Akdolit®

For Water of the Quality You Need

Our Water – A Natural Treasure

Not only is good water our most important resource, the elixir of life, it is also required by many industries for the manufacture of high-quality products. The water cycle (evaporation, cloud formation, rainfall, percolation and formation of groundwater) includes a natural purification process, as the water seeps into the ground, which cannot always be relied upon as a sole. The quality of natural water is often compromised by biological and mineral substances and above all, by environmental influences.

Lhoist and in particular Rheinkalk Akdolit have taken on the task of changing this situation and have proven to be highly competent partners, offering solutions which have traditionally been - and still continue to be - based on natural models. For example, Akdolit® only uses natural mineral products such as lime and dolomite, which are joined by a range of other substances such as pumice, expanded slate, various types of sand and coal-based minerals. Thanks to its decades of experience and extensive knowledge of the field, Akdolit® is a specialist in all types of water treatment, from deacidification to deferrisation, demanganisation and filtration.

All Akdolit® products are based on carefully selected mineral substances obtained from the best raw material suppliers on long-term contracts. This guarantees a sustainable and reliable supply of top quality materials for the production of high-quality Akdolit® products - products, the quality and suitability of which have been proven in countless tests. Regular chemical and physical analyses ensure that the raw materials and, by extension, the finished products are always of the highest quality. Years ago, Akdolit® became one of the first companies in the water treatment sector to introduce an EN 9001 certified quality assurance system.

Rheinkalk Akdolit – the Pure Water Experts

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Pelm, home of Rheinkalk Akdolit and the AWA Institut, lies only a few kilometres away from Gerolstein, a German town which is famous for its mineral water. While Rheinkalk Akdolit's business is centred around our most important resource, water, and its deacidification and filtration, AWA has made a name for itself as an independent institute specialised in water analysis and water chemistry.

The Rheinkalk Akdolit story goes back a long way. Although Pelm has a long tradition of burning dolomitic limestone, it was only in 1960 that Rheinkalk Akdolit underwent a change which transformed the company and paved the way for the company's current special standing. The former owner of Akdolit-Werke GmbH built next to the lime plant in Pelm a fabrication plant for water treatment products.

In 1980, Rheinkalk Akdolit became part of the Rheinkalk Group which, in turn, belongs to Lhoist, an owner-operated Belgian family company and the world market leader for lime and dolomite products.

Akdolit® is now internationally recognised as the name for drinking water and process water-specific products and solutions.
For years Akdolit® products and the people behind them have enjoyed an outstanding reputation in the world of drinking water.

Visitors to the plant cannot miss the tilted and massive 2 metre wide granulating trays in which carefully dosed amounts of water are added to fine-grained mixtures of lime and other raw materials to produce spherical, virtually dust-free granules which are perfectly tailored to the customers' precise specifications. After the granulation process has been completed, the granules are partially recarbonated, dried, bagged and dispatched all over the globe.

Akdolit® products are in use on all continents. Due to the specialised nature of this market, which often requires direct customer consultation, there is a presence of specialised Lhoist employees or authorised representatives in many countries.

Akdolit® Products are a Success Worldwide

AWA Institut – the Analysis Specialists

For many years now, Akdolit has been working closely together with the AWA Institut on matters relating to water analysis and water chemistry. AWA is an independent laboratory with many years of experience in the field. It is accredited in accordance with EN ISO/IEC 17025:2005, and is officially recognised as an independent testing laboratory. Germany's first laboratory of its kind, it was awarded the "Systematic Safety" quality seal.

Services Offered by the AWA Institut:

