

Knauf Binders

Gypsum for industrial applications



Raw materials

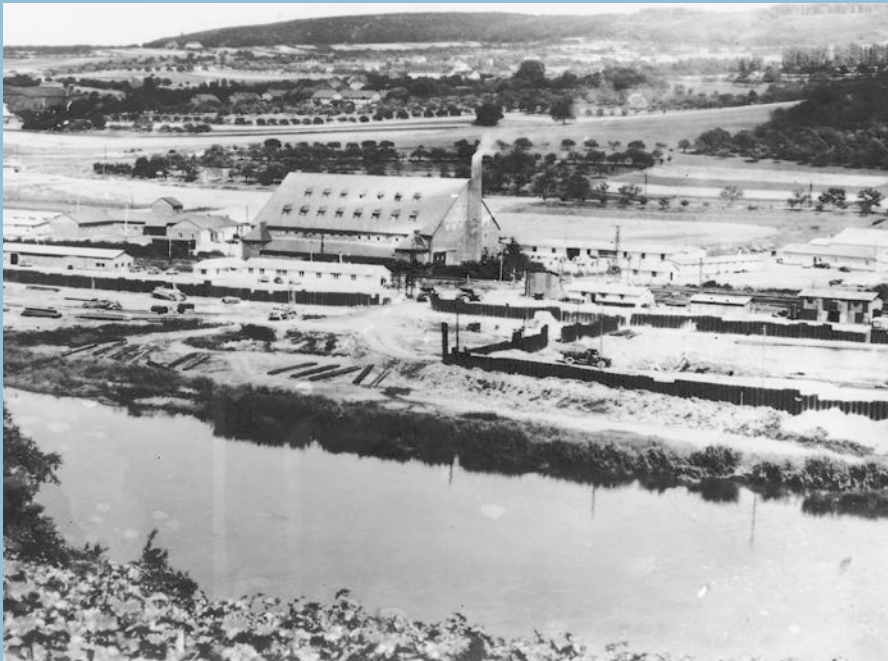
Gypsum – A raw material of endless possibilities

Knauf as a leading manufacturer provides premium gypsum products to the building materials industry, and we use only high-end raw materials for this purpose. Gypsum is not just an essential part of our natural habitat, it is also one of the most important mineral building materials. Its excellent properties make gypsum one of the most versatile materials and thus indispensable for the manufacture of modern building materials and application in many fields of industry.

The fields of application of gypsum are incredibly versatile. A large quantity of modelling and moulding gypsum, for example, is used in the ceramics industry in the manufacture of sanitary porcelain for washing basins, etc. Furthermore, gypsum is also used in medicine, dentistry, agriculture, mining and in food technology.

To fully exploit this potential and to maximize the benefit to you, we bring all our expertise to bear in the selection of the right binder and in the optimization of your recipe formulation and products.

Knauf – A family company



Knauf gypsum plaster plant in Perl

The founding era

The brothers and mining engineers Alfons and Karl Knauf were fascinated by gypsum as a raw material at the start of the 1930s. In 1932, they founded the company "Rheinische Gipsindustrie und Bergwerksunternehmen" and established a gypsum plaster plant in Perl an der Mosel. This was the very first location and the nucleus of today's globally operating Knauf Group.



Knauf headquarters in Iphofen

The Knauf Group today

From 1980 onwards, the Knauf Group was managed by Nikolaus and Baldwin Knauf, the sons of the founders. In 2013, Alexander Knauf, another member of the Knauf family, took over the lead management function for the Knauf Group. Knauf today is one of the leading building material manufacturers worldwide with more than 220 production plants and 70 mines and quarries in more than 60 countries.



► Knauf gypsum competence in materials

- **Drywall solutions from Knauf**
Fulfil all demands in terms of thermal insulation, comfort and added value.
- **Plaster systems from Knauf**
Provide façades and interiors with an individual touch and combine functionality and aesthetics
- **Floor systems from Knauf**
Provide perfectly optimized solutions ranging from the comfort top covering through to the durable base substrates extending right up to the optimum sealing.



Production

Knauf Compound – for all requirements

Different modifications result for the gypsum and the anhydrite during the production process, depending on the raw materials used and the calcination conditions.

Depending on the characteristics concerned, such as the different dehydration or temperature stages, the calcium sulphate binders, stucco gypsum, natural anhydrite, alpha hemihydrate and thermal anhydrite are applied as required.

An example of Knauf raw material competence in the building material industry is Knauf Flowing Screed Compound employed in various flowing screed technologies.

