joinery smoother. Mainly for filling joinery items.



Plaster Hawk. Mostly used for old conventional plastering.



Sanding block. Sanding blocks that can be attached to an extension pole.



Filler roller, 8 cm. For rolling plasterboard joints.



Filler roller, 18 cm / 23 cm. For rolling filler on plaster and concrete.



Extension pole. To be set together with Speed smoothers, sanding blocks or rollers.



Mud pan. To keep the filler while hand filling.



Universal knife. Universal tool.



Work gloves. To be used when filling to protect the skin.



Sanding machine with vacuum cleaner. For dust-free, ergonomic and efficient sanding.



Spray equipment. Fast and easy way to apply filler on larger surfaces.

Corner beads Both corner bead and filler must be approved in accordance with the filler standard EN-13963



Corner beads for filler installation. Provides neat, highly durable corners quickly and efficiently on on plasterboard, concrete, fabric and painted surfaces. Available in different versions:

- Pre-cut lengths for fast and easy installation. Available for both outside and inside corners.
- Flexible corner bead for all angles. Cut the bead to desired length, and fold to desired angle. Suitable for outside, inside and all off angles.



Self-adhesive corner bead. Spray clean water on the bead, wait 45-60 seconds to activate the adhesive. Then install on plasterboard corners, use the outside roller for a perfect and fast installation. Can be filled after 30 minutes.

- Pre-cut lengths for outside corners.
- Flexible roll for outside, inside and all off angles. Cut to desired length and fold to desired angle.

Tools for mounting corner beads



Corner roller tools. Corner roller tool for outside, inside and all off angles. The rollers makes the installation fast, easy and correct.



Corner bead Hopper. The Hopper makes installation quick and easy. Suitable for external corners and internal corners.

Joint tape



Paper tape. Paper tape for plasterboard joints. Installed in filler, it creates a strong joint and reinforces the filler in the joint. Paper tape and filler must be approved in accordance with EN-13963.



Paper tape holder. A practical tool when filling joints in plasterboards. Hangs from a belt, so you always have the tape within reach.



Fibafuse. Glass fibre for plasterboards.

Other



Plasterboard patches. A repair patch for repairing small holes and pieces of damage indoors in walls, ceilings and doors in plasterboards. Repairs holes after, for example, drilling mistakes or the relocation of electrical sockets and spotlights in ceilings and walls. Self-adhesive metal board.



Reinforcement covering. A fiberglass-free fabric for the lining and reinforcement of ceilings and wall surfaces where a smooth surface is desired. The fabric is manufactured from soft cellulose/polyester fibre, which makes it a better alternative for the working environment than fiberglass fabric. Dalatex is suitable for all substrates in dry areas.

Preparation

Before you start, make sure that you have done the preparation work, check if substrates are clean, dry and firmly attached. If you are going to work on plasterboard walls and ceilings, make sure that the installation has been completed to the right specifications from the plasterboard manufacturer.

Different substrates require different preparation. Always follow the manufacturer's recommendations to achieve the desired finish.

These are the general guidelines:

- ▶ Start by protecting surfaces you don't intend to fill. Beware of overspray if using a spraying equipment.
- ▶ Sand off any ridges on concrete or plastered walls or ceilings. Cut out damaged plasterboard and repair with a low shrinkage filler or gypsum-based powder filler.
- ▶ Previously painted surfaces must be clean.

- ▶ Raw steel, new wood joinery and MDF board must be primed to avoid staining, rust and bad adhesion.
- ▶ Previously painted joinery must be clean and dry.
- ▶ Remove loose wallpaper and make sure it has good adhesion to the substrate. In most cases old wallpaper needs to be primed before you start filling.

Summary: before filling work starts, the substrate must be firm, clean and dry. Also make sure you choose the right application method, the right filler for the substrate and method, and the right tool. We will deal with these in the following sections.



Good preparation is a precondition for a good end result. Keep in mind that different substrates require different kinds of preparation.



TIP

When applying filler to concrete, you can check that the substrate is sufficiently dry as follows: Moisten your thumb with water or saliva and make a thumbprint on the surface to be filled. If the mark has disappeared within one minute, the substrate is dry and has sufficient 'suction'.

Select an application method that suits the substrate

The combination of the substrate, desired outcome, and the method you have chosen for application that determines the choice of filler. The filling method is as a rule determined by the size of the project. Bigger construction sites require mechanical equipment for work

to be efficient. You can carry out smaller jobs by hand or using a roller filler.

On the following pages you will find recommendations on the choice of filler and workflow for the most common substrates.

Plasterboard

Plasterboard is the most common substrate in walls and ceilings in homes, offices and public premises.

To be able to carry out good filling work, the plasterboards must be correctly installed. Check that the boards are level with each other and sitting edge to edge. The joint gaps must not exceed 0.6 mm. The screw heads must not stick out or be pulled through the board.

Cross joints must be bevelled. The bevel must be 2–3 mm deep and wide.

Cut off and repair damaged and loose board pieces, use a low shrinkage filler or

a gypsum based powder filler to repair. External corners should be reinforced with corner beads (Habito or AquaBead) and filled using low shrinkage filler or all-round filler. Discolouration of board, known as yellowing or sunburn, must be primed to avoid any staining from the substrate.

Use a joint filler that has an EN-13963 label; this will guarantee superior adhesion to the paper tape and make the joint strong and durable.

You can use any filler that is labelled EN-13963 to embed paper tape.

All joints must have at least two layers of filler applied before wallpapering.



Surfaces that are to be wallpapered require at least two applications of joint filler.

Surfaces that are to be painted require three applications of filler.

Note that the tape has a front and a reverse side. The outside of the roll must be against the wall.

TIP

Do you have a wall to paint that attracts raking light? Replace the third application of joint filler with fine smoothing.

A third application is required before painting. Always use paper tape when filling plasterboard joints. Fill the tapered edge with filler to a level of at least 0.5–1 mm, then place the tape in the filler immediately and press it smoothly into place by drawing the filling tool along the joint so that a thin layer of filler is applied over the tape. Note that the tape has a front and a reverse side. The outside of the roll must be against the wall. The tape must not be moistened or prepared in any other way. You apply the second layer of filler to a sufficient thickness that the tapered edge recess in the first layer is filled in. Increase the width of the filler to around 25 cm. We recommend an all-round filler for the third filler application. Apply filler to a width of 35 cm.

If necessary, sand the joints before applying the next layer of filler, and make sure that no dust is left on the wall or ceiling after sanding.

Use sandpaper with a grit of 150–220 for the final sanding. It must never be any coarser than 120 grit, as that could easily cause scratches that are still visible after painting.