Drinking Water and Natural Water Analysis, Swimming Pool Water Analysis

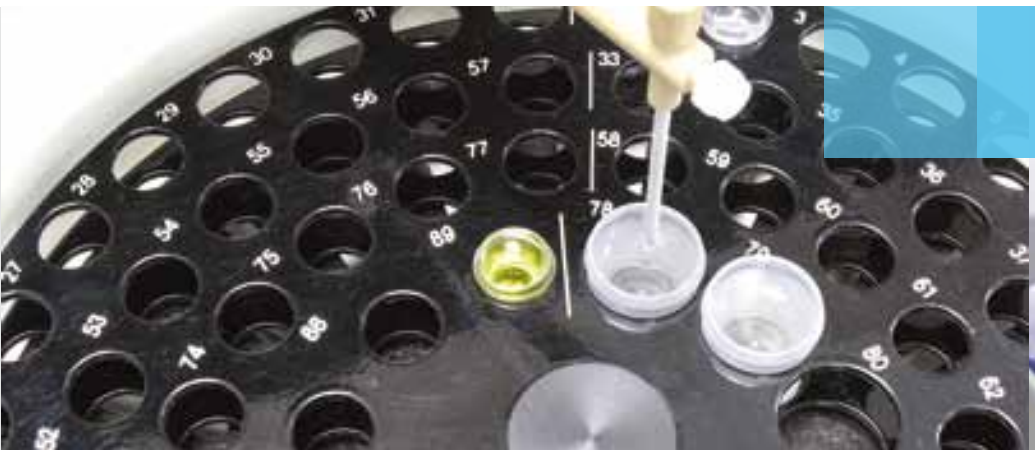
The AWA Institut performs regular drinking water analyses as required by drinking water regulations as well as surface and groundwater checks in accordance with state water regulations. Swimming pool and other bathing water analyses in accordance with German industry standard DIN 19643 are also offered by AWA. In addition to the collection of suitable testing samples, the necessary chemical and physicochemical parameters are analysed using state of the art equipment. The results are set out in a comprehensive report which makes due allowance for all relevant circumstances.

Tests of Filter Media

A wide variety of filter materials are essential for effective water treatment because the functions required of them in the filtration process are so varied. It is advisable that inspections of the layering and functionality of your filter media be carried out after a few years' operation to maintain and enhance operating safety in treatment plants. The filter assembly can be assessed in detail by selective sampling filter media from the filter vessel.

