



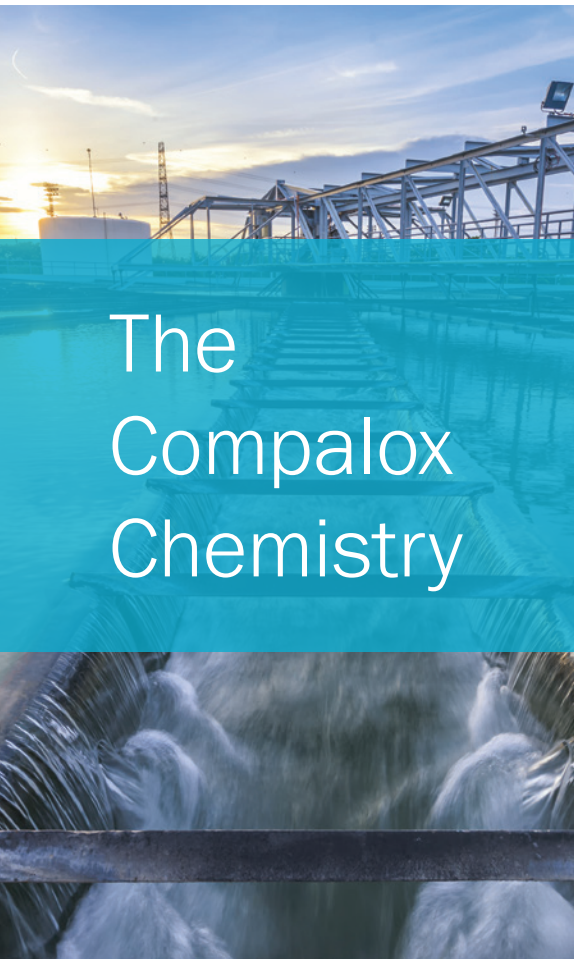
Compalox[®]

Activated Aluminum Oxides

for Sustainability and the
Adsorption of Pollutants
and Harmful Substances



HUBER | MARTINSWERK
ACTIVATED ALUMINAS



The Compalox Chemistry

Activated powders are commonly used to extract impurities from liquids because of their highly adsorptive properties.

Huber | Martinswerk manufactures Compalox® granular activated aluminum oxides via a specially designed process.

- The **granular form** allows flow into fill columns easily, resisting deagglomeration into powders.
- **High surface area** allows extraction of impurities from liquids.

Huber | Martinswerk tightly controls the granulation / compaction process of tailor-made aluminum hydroxide $[\text{Al}(\text{OH})_3]$ and the subsequent activation process into boehmite $[\text{AlOOH}]$ or aluminum oxide $[\text{Al}_2\text{O}_3]$. The resulting low-dust granulates are easy to handle, have high specific surface area, high crystallinity and large pore volumes.

Because of their physical properties, activated alumina can be used in many areas as an adsorbent.

Applications

Compalox® activated aluminum oxides remove a variety of impurities by adsorption from either liquid or gaseous media. Depending on the pH value, flocculation adsorption can also be achieved.

The degree of adsorption depends on the polarity of the substances to be removed. Polar compounds are more strongly bound to water vs. non-polar compounds. When different polar substances are presented at the same time, Compalox products adsorb these at different rates. Therefore, Compalox activated aluminum oxides can be used (for example) with good results in the drying and purification of organic liquids and gases.