Lateral joints, also known as butt

joints, needs a different kind of filling. Fill the v-cut edge with filler and allow to dry. After drying, use a ready-mixed wallpaper adhesive and glue the paper tape over the butt-joint. Then finish off the butt joint with two layers of filler. Please note that you sometime have to fill beside the butt joint to avoid any ridging that will show through the paint.

Paper tape is also recommended in corners and ceiling angles where plasterboard meets plasterboard. The tape is scored in the centre, making it easy to fold. In ceiling angles facing a concrete ceiling, it is recommended that you place the tape in the surface of the filler, flush with the concrete.

If a wall that attracts raking light is to be painted, we recommend that you replace the third application of joint filler with a final skim on the whole surface. This will eliminate flashing joints, starved joints and any absorption issues when painting. This means that the whole substrate has the same absorption, structure and colour – and minimises the risk of gloss patches and colour variations. It also minimises sanding work.

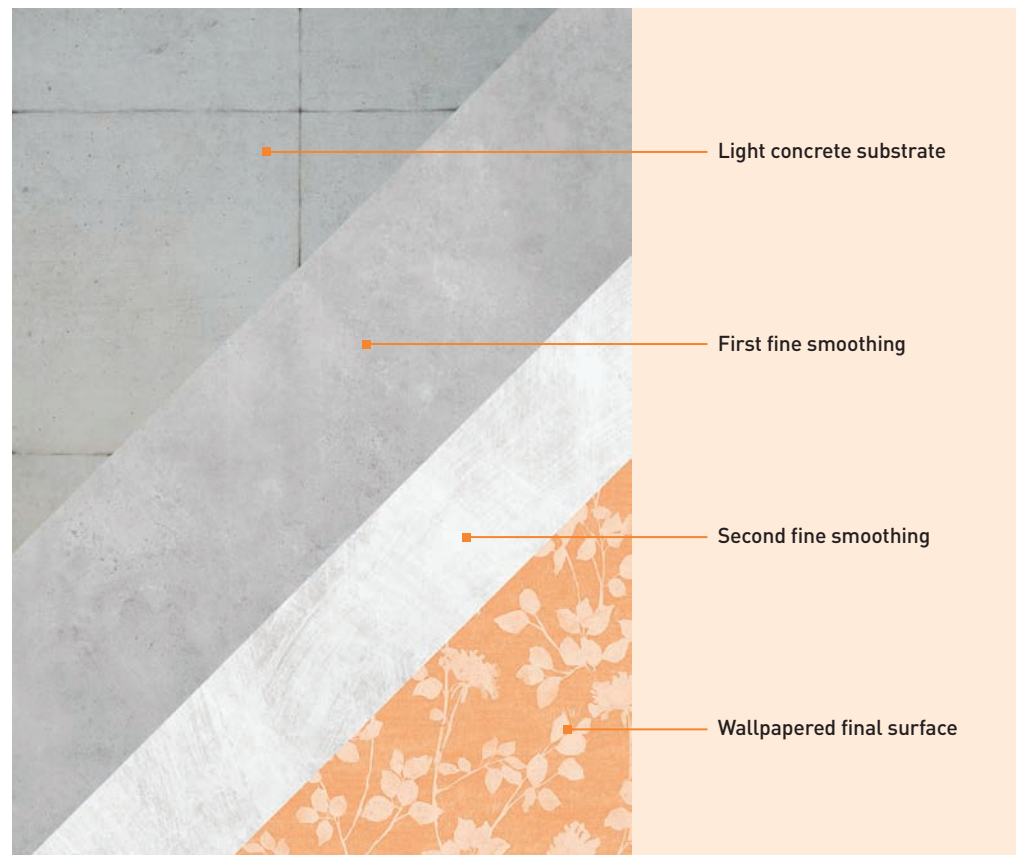
Brickwork

For walls made of brick or light concrete, choose a filler with good filling properties.

Fill joints, gaps and cavities with coarse or all-round filler. Fine smooth the surface once or twice, depending on the desired end finish.

If the joints are not too deep, you can skip the joint filler and instead fine smooth the whole surface twice. Make sure you let the filler dry properly between applications.

When sanding, use 150-220 grit sandpaper.



Concrete and plaster

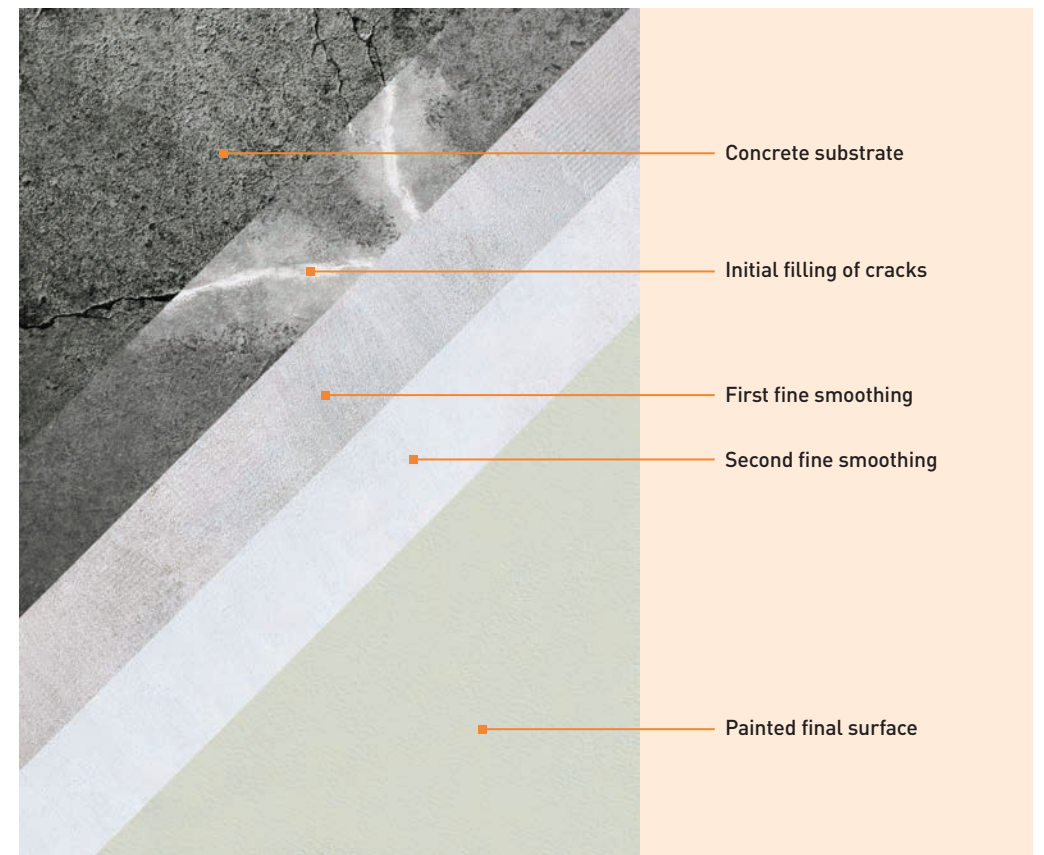
Use a low shrinkage filler for concrete and plaster. Spray filling is the most common method for concrete surfaces.