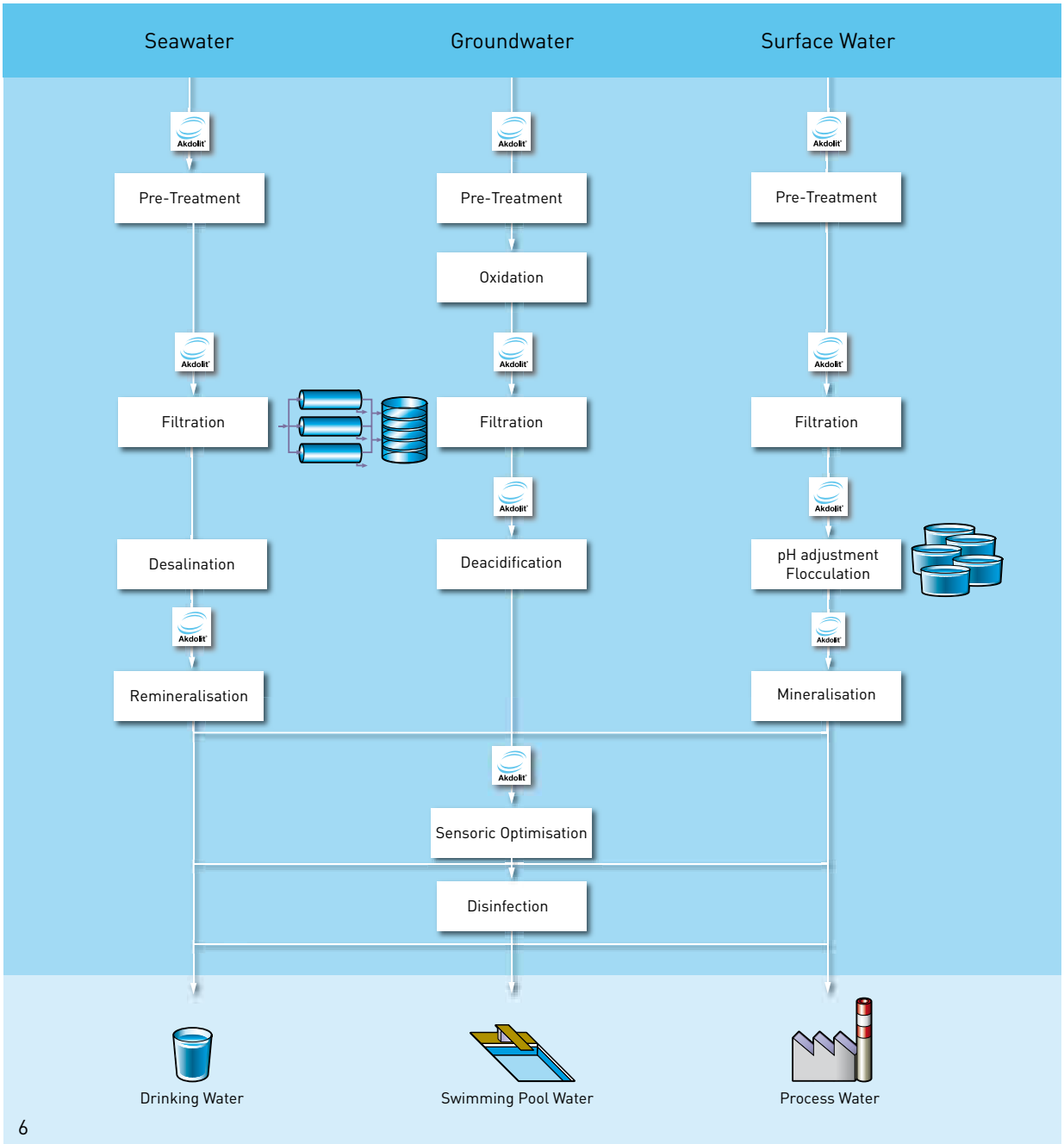
Simulation of Water Treatment Processes

If problems in the water treatment process occure, it is usually a good idea to trial the possible solutions on a laboratory or pilot scale first. Piloting is also an important part of the planning when restructuring or designing a treatment plant. The AWA Institut uses a computer-controlled laboratory filtration system and a pilot plant scale filter module to simulate treatment processes. As several filter columns can be operated in parallel, a direct comparison of the various filter materials is also possible.



The treatment of seawater, groundwater or surface water is generally carried out in several steps. The following diagram shows the various stages of purification. The areas in which Akdolit® can help you with their professional knowledge and experience are marked with the logo.

Purification of Drinking Water and Process Water



Pure Water by Any Natural Means

It is attention to details that confirms competence. The filtering materials used in the Akdolit® product range meet every requirement for filtration media right down to the last detail. Rheinkalk Akdolit offers a broad product range from a single source, providing products and processes which can be tailored to meet customers' individual requirements, always guaranteeing the highest standards in operational safety and efficiency.

This range is backed up by a comprehensive and intensive technical support service - all in all, an offer which you will not be able to find elsewhere. Most of our products are sourced from our own quarries, where we know that they are handled with the sort of care that is only possible in a company with as sophisticated a system of quality assurance as ours. Akdolit® products meet the strict quality requirements of both the European Drinking Water Guidelines and the regulations of the WHO. All materials are regularly inspected to ensure that they comply with DIN and CEN specifications with respect to grain size, stability and chemical composition etc. Rheinkalk Akdolit is certified in accordance with standard EN 9001, as are selected Akdolit® products which have been checked against strict KIWA-ATA specifications and certified in accordance with HACCP.
We offer you quality that you can rely on.

Rheinkalk Akdolit – A Complete Range of Products from a Single Source

Deacidification	Filtration	Special Applications
Akdolit® Magno-Dol CM	Akdolit® Hydro-Anthrasite (N/H/P)	Akdolit® Hydrolit Mg G
Akdolit® CM G	Akdolit® Hydro-Filt (ES/PS)	Akdolit® Hydro-Chlorex
Akdolit® Hydro-Calcit C G	Akdolit® Magno-Filt	Akdolit® Hydro-Sorb
Akdolit® C UP	Akdolit® FS	
Akdolit® Q	Akdolit® Hydrolit-Mn	
Akdolit® H	Akdolit® Mn FS	
Akdolit® SL		

Deacidification – for Top Water Quality

The requirements for our drinking water quality have been set very high; it must not be detrimental to health or have any corrosive properties. This is the reason why it frequently has to be deacidified and hardened to stabilize it. Rheinkalk Akdolit offers a wide range of filtering materials and has the perfect solution for every type of untreated water and for every treatment purpose.