Screeds for interior applications in residential, commercial and public buildings are manufactured based on Knauf compounds. They are ideally suited as a substrate for all elastic and textile coverings, parquet flooring, tiles and boards.

Raw material production

By employing many modern processes, Knauf calcium sulphate-based binders are produced with different technical application properties.



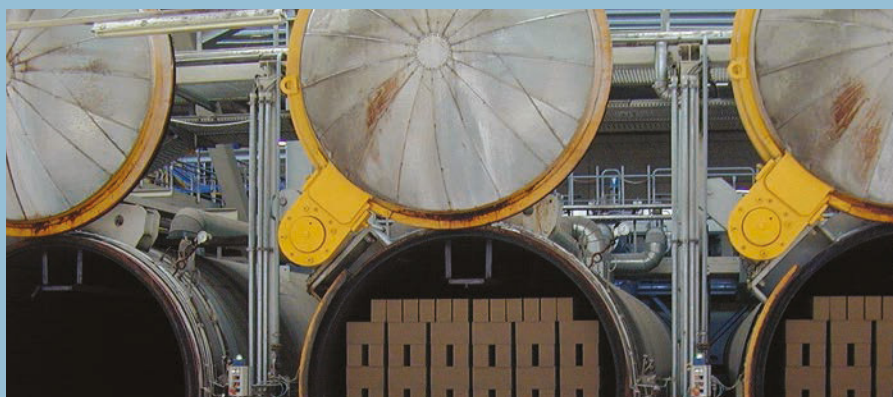
Raw material natural anhydrite

Geologically formed by the sedimentation and evaporation of oversaturated watery solutions of shallow seas more than 200 to 250 million years ago. The difference between gypsum and anhydrite is an absence or presence of a half molecule of water before processing. The crystallized water in gypsum is extracted by calcination. As soon as waterless anhydrite comes into contact with water, it gradually reverts back into gypsum.



Raw material thermal anhydrite

Manufactured in a large scale process from FGD gypsum by firing at a minimum 700 °C. As a moist, particulate flue gas desulphurization gypsum – FGD gypsum – that can be directed straight into the economic cycle of the building material industry. Because of the uniform grain size of the FGD gypsum crystals, it is very beneficial for the production process of many products.



Raw material alpha hemi-hydrate

Manufactured in a large scale process from FGD gypsum by steam-pressure treatment at maximum 150 °C. Calcium sulphate hemihydrate results in the gypsum firing process, also referred to as calcination. Due to the rapid hardening and high structural strength, alpha hemi-hydrate is used for the manufacture of moulding plasters as well as gypsum building materials and special gypsums for fields of application with special demands.

► Knauf Flowing Screed Compound

Compounds from Knauf are manufactured in the most-modern computer-controlled manufacturing plants, with uncompromising levels of quality control consistently monitored by in-house production control compliant to EN 13454.



Building materials

In today's building engineering, gypsum (as a hemi-hydrate or multiphase gypsum) is usually used in the form of FGD gypsum, e.g. for plaster blocks used in partitions, gypsum board used in drywalling, as a base material for various plasters and screeds, as a binder and filler for building chemicals (including paints and lacquers) and in the cement industry.

In the fire protection of buildings, gypsum is used as the preferred material as it offers a high resistance to fire for a relatively low weight. The protective effect is provided by the water of crystallization of the dihydrate, which vapourizes in the event of a fire and forms a protective steam barrier at the side facing the fire.



Foodstuffs

In the foodstuff industry, calcium sulphate is used as a release and anti-caking agent. It is also used as a milling agent and extender in the production of flour, for increasing the sugar yield from sugar beet and for regulating water hardness. Calcium sulphate is even used in the beer brewing process (to prevent oxalate turbidity). Furthermore, calcium sulphate is employed as a foodstuff additive (E 516).

In the manufacture of feedstuffs, calcium sulphate boosts coagulation (gelling) and is used as an extender and source of calcium ions.



Modelled parts

When used as a modelling or moulding gypsum, as a raw material it is subject to enhanced demands with regard to the purity and the preparation. A more uniform surface structure can be achieved by grinding to finer particles and a lower share of foreign mineral particles. Higher modelled and moulded part strengths can be achieved by using hemihydrate. This is often referred to as hard plaster.

Gypsum is used frequently in figurative art for the creation of sculptures as well as in the technology applied for the creation of designs and models.