Start with careful preparation before sanding the whole surface with a sanding block and sandpaper, steel scraper or other suitable tool. Brush clean plaster surfaces. Apply filler in uneven areas, cavities, joints and cracks. Use low

shrinkage filler for a thicker layer. When the material has dried, scrape uneven areas gently with a steel scraper.

Then fine smooth the whole surface one or two times.

Let the material dry properly between each application. When sanding, use 150-220 grit sandpaper.



Painted plaster and fabric

When applying filler to painted plaster or fabric, use a filler with good filling performance.

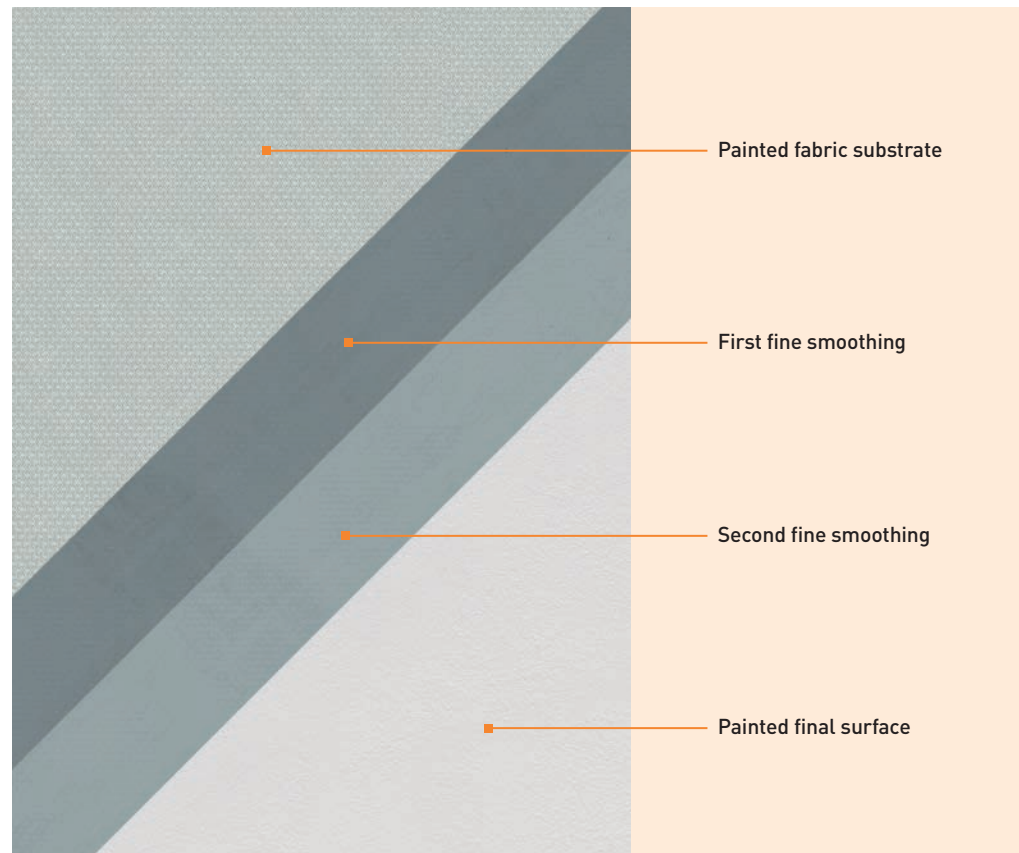
If the filler is to have sufficient adhesion, smooth and/or dirty surfaces must be washed with paint cleaner. Flakes of paint, loose fabric and other loose material must be removed. If necessary, the surface must be primed (see section on Preparations, page 64).

Repair cracks using low-shrinkage filler. Sand gently when the filler has dried. Then fine smooth the whole surface one or two times.

Sand using 150-220 grit sandpaper, depending on the final treatment.

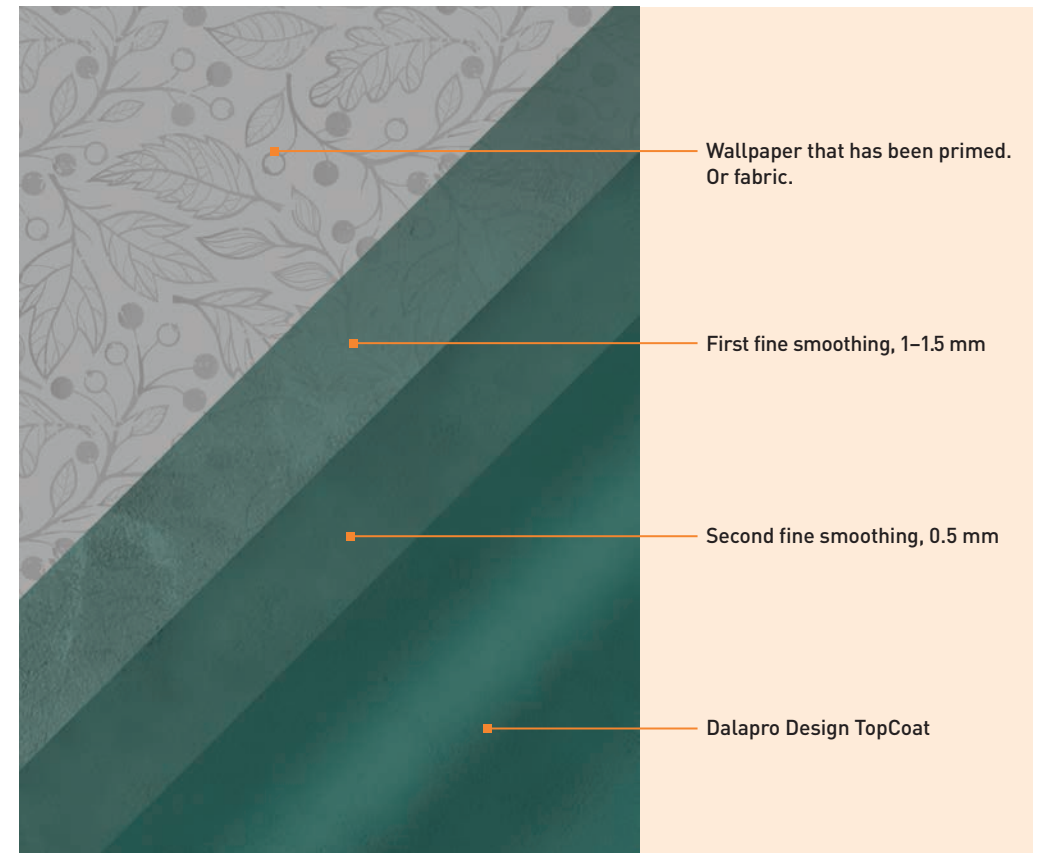


Painted fabric that is to be replaced by smooth, painted or wallpapered wall surfaces requires one application of fine smoothing, ideally two.