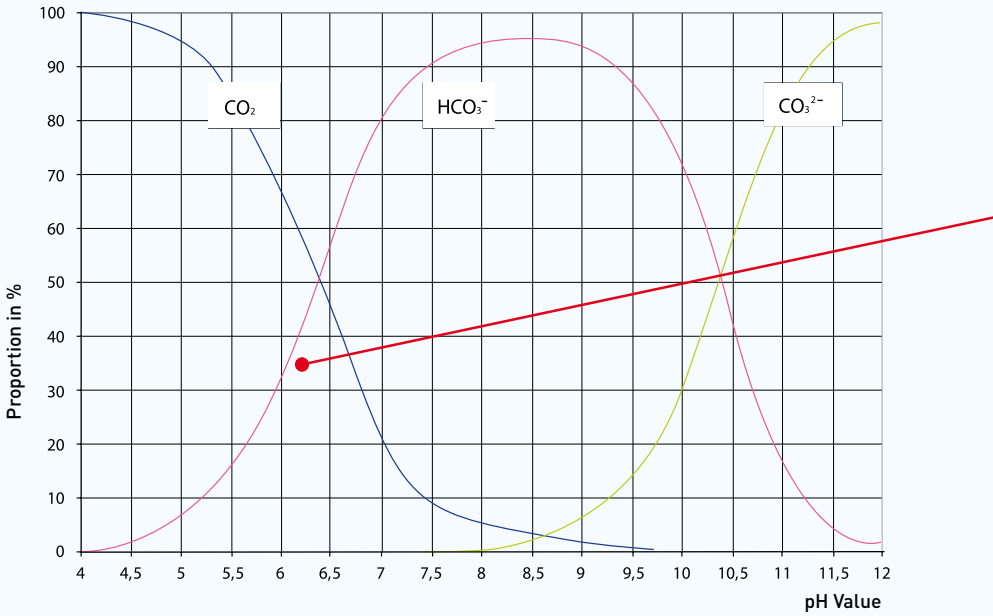
The various filtering materials used by us have various degrees of reactivity depending primarily on their chemical composition. Grain size is also a key factor influencing the so-called empty bed contact time (EBCT). Akdolit® has also pioneered modifications to traditional water hardening processes which have made it possible to develop safe and economical procedures for water treatment plants. They also have another additional advantage which is quite important: deacidification filters which use Akdolit® products also help to remove particulate contaminants from water.

The choice of grain size and the shape are determined by the filter's filtration properties.

In addition to filter-based deacidification of water, there are methods of pH adjustment involving lime-based compounds which can be used to harden untreated water. Akdolit® offers a ready-to-use and highly reactive milk of lime suspension which does not sediment, is easy to use and produces reliable results. Users who wish to produce their own milk of lime on site can use Akdolit® fine-grain lime and lime hydrate.

Hardened, well-buffered water in chemical equilibrium has no corrosive properties. It complies with the requirements specified in both German drinking water regulations, and the European Drinking Water Directive.