Medicine

In the medical field, gypsum is used for plaster casts. The limb or joint concerned is wrapped in moist gypsum bandages to stabilize it, which then hardens in minutes and can be fully loaded after about twelve hours.

Furthermore, gypsum is used as a carrier and natural calcium additive for tablets and as a filler in medicines and cosmetics.

It is used as a remedy as it is classified as one of the twelve Schuessler salts.

Application fields

Gypsum is used as a raw material in these industrial fields



Dental

Gypsum is the most important raw material used in dental technology and is used for creating models taken as imprints of the mouth and tooth situation.



Ceramics

A large quantity of modelling and moulding plasters are employed in the ceramics industry in the manufacture of sanitary porcelains used, for example, in washing basins, etc.

Shapes and patterns of different designs and material characteristics made of gypsum are required for shaping ceramics. They are generally a negative of the parts to be manufactured.

Gypsum is also used as a filler in the manufacture of ceramic materials used in wall tiles.



Agriculture

Gypsum is a two-nutrient fertilizer and primarily known as a sulphur fertilizer. In addition to providing sulphur as a neutral salt, gypsum also provides calcium ions without changing the pH value. Gypsum is soluble in water and contains about 18 % sulphur as well as 23 % calcium. In addition to sulphur, gypsum is also a source of calcium, which is a plant nutrient and improves the structure of the soil.

Gypsum also serves as a carrier substance in both pesticides and fertilizers.



Mining

Gypsum has been used as a building material for more than 11,000 years. Gypsum is used both as a filler material and a binder. It is the only mineral binder that can be worked to an end product without mixing additional additives. In mining, it is used as a "filler" after tunnels are decommissioned.

Other fields of application

Further fields of application for calcium sulphate can be found in the oil industry (as a rinsing agents and for bore hole packing), in the paper industry (as a filler material) as well as in the manufacture of grinding products (as a filler in polishing agents and in grinding fluids).