Coloured filler

You can use ready-mixed, coloured filler indoors in dry areas where you want to create a decorative wall with a concrete-like appearance. The filler has a unique composition, the highest quality and is easy to apply and sand. The special composition of the product contributes to giving the finished treatment extra colour variations to enhance the rustic feel. When the filler has dried, seal it with Dalapro Design TopCoat.





Wallpaper

Use a low shrinkage filler when working on wallpaper

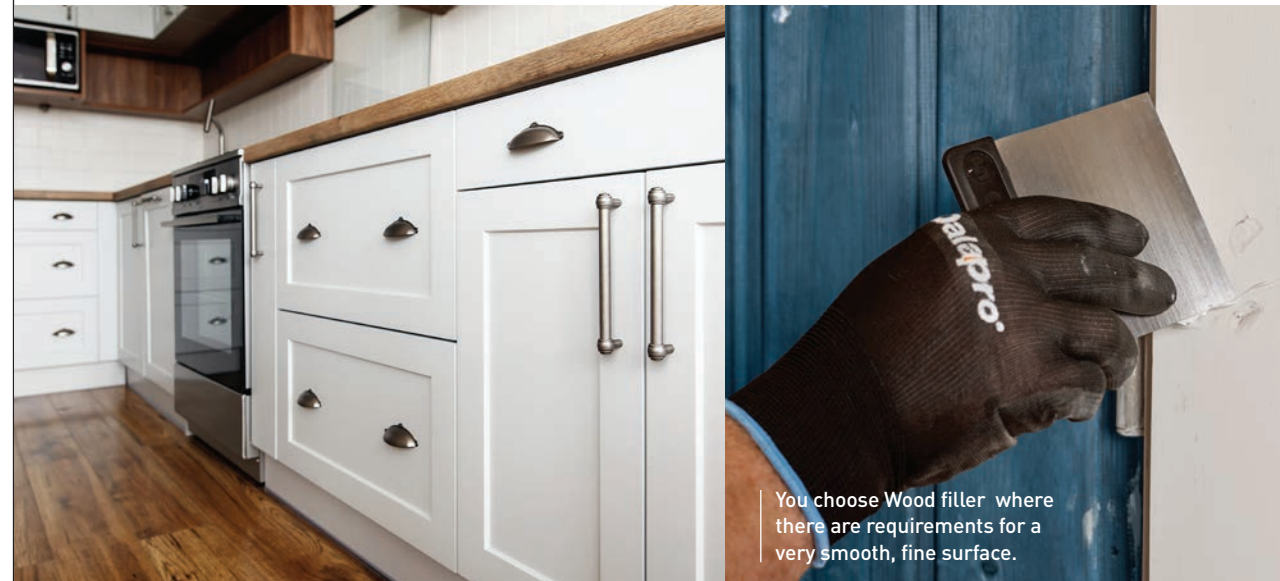
First check that the wallpaper is firmly attached to the substrate. If large areas are loose, it will be necessary to remove all the wallpaper. Even when there are many layers of wallpaper, the best approach is to remove all the wallpaper down to the solid substrate.

If the substrate is poorly attached or has pieces of old wallpaper, fabric, etc., a primer is required before filling work starts. Even after removing all the wallpaper, there may be a need to reinforce the substrate, i.e. the previously filled surface, by means of preparation (priming).

Vinyl wallpapers must be skived, i.e. the surface layer must be removed. If it is not possible to skive and if there is a risk of seepage, the surface must be primed to avoid blisters and staining. Then apply filler to all cavities, cracks and wallpaper joints. Then fine smooth structured wallpaper or badly damaged surfaces one or two times. Sand using 150-220 grit sandpaper, depending on the final treatment.



Start by removing wallpaper that has come loose. Then apply filler to all cavities, cracks and wallpaper joints. Fine smooth structured wallpaper or severely damaged surfaces one or two times.



You choose Wood filler where there are requirements for a very smooth, fine surface.

If the surface is not fine smoothed: keep in mind that the surface structure of the filler can be different to that of the wallpaper and it can often be seen through it.

MDF

Plaster is the dominant board material in the new construction of homes and premises. But there are also other materials, for example wooden boards and MDF boards. These are sensitive to moisture and can 'move around' when the humidity changes. It is therefore particularly important that the boards are dry, as otherwise there will tend to be problems with cracks in joints after drying.

The principle for applying filler to these materials is the same as for plasterboard. But as these boards do not have a tapered edge of plasterboard and do not therefore have a recessed joint, it can be difficult to place the joint tape in the filler. One alternative is to fill the joint in an initial application and then, once the filler has dried, to glue the tape using fabric

adhesive. The tape can then be covered with filler as many times as is necessary.

To prevent raised fibres and penetration from colourants in the board, wood fibre boards can require priming before fine smoothing.

Joinery

If you have to apply filler to wood and steel, choose a joinery filler. This is used for joinery, such as frames and shutters, where there are requirements for a very smooth, fine surface.

Prime untreated wood and metal (door leaves, window frames, borders, etc.). Paint knots and resin spots with knotting varnish. Wash previously painted surfaces. Fill holes and cracks so that the surface is even. Use a joinery knife when working with wood filler. Use your fingers in corners where the filling knife cannot reach.

Fine smooth bigger surfaces such as door leaves, cabinets and the like in full or partly using Wood filler. Sand evenly using fine grit sandpaper.

Create neat, strong corners

The external corners of walls are particularly vulnerable to knocks and bumps. So it is a good idea to reinforce them while you are applying filler. This is easily done with the aid of corner reinforcements, which are available in two kinds: self-adhesive and those you install in filler. Dalapro corner reinforcements are available in pre-cut lengths for 90-degree external corners and on rolls that can be folded to the desired angle in order to fit internal corners, external corners and all of-angles corners.

Three variants

Dalapro's product range contains three different corner reinforcements and special tools to make work easier:

AquaBead corner reinforcement is a

self-adhesive corner bead with a water-activated adhesive. Attach by spraying clean water onto the reinforcement, wait 30–60 seconds and then install the external corner. Only to be used on new, paper-faced plasterboard.

Habito corner reinforcement is installed in filler, is very hard-wearing and produces straight, neat corners. Can be used on all kinds of substrates such as gypsum, concrete, plaster and painted surfaces.