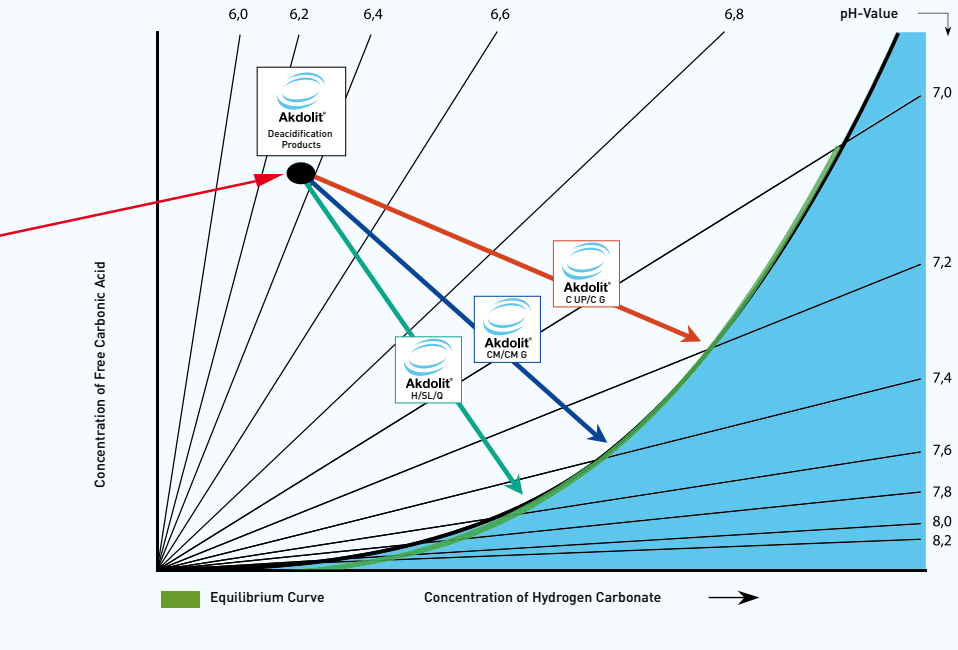
Deacidification – Filtration Materials



Akdolit® Deacidification Products

Product	Application	Hardening Properties	Advantages	Delivery Form
Akdolit® Magno-Dol CM Dolomitic filtering material, complies with EN 1017	In open or closed fixed-bed filters as specified in DIN 19605	1.0 ° per 10 mg/l bonded CO_2	Enables deacidification, deferrisation and demanganisation to reach calcium / carbonic acid equilibrium without releasing foreign substances into the water	Splintered material of varying grain size
Akdolit® CM G (Gran) Dolomitic filtering material, complies with EN 1017	In open or closed fixed-bed filters as specified in DIN 19605	1.0 ° per 10 mg/l bonded CO_2	Enables deacidification, deferrisation and demanganisation to reach calcium / carbonic acid equilibrium without releasing foreign substances into the water	Spherical granules of varying grain size
Akdolit® Hydro-Calcit CG Calcium carbonate-based filtering material, complies with DIN EN 1018	In open or closed fixed-bed filters as specified in DIN 19605	1.3 ° per 10 mg/l bonded CO_2	Enables deacidification, deferrisation and demanganisation to reach calcium / carbonic acid equilibrium without releasing foreign substances into the water	Spherical granules of varying grain size
Akdolit® CU P (Hydro-Carbonat) Calcium carbonate-based filtering material, complies with DIN EN 1018	In open or closed fixed-bed filters as specified in DIN 19605	1.3 ° per 10 mg/l bonded CO_2	Enables deacidification, deferrisation and demanganisation to reach calcium / carbonic acid equilibrium without releasing foreign substances into the water	Splintered material of varying grain size
Akdolit® H Water-hardening agent, complies with EN 12518	For dosing either in dry form or in wet form as an aqueous suspension	0.6 ° per 10 mg/l bonded CO_2	Enables deacidification and decarbonation to reach calcium / carbonic acid equilibrium, adjust the pH value	In powder form
Akdolit® Q Water-hardening agent, complies with EN 12518	For dosing either in dry form or in wet form as an aqueous suspension	0.6 ° per 10 mg/l bonded CO_2	Enables deacidification and decarbonation to reach calcium / carbonic acid equilibrium, adjust the pH value	In powder form
Akdolit® SL Water-hardening agent, complies with EN 12518	For dosing as an aqueous suspension	0.6 ° per 10 mg/l bonded CO_2	Enables deacidification and decarbonation to reach calcium / carbonic acid equilibrium, adjust the pH value	As a suspension

Calcium / carbonic Acid Equilibrium



Filtration – Naturally Pure Water

Most drinking water purification installations have open or closed filter units which are used to remove impurities. Various filtration materials and filtering processes are used for the treatment of different types of untreated water e.g. groundwater or surface water, depending on its initial quality and the desired filtrate quality; Akdolit® filtration materials are the perfect solution for the many difficulties involved in water treatment. Coal-based materials such as anthracite, lignite coke and petroleum coke complement our range of products, as do natural dolomite, sand, pumice and expanded slate.