Removal of environmentally problematic pollutants from open circuits



Removal of harmful substances from closed circuits



Selective purification of crude products



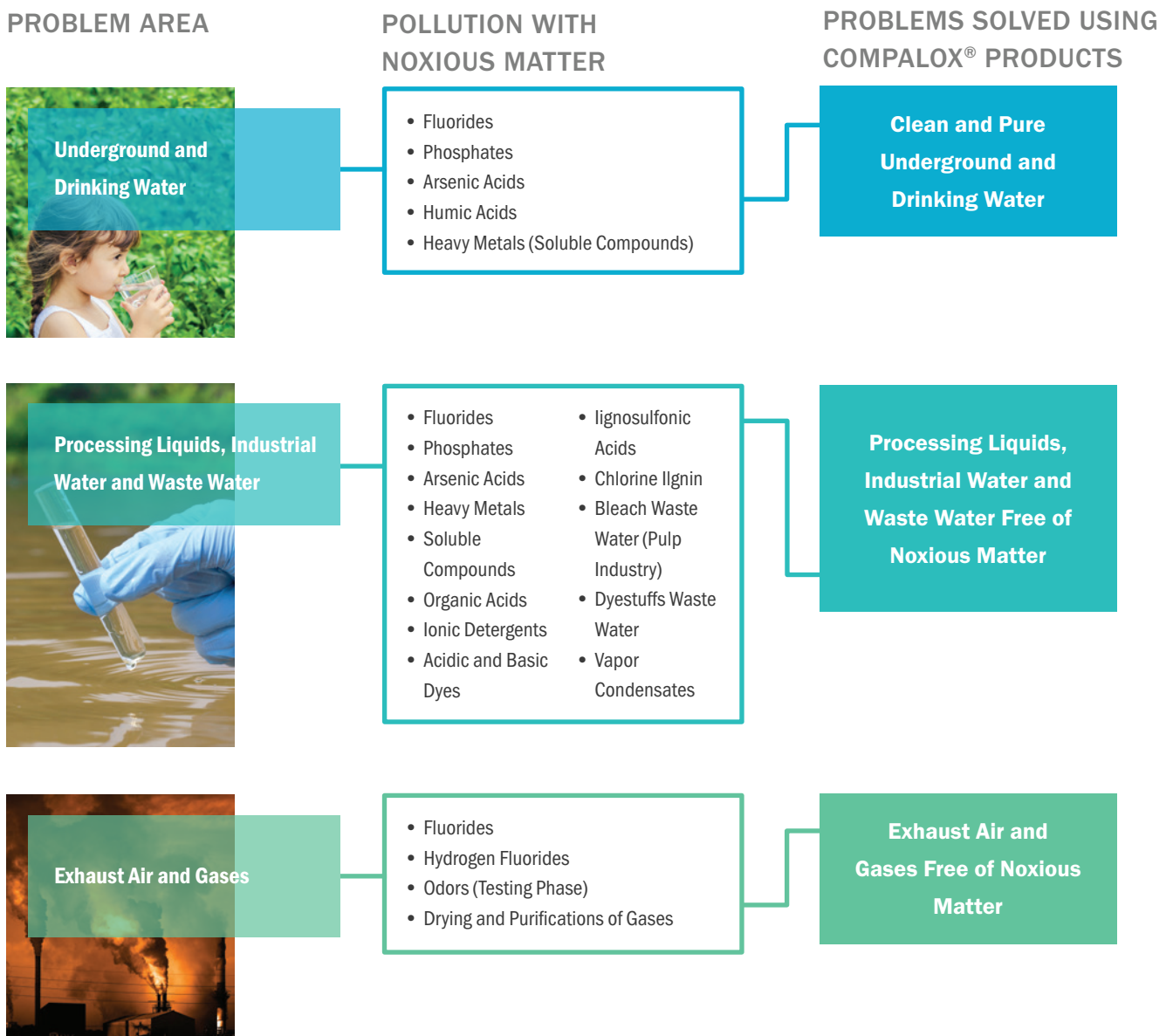
Concentrating highly diluted pollutants or desired products for further processing

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Application Examples

Examples of Compalox[®] product applications are featured below. Huber | Martinswerk works closely with customers, research institutes and experts in the field of environmental protection to contribute to the successful reduction of harmful pollutants in a variety of key areas.



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Typical Physical Properties

The following overview features the chemical and physical characteristics of Compalox[®] activated aluminum oxides:

CHEMICAL ANALYSIS

(Average Values in Weight Percent)

Al ₂ O ₃	92%
SiO ₂	0.02%
Fe ₂ O ₃	0.02%
TiO ₂	0.005%
Na ₂ O	0.4%
Loss On Ignition	8%

PHYSICAL PROPERTIES

Specific Surface Area (m ² /g)	230 to 330
Water Absorption % (Static)	
10% Relative Humidity	5.5
60% Relative Humidity	17.6
Bulk Density (kg/m ³)	950
Specific Gravity (g/cm ³)	3.1
Pore Volume (cm ³ /g)	Total 0.35
Breaking Strength (N) (with Pfizer Tablet Hardness Tester)	
1 - 1.5mm	ca. 30
3mm	ca. 80
5mm	ca. 150

AVAILABLE PRODUCT GRADE GRANULAR SIZES

Compalox [®] AN/V-801	0.3 - 1.0mm
Compalox [®] AN/V-802	0.3 - 2.0mm
Compalox [®] AN/V-812	1.2 - 2.5mm
Compalox [®] AN/V-813	1.0 - 3.0mm
Compalox [®] AN/V-825	2.0 - 5.0mm
Compalox [®] AN/V-827	2.5 - 6.5mm
Compalox [®] AN/V-850	5.0 - 10.0mm

Huber | Martinswerk selectively produces a variety of Compalox grades, which differ mainly by granule size distribution, specific surface area (230 to 330 m²/g) and pore size distribution. The loss on ignition is usually in the range of 7 to 10 weight percent.