Levelline corner reinforcement is installed in filler and is hard-wearing. It is a little narrower than Habito corner reinforcement and is therefore particularly good in, for example, window and door openings. Can be used on all kinds of substrates such as gypsum, concrete, plaster and painted surfaces.



AquaBead is a self-adhesive corner bead with a water-activated adhesive.



TIP

The corner beads AquaBead Flex Pro, Habito Flex 83 and Levelline Flex produce particularly durable internal corners or wall angles. They absorb any movements in the substrate and effectively eliminate crack formation.

Application

Three steps

Filling work can be divided into three steps:

Pre-filling. Filling of uneven surfaces, cavities, hollows or other damage.

Joint filling. When filling only involves joints or gaps.

Fine smoothing. When filler is applied to most of a wall or ceiling surface.

With current high demands on surface finish, there is often a requirement that the surface is skimmed, regardless of whether it involves plasterboard, concrete or another substrate. Not only does fine smoothing make the surface aesthetically more attractive, you also eliminate the risk that the plasterboard joints will be flashing or have starved joints in raking light.

Pre-fill and re-filling

In what is known as initial filling, you fill in cavities, cracks and other uneven



surfaces. Press the filler into the cavities and smooth it by scraping off the surplus. When the material has dried, repeat the treatment. This is known as re-filling.

Joint filling

Joint filling means that you level out gaps between construction boards or building blocks, casting joints in concrete and joints in wallpaper or fabric. Once the first layer has dried, you repeat the treatment. Plasterboard joints usually need three treatments.

When applying joint filler to construction boards and plasterboards, joint tape must be used to reinforce the filler and prevent cracks.

You must use paper tape for plasterboard joints. The paper tape must be perforated in order to minimise the risk of blister formation. In corners and ceiling angles it is easiest to use a scored tape, i.e. one that is pre-folded along the tape. Apply the tape in wet filler and apply filler on top immediately after installing. Keep in mind that only paper tape is approved for plasterboard joints. When it comes to other board material, you must always follow the supplier's instructions.

Fine smoothing

The levelling of bigger surfaces of, for example, plaster, concrete, brick and fabric is called fine smoothing or skimming. Choose the right method for the application of filler, for example roller- or spray application, if the surfaces are bigger than 250 square metres.

When applying filler by hand, two knives with different sizes will often be used. For fine smoothing, the knives should be around 35 or 45 cm wide. For joint filling, the knives are normally 20 or 30 cm wide. Fine tune your knives edges to make the filling perfect.



Application methods

When the surface is too small for traditional spray filling and too big for hand filling, roller filling is an alternative. As the method is both economically and ergonomically beneficial, it saves both time and the body. Spray filling is the

fastest application method. With the right mechanical equipment and the right material, you can apply filler to as much as 1,000 square metres a day. On the following pages we describe these and a few more methods in more detail.

Hand filling

Hand filling is the traditional method and is effective when you have to apply and smooth the filler on small areas.

The general approach is that the filler should be applied in several thin layers. The drying time is shortened and strength

increases compared with applying one single thick layer. You usually require at least two applications, as the material shrinks a little when it dries.

As always, it is a question of adapting the choice of material to the substrate, for example wet room filler in bathrooms.



It is important to choose the right product, for example wet room filler in bathrooms.



Roller filling

Roller filling is an alternative to hand or spray filling. Compared with hand filling, it saves time and is more ergonomic. The method requires less sanding work and the end result is better.

The tools are conventional, primarily a regular roller. A roller with a large diameter is the most effective option. The bigger the diameter, the more filler per dip. When smooth filling on concrete, plaster, brick or painted fabric, you will usually use a 23 cm wide roller. For smaller surfaces an 18 cm wide roller works best. When applying joint filler to plasterboards, a roller no more than 10 cm wide is recommended. The roller must be fitted with an extension pole, which distributes the load on both arms.



Smoothing the filler after rolling is convenient and easy. Then comes the sanding.



TIP

Before you start applying filler: first moisten the roller with a little water and work the filler into the roller by rolling over a limited surface. When you add new material: dip the roller so that it is immersed in the filler. This helps you to get the right quantity.

Spray filling

Spray filling is a fast, ergonomic and profitable work method for bigger surfaces. This method can also be used for texturing ceilings.

Choose the product and quality suitable for the application you have to perform. The section entitled "The most common types of filler" contains information about the types and qualities of decorating filler.

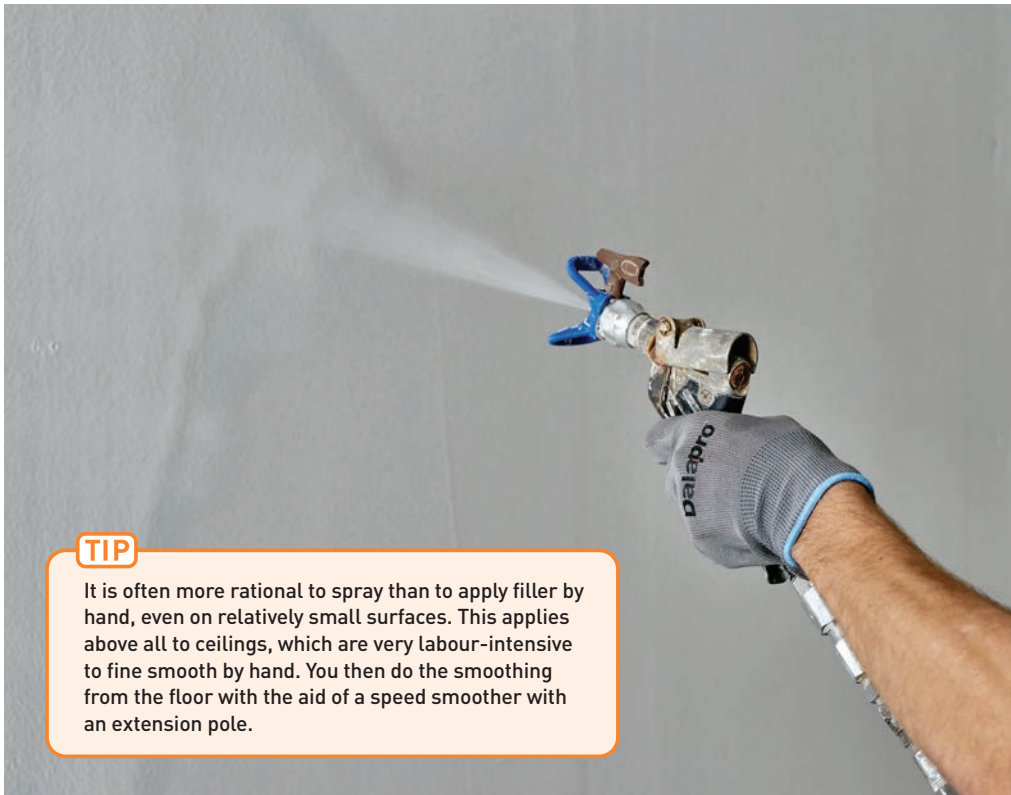
Spray filler is usually supplied in 15-litre plastic bags, although some are available in buckets.