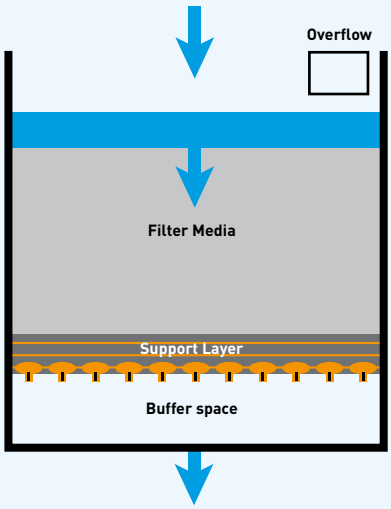
The structure of a fixed-bed filter depends on the treatment required for the water. This normally entails removal of iron, manganese and ammonium ions, heavy metals, turbidity and organic containments. Fixed-bed filters can be configured as a single-layer or multi-layer filtration system. A single-layer system contains only the supporting layer plus a homogeneous layer of filtering material.

Multi-layer filters use carefully selected combinations of mutually compatible materials. Their advantage is, firstly, that they produce very good filtrate quality despite relatively low filter thickness and, secondly, that they can handle higher contaminant loads. In many cases they have more than twice the capacity of a single-layer filter, which brings significant savings in filter backwashing costs and increases efficiency. One example of an application in which multi-layered filtration has proven to be very effective is in filtration of iron, manganese and in flocculation filtration.

In order to ensure that you choose the best filter system and filtration materials to provide you with an optimal result, Rheinkalk Akdolit offers a comprehensive consultation service. Our experts will take your required filtrate quality and desired economy of operation into account and help you to develop the optimal solution. The service package is topped off with water analyses and filter media testing.

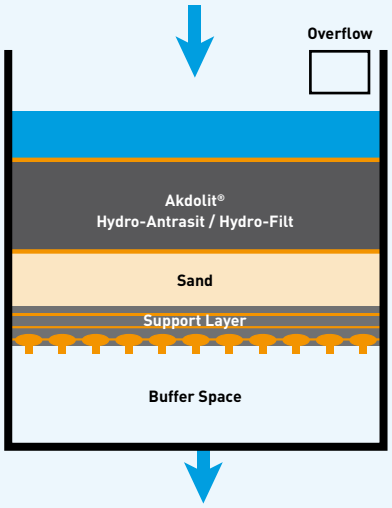
All Akdolit® products can be operated in open and closed fixed bed filters in accordance with industry standard DIN 19605.

Single-Layer Filter



Use of surface filtration, good filtrate quality, but low contaminant loading capacity

Multi-Layer Filter



Use of deep bed filtration, enhancement of filtering function, higher contaminant loading capacity, less filter resistance, longer running times.

Akdolit® Filtration Products

Product	Components	Applications	Advantages	Delivery Form
Akdolit® Hydro-Anthrasit N Coal-based filtering material in compliance with DIN 12 909	Natural anthracite	Treatment of drinking water, process water and water for swimming pools	Proven, ready-to-use base product	Splintered granules
Akdolit® Hydro-Anthrasit H Coal-based filtering material in compliance with DIN 12 907	Thermally treated coal	Treatment of drinking water, process water and water for swimming pools	Absorbent properties with respect to e.g. disinfection by-products	Porous, splintered granules
Akdolit® Hydro-Anthrasit P Coal-based filtering material in compliance with DIN 2000 DIN 19643	Thermally treated special coal	Treatment of drinking water, process water, boiler feed water and condensate	Virtually no release of silicic acid or salts	Splintered granules
Akdolit® Hydro-Filt PS Micro-porous, alumosilicate filtering material in compliance with EN 12 906	Natural silicates	Treatment of drinking water and process water	Porous structure enhances efficacy of catalytic and biological processes, e.g. deferrisation, demanganisation, ammonium degradation. Optimised backwashing.	Porous, splintered granules
Akdolit® Hydro-Filt ES Micro-porous, alumosilicate filtering material in compliance with EN 12 905	Natural silicates	Treatment of drinking water, process water and wastewater	Porous structure enhances efficacy of catalytic and biological processes, e.g. deferrisation, demanganisation, ammonium degradation.	Porous, splintered granules
Akdolit® Hydrolit-Mn Manganese dioxide-containing contact filtering medium in compliance with DIN EN 14 368	Natural calcium carbonate and manganese dioxide	Treatment of drinking water, process water, sometimes in conjunction with deacidification filtration materials or potassium permanganate additives	Rapid elimination of manganese	Splintered granules
Akdolit® Mn FS Manganese dioxide-containing contact filtering medium	Natural silicates and manganese dioxide	Treatment of drinking water, process water, sometimes in conjunction with deacidification filtration materials or potassium permanganate additives	Rapid elimination of manganese, starting at a pH of 6.5	Splintered granules
Akdolit® Magno-Filt Calcium and magnesium carbonate-containing filtering medium	Carbonate-based minerals	Treatment of drinking water and process water	Filters out suspended matter, precipitated or flocculated iron and manganese, and turbidity	Splintered granules
Akdolit® FS Filter sands in compliance with DIN EN 12 904	Natural sands	Treatment of drinking water and process water	Used in fixed-bed filters in conjunction with Hydro-Anthrasit and Hydro-Filt in multi-layer systems	Spherical granules