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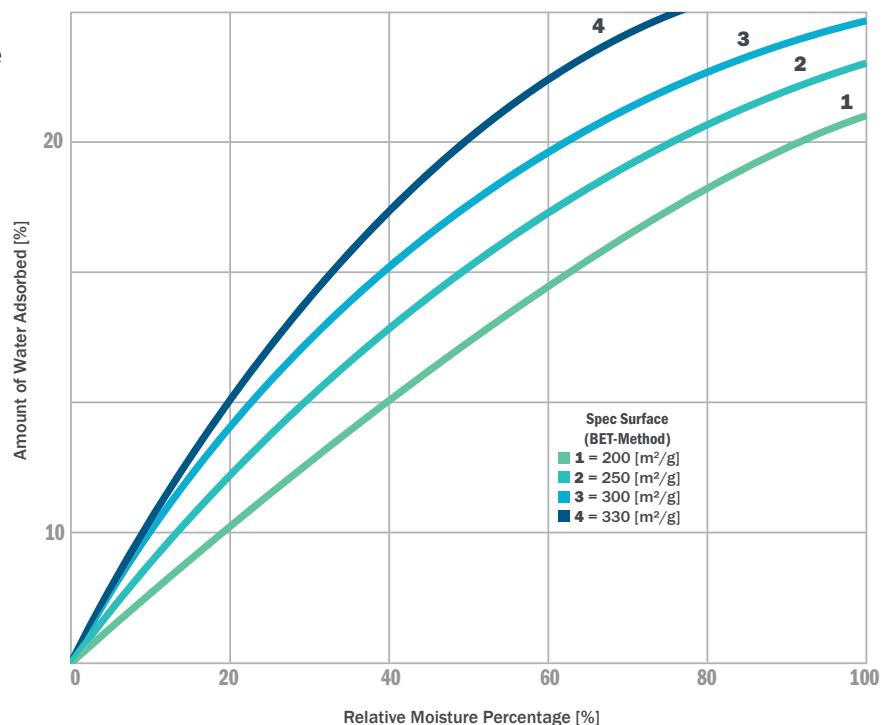
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Adsorption

By adsorption—gases, vapors or dissolved substances are physically bound on the surface of solid, porous materials.

When using Compalox[®] activated aluminum oxides as an adsorbent, the occurring adsorption isotherms can be described mathematically by the Langmuir or Freundlich equation. The static adsorption of water from the gas phase is shown in the adjacent graphic as an example of the adsorption capacity of various qualities of Compalox[®] products.

Adsorption Isotherms for Water with COMPALOX[®] Activated Aluminum Oxides



A reduction of harmful substances using Compalox activated aluminum oxides is possible in all adsorption reactors. Sufficient contact time between the adsorbent and the medium to be cleaned must be ensured. For each individual problem, a separate process needs to be designed.

Huber | Martinswerk has extensive experience in the use of Compalox activated aluminas to reduce harmful substances. We offer detailed technical advice on your specific application situation.

When using fixed-bed reactors, the following guidelines can be given for the equipment design. Contact time of 0.5 to 0.75 hours and filter flow velocities of about 1-2 m/hour should be applied. By doing this, an optimum adsorption of the relevant pollutants is ensured. In other reactors, the operating parameters must be chosen so that optimum adsorption is achieved.

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Process Flow

Compalox® Activated Aluminum Oxides Regeneration

Compalox® activated aluminum oxides regeneration is possible in most applications and desirable. When planning a continuous adsorption process, it has to be taken into account that the reactor with the highest pollutant levels has to go through regeneration phase in cycles. The total capacity must be calculated in a way where the maximum adsorption capacity is always guaranteed.

The selection of a suitable method for the regeneration depends on the nature of the adsorbed substances and possible further marketability.

Organic contaminants may be removed by a thermal treatment (up to maximum of 400°C) without Compalox adsorbent activity loss.

Inorganic contaminants, such as phosphates or fluorides, can be eluted by a shift adjustment of the pH.

Huber | Martinswerk has more than half a century of experience supplying Compalox activated aluminum oxides and in addition to the individual product grades we've discussed, we provide superior technical service and expertise along with our dedicated and personalized customer care that's second-to-none.

Contact us today for more information and to obtain samples of our Compalox products.

Email: hubermaterials@huber.com
Click: hubermaterials.com/compalox



EUROPE / MIDDLE EAST / AFRICA

Martinswerk GmbH
Kölner Strasse 110
D-50127 Bergheim, Germany
+49-2271-902-0
Fax: +49-2271902-710

NORTH AMERICA

Huber Engineered Materials
3100 Cumberland Blvd.
Suite 600
Atlanta, Georgia, US 30339
866-564-8237

ASIA PACIFIC

Huber Fire Retardant Additives (Qingdao)
Co. Ltd.
8th Floor; No. 2 Building, No. 7
Wuyishan Road
Huangdao District
Qingdao, Shandong
266555 China
+86-532-58792008



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