Using Airless spray equipment. The high-pressure filler spray disperses

the filler without the use of added air, which is why it is widely known as "airless". This kind of machine is often a combi machine, i.e. you can spray both filler and paint using the same machine.

This kind of machine has a high capacity, is silent, and distributes an even pattern that makes it easier to level out on walls and ceilings. The accurate spray pattern leaves less overspray.

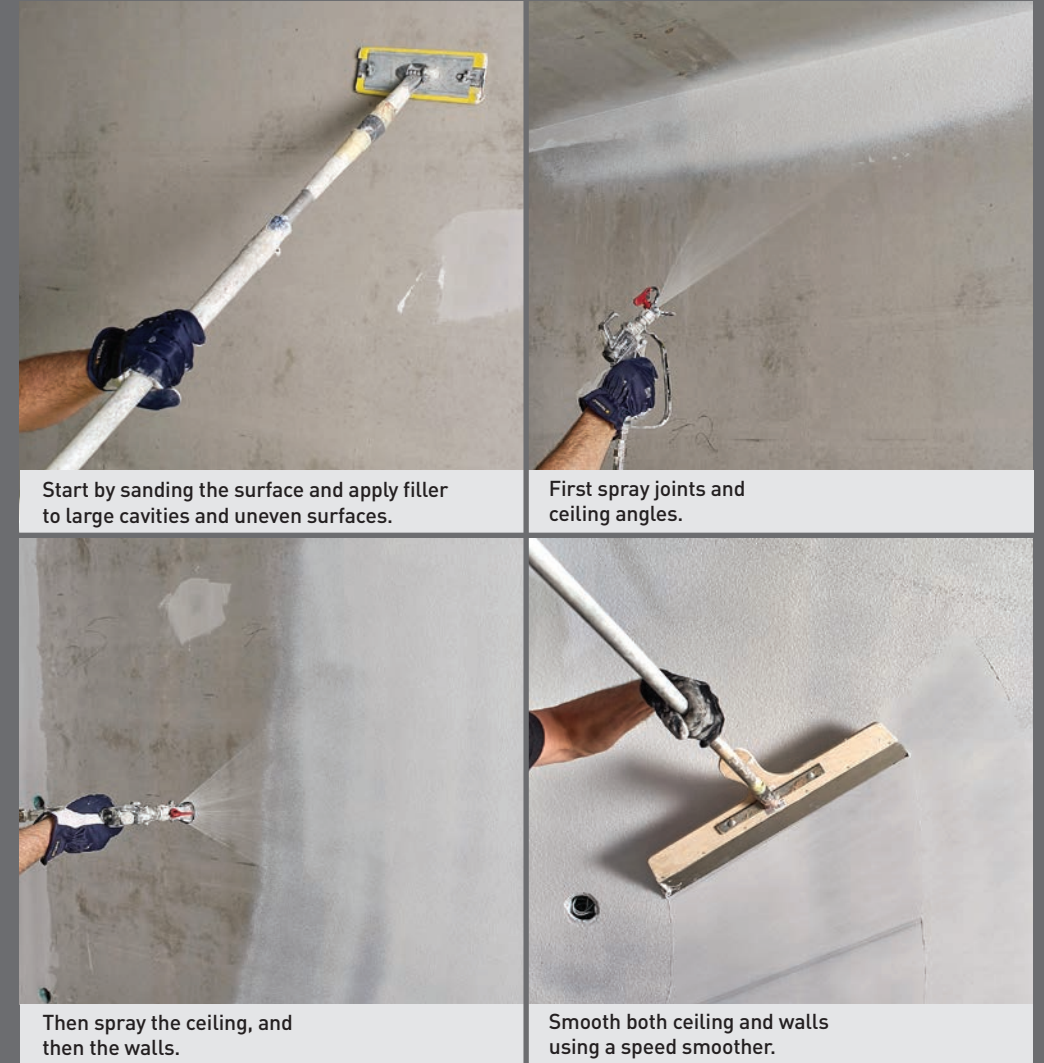
High pressure rotor-stator pumps. There are a number of rotor-stator pumps on the market that don't need air to disperse the filler. These machines are more silent and has a high capacity when spraying filler.



TIP

It is often more rational to spray than to apply filler by hand, even on relatively small surfaces. This applies above all to ceilings, which are very labour-intensive to fine smooth by hand. You then do the smoothing from the floor with the aid of a speed smoother with an extension pole.

Workflow for spray filling



Start by sanding the surface and apply filler to large cavities and uneven surfaces.

First spray joints and ceiling angles.

Then spray the ceiling, and then the walls.

Smooth both ceiling and walls using a speed smoother.

KEEP IN MIND

There would be a significant reduction in occupational injuries if people made more use of spray application than is the case today. It would also save a lot of time.

**TIP**

Allow the filler to hang for as long as possible before you smooth it. This provides better filling properties, a neater result, and above all less residue.

Fine smoothing

Start by sanding down the surface and apply filler to large cavities and uneven surfaces (see section entitled Preparation).

First spray joints and ceiling angles. Smooth the treated surfaces with a smoother on an extension pole (speed smoother). It is a good idea to use a corner smoother for the ceiling angle, or to water down the ceiling angle with a paintbrush. Carry out a gentle sanding before fine smoothing.

Always start by spraying the ceiling and then the walls. The size of the surface that can be treated each time depends on the filler's open time, the substrate's absorption properties and nature, climate conditions, machine capacity and experience.

Smooth with a speed smoother from angle to angle of the ceiling. You can also use the speed smoother on the walls.

Texturing

Texturing is the method that is used to create a structured surface on ceilings. The method is fast and cost-efficient. But, keep in mind that the ceiling must be white, sealed and smooth before you start texturing.



Texturing is a fast, efficient method that gives the ceiling a structured surface.

**TIP**

If you are going to paint it white, it can be a smart idea to choose a white filler so that you have a surface that is easier to paint over. If you are not going to fill the whole surface, it is easier to use a grey filler, as you can then see clearly where you have applied filler, making sanding work much easier.



Other application methods

Bazooka

The bazooka is a tool for the automatic application of the right amount of filler and tape to joints and internal corners when applying filler to plasterboard.