Special Products

Our comprehensive range of products is complemented by a number of special products. Whether you need a product for use in neutralisation boxes of condensing boilers or for the neutralisation of weak mineral acids, Akdolit® Hydrolit Mg G is the right product for you. As a product of the chemical reaction, readily soluble salts are formed and the neutral filtrate can be draine off at no significant expense.

Activated carbons based on coconut shells are ideal for various purification purposes in drinking water treatment, e.g. the removal of odours and tastes. They can also be used as a safety precaution after ozone treatment of swimming pool water and for the removal of bonded chlorine and trihalogen-methane.

The Akdolit® range also includes other activated carbon products with varying adsorption capacities which make them ideal for removal of other organic compounds.

Very high chlorine concentrations are often needed in the drinking water supply of many non-European countries to ensure hygienic drinking water quality. Akdolit® Hydro-Chlorex makes it possible to reduce the chlorine concentration directly at point of use, leaving only calcium sulphate and calcium chloride residues in the water.

Special Akdolit® Products

Product	Components	Applications	Advantages	Delivery Form
Akdolit® Hydrolit-Mg G Alkaline-reacting filtering material	Magnesite	Treatment of drinking water and process water Treatment of groundwater, surface water and wastewater Neutralisation of light mineral acids and condensates from condensation boilers	Ideal for deacidification of water containing high concentrations of sulphate and calcium, hardening effect, highly reactive, no gypsum formation	Spherical granules
Akdolit® Hydro-Sorb Activated carbon filter material in compliance with DIN EN 12 915	Based on coconut shells	In open or closed fixed-bed filters in compliance with in DIN 19 605. Treatment of drinking water, process water and swimming pool water	Eliminates undesirable odour, taste, colour and ozone, dechlorinates. Lowers concentration of organically bound carbon (TOC), chemical oxygen demand (COD) or biological oxygen demand (BOD)	Porous, splintered granules
Akdolit® Hydro-Chlorex Dechlorination material	Calcium sulphite	Sluice filters; treatment of drinking water, process water and swimming pool water	Dechlorination through filtration. No release of foreign substances. Conversion of chlorine into readily soluble calcium salts. Eliminates chlorine odour and unpleasant taste. Can be used in sluice filters - no dosage equipment necessary. Cleaned by backwashing - economic in use	Cylindrical pellets

Seawater Treatment

The globally increasing demand for drinking water has made an increased use of seawater necessary; however due to seawater's high salt content, desalination is essential. Ships also use this treatment process.

A desalination unit is usually subject to a purification process as a pre-treatment, which can be carried out using a multi-layer filtration system. This deep bed filtration system has a number of advantages, offering a significantly larger loading capacity and considerably increasing the filter's running time.

Akdolit® Hydro Filt PS has proven to be an effective filtration material for the top layer in many systems. While the porous structure improves the filtration process, the low density has a positive effect on the pump capacity required for backwashing. These two advantages lead to a significant increase in productivity and economy.

Desalination produces a distillate (or permeate) which has a high corrosion potential due to its low mineral content, which makes it dangerous for pipes and fittings. Corrosion damage and a lower drinking water quality due to dissolved heavy metals are the consequences in this case.

Health concerns e.g. in the form of allergic reactions cannot be ruled out. This danger can be counteracted with remineralisation (hardening) of the corrosive distillate (or permeate).