Logistics

Sophisticated systems just-in-time

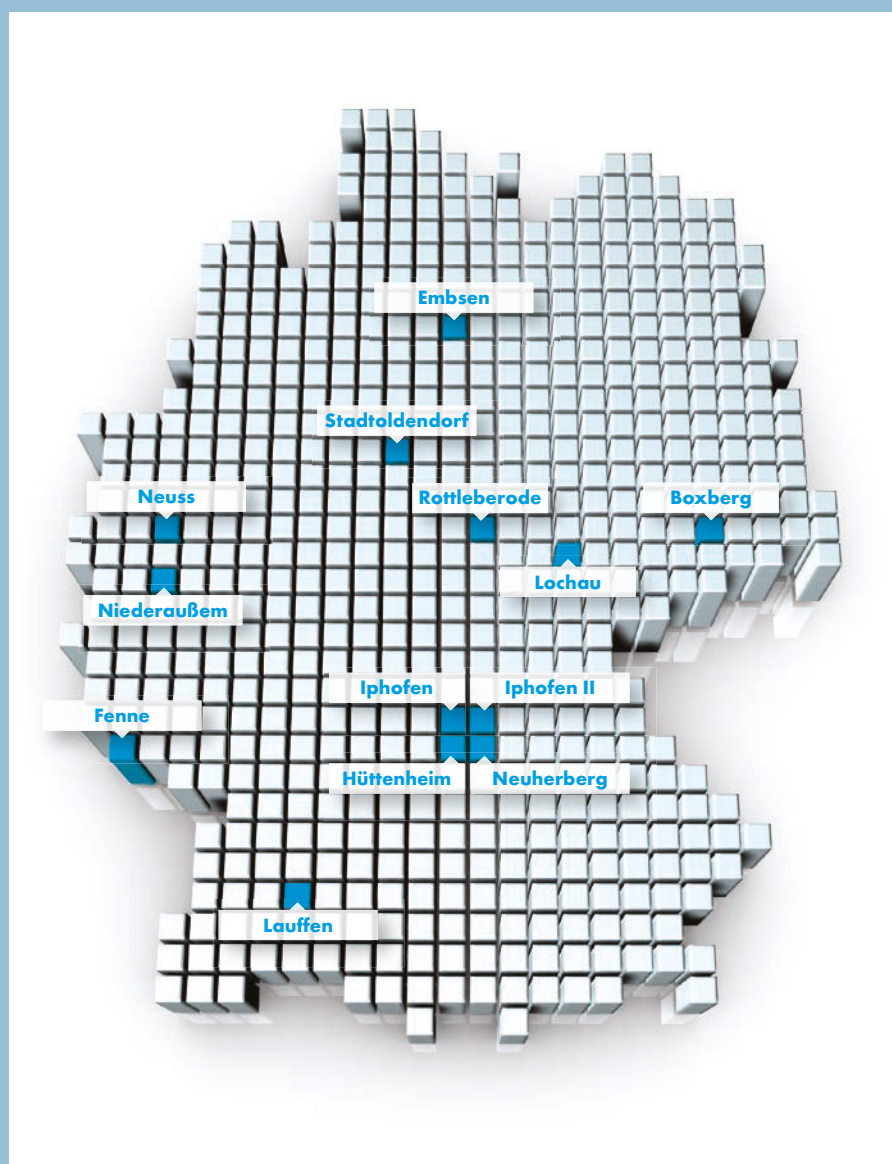
Made-to-measure logistical concepts

The excellent organization becomes evident during handling of the order. Knauf logistical staff are highly-trained, customer-orientated and assure punctual deliveries.

In addition to traditional deliveries on truck-borne silos, it is one of our primary objectives to use rail and/or ship based shipments to minimize the environmental impact. This approach facilitates the conservation of millions of litres of Diesel every year as well as a considerable reduction in CO² emissions compared to shipment by truck.



Knauf Gips KG in Germany



Knauf Gips KG has numerous raw material supply locations in Germany. They guarantee a quick and flexible delivery to our industrial customers. These companies offer solutions for the industrial market and special customer requirements. They also generally sell the raw materials all over the world. Knauf is a competent partner thanks to its many years of experience in supplying industrial customers.

Knauf in Germany operates a total of 45 production plants at 40 sites, and in addition to raw materials, it also manufactures modern drywalling systems, plasters, paints, flowing screeds and floor systems, machines and tools as well as insulating materials. Knauf operates world-wide at more than 150 locations in more than 60 countries.



► Certified quality

Continuous research and development, sophisticated quality management and the experience of outstanding experts ensures that you will continue to reap the benefits from Knauf Compound in the future.



Sustainability

Renaturation of a cultural landscape

We are aware of the native symbioses of flora and fauna on the surface of the earth and in the top layers of the soil. Equally, we are aware that any intervention to the natural balance of things can be detrimental, no matter how sensitively or temporarily it is carried out.

Our sense of responsibility for the environment causes us to give more back to nature than we take from it in the form of raw materials.

Our sustainable extraction of raw materials is carried out with consideration for the existing habitats with their flora and fauna. It gives targeted support for protection of species and biotopes during and after the extraction of the raw materials.

It is precisely renaturation that brings forth a large variety of biotopes specific to the respective locations, providing new habitats for a large number of species of flora and fauna.

Knauf Gips KG in Germany



Think and act responsibly

The balance between ecology, economy and social commitment are inseparable core elements of the Knauf corporate philosophy. This is why we accept direct responsibility for that which is important to us: Our customers, our environment and our employees. Knauf has been committed for many years in ensuring the sustainability of its products and systems. Sustainability has always been practiced in family-run companies that are managed from generation to generation by family members.



FGD gypsum - raw material management protecting nature

Use of flue gas desulphurization plants (FGD) in power stations with fossil fuel based combustion plants contributes very significantly to air purity. Knauf played a key role in developing this technology: In a cleaning process using natural lime, and ultimately producing fine particulate FGD gypsum, that can be employed directly as a raw material in the building material industry. FGD gypsum develops as a result of the same physical laws that govern the development of natural gypsum and thus has the same high quality.

► FGD gypsum – produced at power plants

Processing FGD gypsum helps to conserve natural resources, allows existing landscapes and habitats to remain untouched and protects precious ecosystems.





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Knauf Binders — Gypsum as a raw material for industrial applications

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Knauf AMF
Ceiling Systems

Knauf Bauprodukte
Professional DIY Solutions

Knauf Dämmstoffe
Insulation materials made of
polystyrene solid foam

Knauf Gips
Drywall Systems
Plaster and Façade Systems
Floor Systems

Knauf Insulation
Insulation materials made of
glass wool and stone wool

Knauf Integral
Gypsum fibre technology for
floors, walls and ceilings

Knauf AQUAPANEL
AQUAPANEL® Cement Board
TecTem®, insulation bulk levellers

Knauf PFT
Machine Technology and Plant Engineering

Knauf riessler
Competence in surfaces

Marbos
Mortar systems for
cobblestone paving

Sakret Bausysteme
Dry mortars for new
projects and renovations