The tool consists of a tube that is filled with filler. On the tube is a holder and control mechanism for the paper tape, as well as a handle for cutting the tape. When you place the nozzle against the surface of the wall or ceiling and move the bazooka's nozzle along the joint, the tape and filler are fed automatically. Whatever the speed, the right amount of filler always comes out.



Photo with the permission of TapeTech Tools.



The Bazooka is a fast, efficient tool for use on plasterboards joints. It is mostly used in North America and southern parts of Europe.

Finishing boxes

A tool known as a finishing box is used for final joint filling. These are available in different sizes and consist of a box mounted on a pivoting handle. The finishing box automatically provides just the right amount of filler as you move the tool along the joint.

The outcome is a very even surface that requires a minimum of sanding. The job of applying the filler also goes extremely quickly. The drawback is that the finishing box can be somewhat heavy to work with. It also places tough demands on the plasterboard installation in order to achieve maximum efficiency.

Bazooka



6" inch box



Nail-spotter



The effect of temperature and humidity

Temperature and humidity

The climate at the workplace is more important than many people think. The right conditions in terms of heat, humidity, and air circulation have a major impact on the end result. Even though our fillers can, in purely technical terms, work in temperatures down to +5 °C, the optimal room temperature is +15 °C–+20 °C and with a relative humidity of 40–60%.

Both substrate and filler must have a temperature of at least +10 °C. As our fillers are air-drying products, i.e. the water must evaporate during drying, it is extremely important that the humidity does not exceed 80%.

The effect of the temperature

A high level of heat will not speed up the drying process significantly. Quite the reverse, it can actually make it longer, as the heat initially will raise the humidity before going down to a more normal level. A heat level that is too high can also cause the surface of the filler to dry far too quickly and cause the surface to crack.

Nor is it preferable to apply filler to cold substrates. Apart from long drying times, there is a major risk that there will be poor adhesion. Always follow the manufacturer's recommendations regarding temperature

The effect of humidity

High humidity has a negative effect regarding drying times, and filler should not be applied if the humidity is above 80%.

One good way of guaranteeing a good drying climate is to use a dehumidifier. These are very effective when it comes to regulating the indoor air climate.

Low humidity can also pose problems, as the surface of the filler dries too quickly and causes crack formation, for example when applying joint filler on plasterboard.

Drying time, 1–1.5 mm thick layer of filler

Relative humidity	TEMPERATURE			
	+10 °C	+15 °C	+20 °C	+25 °C
10%	21 h	14 h	10 h	7 h
20%	23 h	16 h	11 h	8 h
30%	26 h	18 h	12 h	9 h
40%	29 h	20 h	14 h	10 h
50%	36 h	24 h	17 h	12 h
60%	42 h	29 h	20 h	14 h
70%	54 h	38 h	26 h	19 h
80%	78 h	54 h	38 h	27 h

The highlighted drying times produce the best result.

Here you see the correlation between temperature, humidity and drying time. Even if the filler can be sanded, it has not always hardened through. Make sure that the filler is sufficiently dry before you start the surface treatment.



Document the temperature and humidity at the workplace. These instruments are extremely simple to use and easy to take readings from.

Finishing

Sanding

Filled surfaces often require sanding with sandpaper. Adapt the grit of the sandpaper to the substrate and the requirements for the finished surface. Use 150-220 grit sandpaper for painting walls and 180-220 for joinery. If the surface is to be wallpapered, you can use a coarser sandpaper, but no coarser than 150, as there would then be a risk that scratches may be

visible through the wallpaper. Grain that is too coarse when sanding plasterboard joints, for example, also roughens the surface of the plasterboards and can cause structural damage and increase absorption in the substrate, which often become visible through the layer of paint – especially on walls with raking light.

A sanding block on an extension pole makes it easier to work on ceilings and



The sanding machine make the work more efficient and contribute to better ergonomics.



large wall surfaces. There are also special sanding machines (Giraffe) that make the job more efficient, less strenuous, and more ergonomic.

Make sure you use respiratory protection and protect your eyes.

Dust removal

Take care to remove all sanding dust from the surfaces. This is a must in order to achieve good adhesion between the substrate and the next treatment. Applying filler, painting, or wallpapering on a dusty surface can cause delamination, i.e. the surface layer comes loose from the substrate.

Use a vacuum cleaner and/or a soft brush to remove dust from the surfaces. If a high-pressure spray is to be used after sanding, also vacuum the floor in order to prevent dust from swirling around.

Sanding machines combined with an extractor are very practical, as they take care of the sanding dust 'at source'. The machine can also be used as a vacuum cleaner.

Pre-pasting

Filled surfaces are absorbent and must therefore be pre-pasted before wallpa-

pering. Use ready-mixed products that are recommended for this. Allow to dry well.

Cleaning

Remove any spillages and splashes using a sponge and water. Then wipe dry with a clean cloth. Also clean the tools in water.

The best way to clean spray equipment is to run water through the machine until it is clean. Your spray equipment can usually keep filler in it with no problem for one or two weeks. Cleaning is recommended if there is a longer break in operation.

Painting and wallpapering

Dalapro filler can be painted over using most of the regularly used paints. Silicate paint is fine. We do, however, advise against applying epoxy paints on decorating filler, as this can affect the binder in the filler, among other things.

The general advice is: follow each manufacturer's instructions regarding the choice of products and advice on how to perform the work. Most manufacturers have comprehensive product information that you can download via the Internet. You can also request product information from your supplier.

Ten tips for a successful end result

1. Choose the right method and filler

Spray filling is suitable for large surfaces. Roller filling is best for medium-sized surfaces. Hand filling is most appropriate for small surfaces. Choose the filler based on method and substrate.

2. Inspect the surfaces

Demand that the 'builder' provides surfaces that are ready to decorate, i.e. that all concrete must be completed and cleared, and plasterboard must be fitted in accordance with instructions. Make sure that the substrate is firm, clean (free of grease and dust) and dry. Document any deviations.

3. Use the right tool

Take care to always use the right tool, as this makes the job easier and guarantees a good end result.

4. Look out for moisture and cold

Never work at temperatures below +5°C. The optimal temperature is +15°C – +20°C with 40–60% humidity. Never apply filler on damp substrates, as there is a negative impact on adhesion and it can result in variations in the gloss of the surface treatment.

5. Protect yourself and surfaces that are not to be treated

Remember to use protective gloves, eye protection, respiratory protection, hearing protection and protective paper.

6. Start with the ceiling

If both ceiling and walls are to be filled, start with the ceiling. It is best to work from the light source and into the room.

7. Apply filler thinly

Filler dries slowly if it is applied too thick. Several thin layers always produce a better result.

8. Apply filler with care

Keep in mind that whatever you apply has to be sanded. The more effort you put into applying and smoothing the filler the less work for is needed for sanding.

9. Take care with finishing

Avoid sandpaper that is too coarse. Remove sanding dust before you apply the next layer. Otherwise adhesion is compromised.