The hardening is carried out through filtration of the desalinated acidic water (CO_2 or mineral acids) using lime or dolomite-based materials.

In practice, our Akdolit® Hydro-Calcit C G and Akdolit® CM G products have demonstrated their high performance in many systems. Both granulates guarantee a precise adjustment of the water hardness, ensuring sufficient corrosion protection.

The high reactivity of these granuales also ensures a compact filter design which is well suited to ships where low space availability and weight are important factors.

Technical Advice for Filter Applications

The major technical problems posed by the purification process of drinking water, process water and swimming pool water make individually-designed solutions necessary for effective water treatment. Our application support department has wide experience with virtually all recognised filtering processes and will be glad to help you select the best filtering method to suit your needs. The department's technical centre has a large selection of test filters and equipment in which various scenarios can be run and solutions tested in laboratory batch trials with samples of the customer's input water.

Our service also includes on-site installation of trial filters at waterworks and functional checks on your own water treatment plant using the latest technical procedures. The results are then evaluated by experienced technicians who then draft proposals aimed at making your treatment process function more efficiently and economically. Their reports can be used as a basis for planning restructuring or renovation of existing waterworks or designing of new ones. We also test mixed water in accordance with worksheet DVGW W 216 and the corrosive properties of water in accordance with standard DIN 12502.

Rheinkalk Akdolit is naturally willing to offer its services for ongoing maintenance of existing water treatment plants and give recommendations to improve their efficiency, and also to aid in planning of new ones. Our qualified specialists will visit your company and work together with your staff to find the optimal solution. Akdolit® designs new solutions that are tailor-made for the individual customer's needs providing you with new processes and combinations of filter materials that can significantly enhance the safety, quality and efficiency of your water treatment processes.

The company tests the reliability and accuracy of planned solutions through a series of laboratory trials and tests before they are commissioned. As a part of this service we also offer the sampling and analysis of water and filter media.

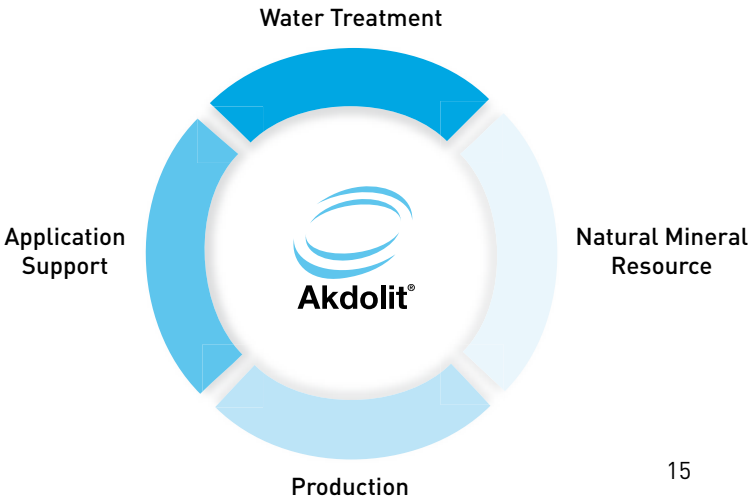
Research and Development

Water purification is constantly faced with new challenges, with modern analytical technology identifying organic and microbiological contamination that requires various different types of filtration systems. The global demand for seawater desalination has also seen new challenges arise which require filtration solutions. The ongoing development of Akdolit® products is a result of close cooperation with their customers and is central to Rheinkalk Akdolit's corporate policy.

Our years of experience working in professional committees and standards boards have given Rheinkalk Akdolit the chance to quickly recognise market trends and to react flexibly. Current research projects which are being carried out in cooperation with various universities yield new insights for the development of pioneering products and solutions.

In addition to their experienced specialists, Rheinkalk Akdolit also has the advantage of cutting-edge technology.
This includes electron microscopy, x-ray diffraction and x-ray fluorescence analysis. These methods offer comprehensive information about the structure and surface of the filter materials. Both have a decisive influence on the products' reactivity and effectiveness.

Modern production plants enable the application of the research results. This allows us to produce filter materials which are optimised to meet customers' individual requirements. Akdolit® products can be modified to make them appropriate for special applications.



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