10. Do what it says...

And finally: always follow the manufacturer's instructions. Most manufacturers have comprehensive product information available on the Internet. If not: request product information from your supplier.

A really good filling job is the one you can't see.



Storage and handling

Ready-mixed filler contains 15–20 different ingredients, including filling agent, binder, dried clay and other additives. The dolomite that forms part of our fillers is produced close to our factories and is a pure natural asset that can contain a small amount of microorganisms.

In order to guarantee consistent, durable quality, we add a small amount of preservative to keep the product free of bacterial growth. If, despite this, the product smells bad or looks mouldy because of unfavourable circumstances, you should not use it.

Date-marked product with limited shelf life

Filler has a limited shelf life and is therefore date-marked with a Best Before date. Store the filler in a cool, but frost-free place. Unopened packaging can be stored for 12 months.

Seal the packaging properly

Once opened, the packaging must be sealed securely, otherwise there is a risk that the filler will become dry.

If the filler has thickened, it can be a good idea to whisk it a little so that it regains its consistency. Avoid diluting the filler with water, as this has an adverse effect on its properties.

Store in frost-free environment

Filler that has frozen must not be used under any circumstances, as the properties of the filler have been drastically compromised, primarily because the binder has often been degraded.

Avoid strong direct sunlight

If filler is stored in a hot place and in direct sunlight, the water in the filler will evaporate and make the filler dry.



Filler must be stored in a cool, frost-free place and must not stand in sunlight.

Explanation of terms

Casting flash Concrete residues of leaked mortar. Often appear by joints in ceilings and walls that have hardened on the surface. Should be removed before filling work begins.

Dust removal Removal of sanding dust or loose particles from a surface using a brush or vacuum cleaner. Even if you use a sanding machine with a vacuum cleaner: make sure that there is no dust left on the surface.

Embedding of tape in adhesive Work method that includes gluing and installing of tape. Recommended for joint filling of non-recessed joint boards. Wet room adhesive must not be used for this process.

Embedding of tape in filler Work method that involves applying filler for the installing of tape and the securing of tape by applying filler on top.

Filler Ready-mixed, water-borne putty for smoothing ceilings and walls indoors. There are qualities for different kinds of substrate and for different kinds of application methods.

Final coat Last coat of paint or clear varnish. There is no further treatment after this.

Fine smoothing Applying filler to a whole surface.

Flashing joints Visible joints due to raking and incoming light. To avoid this, the walls and ceilings must be thin smoothed or skimmed.

Gloss Property in a surface to reflect light. A surface with a high sheen is described as being gloss, while a surface that has no gloss is said to be matt.

Gloss patch Uneven gloss, flamed surface.

Gypsum mortar Mortar with gypsum as a binder. Used by construction workers (rarely by decorators) to prepare concrete and plasterboard. Gypsum mortar often has poor adhesion in thin layers. You should therefore make sure you prime surfaces that are to be prepared with gypsum mortar.

Initial filling Single application of filler on cavities, small cracks, damage and uneven surfaces to a limited extent.

Joint filling Filling of gaps between boards or concrete joints and filling of joints between lengths of wallpaper. Filling of joints with tape on plaster.



Explanation of terms

Joint gap Difference in level between boards in a joint. Also known as tothing. See YBG for further information.

Joint tape Reinforcement tape for jointing board joints. For use with plasterboard, it must be made from paper and should be about 50 mm wide. Keep in mind that joint tape is only there to reinforce the filler that is in the joint.

Lightweight filler Filler in which most of the filler consists of different kinds of lightweight filler, and with a density of 0.8–1.3 kilos per litre.

MDF (Medium Density Fibreboard) Wood fibre boards made of wood fibres held together with adhesive.

Paint Blend of binder, binder solution or binder emulsion and dispersed pigment that forms a solid, opaque layer.

Plasterboard Board manufactured from a plaster core enclosed in cardboard. The long edges are usually recessed and coated in cardboard. There are also plasterboards that are recessed on all four sides, which makes filling work easier.

Plaster filler Plaster-based powder filler that is reinforced with PVA as a binder. These products are available with different hardening times, for example 20, 40 and 60 minutes. Certain qualities are approved in accordance with CE EN-13963.

Plywood Board made up of several layers of veneer that have been glued together, usually with different fibre directions.

Priming Coating with paint or adhesive blend for the purpose of, for example, reinforcing a poorly structured substrate. Similar to Patenting, or the first coat of paint on surfaces that are to be further treated.

Pre-pasting Pasting of absorbent substrate (filled surface). Performed before wallpapering, for example using pre-diluted fabric or wallpaper adhesive or paint adapted for this purpose.

Powder filler Plaster-based powder filler that is reinforced by PVA as a binder. These products are available with different hardening times, for example 20, 40 or 60 minutes. Certain qualities are approved in accordance with CE EN-13963.

Raking light Light that falls in parallel with a surface. Make sure you adapt the preparatory treatment according to the light. Dark shades with a high gloss often require more preparatory work.

Relative humidity (RH) Ratio of actual water vapour content and water vapour content at saturation at the same temperature.

Re-filling Filling that follows a previous (initial) filling.

Re-priming Coating with primer on scraped or worn parts of the surface before filler.

Sanding Sanding of a surface before or between filling or painting to make the surface smoother. Make sure you match the grit of the sandpaper with the type of filler you are using. We recommend a grain size of 150–220.

Sand filler Old name of decorating filler. Comes from the time (1950s) when filler was manufactured using sea sand as a filler. There is now no sand in our fillers.

Shade Property of describing a type of visual impression, for example red, dark blue, light brown. The word 'colour' is often used for what we see.

Stain-blocking Priming of surfaces that are poorly structured, severely stained by nicotine, for example, or damaged by damp.

Starved joints If the filler was not completely dry when it was being painted, the joints can appear after a period of time. Make sure the filler is dry before painting.

SVEFF Swedish Paint and Adhesive Association, www.sveff.se

Thin smoothing Very thin layer of filler that you obtain by increasing the angle of the filling tool against the substrate.

Traditional filler Filler in which only dolomite is used as a filler, and with a density of 1.7–1.9 kilos per litre. Also known as heavy filler.

Yellowing Lignin precipitate in the surface of cardboard on plasterboards that have been in the sunlight. Also known as sunburn. A yellowed surface must be primed before painting.

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Nice & Smooth – a book about filler and filling

This is a book for anyone who wants to acquire more in-depth knowledge of filler and how it is used.

You will find a look back at its history, knowledge of what filler contains and how it is manufactured. But most of all, it is a manual that provides you with knowledge of what demands you must make of the product, how to work with filler, different application methods and important points to keep in mind to achieve a perfect end result.

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