BASF Adsorbents at a glance
The BASF Difference

At BASF, we make adsorbents differently. The difference comes from not only making our adsorbents differently, it comes from thinking differently. BASF leads the way in helping businesses and institutions across industries meet and exceed stringent moisture control standards with a variety of superior and unique alumina, desiccant and adsorbent technologies that underscore BASF’s reputation for delivering ingenious answers to tough business challenges. It is this distinction that sets us apart. Customers seek us out in the marketplace for all their adsorbent requirements. We make adsorbents differently.

BASF Adsorbents

BASF offers a wide range of adsorbents for a broad spectrum of applications in industries such as refining, petrochemical, chemical, and gas processing. The BASF portfolio includes proprietary alumina, silica, bentonite adsorbent technologies and the base metal oxide PuriStar® line of guard beds.

Customers First

BASF’s state-of-the-art adsorbents are backed by the best technical support in the industry. Technical service for application, design, optimization of the adsorption process and regeneration, and troubleshooting are available in our global markets. BASF understands that support and service are paramount for achieving customer success. Both technical service and adsorbent development are supported by BASF laboratories. We are dedicated to offering intelligent system solutions that work together with our outstanding customer and technical support.
Diverse BASF Adsorbents for Numerous Markets

- Dehydration of Natural Gas and Petrochemical streams
- Sulfur recovery via Claus and Tail Gas treatment catalysts
- Hydrocarbon recovery from natural gas
- Catalyst substrates and intermediates
- Purification of hydrocarbon streams
- Purification of industrial gases
- Dehydration of compressed air
- Bed support media
- Molecular sieves
Alumina Adsorbents

- Tailored pore size distribution
- Physical durability with uniform ball size, high crush strength, low abrasion and high adsorptive capacity
- Available in powder, granular and spherical forms in standard and custom sizes
- Impressive range of adsorbent products including Selexsorb® adsorbents, chloride traps, and Claus catalysts
- Boehmite and boehmite-based gamma alumina powders are available for such applications as automotive and chemical catalysts, catalyst binders and abrasives

Active Bentonite Adsorbents

- Remove unwanted olefinic species in aromatics streams with the F-24 family of activated clays
- Highly-effective purification of benzene, toluene and xylene
- Trusted and proven activation technology (H₂SO₄) for outstanding performance
- Superior water stability to withstand process disturbances
- Capability to handle a wide-range of operational requirements, including low pressure drop, high selectivity, or maximum cycle length
- Bentonite-based Novasil™ Plus flow agent, used to protect poultry feeds

Sorbead®/KC-Trockenperlen®
Alumino-Silica Gel Adsorbents*

<table>
<thead>
<tr>
<th>Sorbead Properties</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Low regeneration temperatures</td>
<td>- Reduced energy consumption</td>
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<td></td>
<td>- Minimal hydrothermal aging</td>
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<tr>
<td></td>
<td>- Lower operational costs</td>
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<tr>
<td>Bead shape</td>
<td>- High abrasion resistance</td>
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<td></td>
<td>- Low pressure drop</td>
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<td></td>
<td>- Reduction of energy and operational costs</td>
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<tr>
<td>Long-life</td>
<td>- Decreased adsorbent replacement expense</td>
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<td></td>
<td>- Lower service and operational costs</td>
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<tr>
<td>Large specific surface area</td>
<td>- Greater adsorption capacity</td>
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<tr>
<td></td>
<td>- Increased drying performance</td>
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<tr>
<td></td>
<td>- Low pressure dew points (minus 70°C)</td>
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<tr>
<td>High bulk density/high loading capacity</td>
<td>- Reduction of plant size</td>
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<td></td>
<td>- Increased capacity of existing equipment</td>
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<tr>
<td></td>
<td>- Substantial savings in both construction and operational costs</td>
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<tr>
<td></td>
<td>- Improved operational benefits due to longer regeneration cycles</td>
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*In Europe, Sorbead™ adsorbents are known by the registered trade name KC-Trockenperlen™
Catalyst Substrates and Intermediates

Catalytic Grades of Alumina: Excellent combinations of purity and porosity
- Aluminas of extraordinary purity (less than 0.01 wt% by weight)
- Controlled production processes result in tailored chemical and physical properties
- Range of crystallinities provides suitable product for a variety of applications

Gamma Phase Catalytic Aluminas: Controlled pore distribution in pseudoboehmite-based alumina powders
- Produced from medium density, high purity pseudoboehmite feed or precipitated aluminas of varying densities and purities
- Ideal for washcoat-type catalyst support, specialty desiccants, and abrasives in polishing and scrubbing applications

Automotive Washcoat Powders (AWP): Diverse family of standard, stabilized and promoted aluminas
- Diverse selection of AWP categories
- Provide the increased surface area which leads to a reduced diffusion resistance
- Gamma alumina powders with promoters for enhanced thermal stability and functionality

Spherical Catalyst Carriers: Unique smooth, porous alumina and silica spheres
- Wide range of spherical porous carriers to comprehensively meet the needs of heterogeneous catalyst manufacturers
- Unique and controlled manufacturing processes to provide suitable carriers for numerous applications
- Spheres with outstanding properties: nearly inert to highly active surface chemistry

Petrochemical Purification Products

Combinations of Selexsorb®, PuriStar®, ProSorb® and other BASF adsorbents provide comprehensive purification and contamination solutions.
- Selexsorb Activated Alumina Products
  - A select group of promoted state-of-the-art alumina adsorbents that are used in various aspects of olefin production and refining
  - Most offer the added benefit of regeneration at high temperature for use in multiple cycles
- PuriStar and ProSorb Metal Oxide-based Products
  - Use selective chemical reaction to remove a wide range of contaminants

Contaminants Removed:
- COS, H₂S, CS₂
- CO, CO₂, H₂O, NH₃
- Mercaptans
- Sulfides, Disulfides
- Thiophenes
- Oxygenates (Alcohols, Aldehydes, Ketones, etc.)
- Amines, Amides, Nitriles
- Organosilicates
- Arsine
- Oxygen
- Hydrogen
- Phosphine
- Acetylenes and Dienes (Trace)
Claus Catalysts

BASF offers the most comprehensive line of Claus Catalysts from any single provider in the industry. They provide:

- Maximum H₂S, COS and CS₂ conversion efficiency
- Substantial number of accessible surface active sites
- Good large pore volume distribution for sustained activity (High macroporosity)
- High crush strength and chemical purity
- Low bulk density which directly lowers catalyst expense
- Uniform size and shape for lower pressure drops
- Optimal catalyst for every stream and condition
- Comprehensive global technical support and service

Zeolite Molecular Sieves

Outstanding zeolite molecular sieves offer:

- High adsorption of water at low partial pressures
- Separation of compounds with similar polarity
- Selective adsorption or separation based on molecular size
- Polar compound drying
- Uniform ball size for consistent pressure drop

Molecular Sieve adsorbents are available in the following forms:

- 3Å K-Na zeolite A with a nominal pore opening of 3 Å (0.3 nm)
- 4Å (as-synthesized) Na zeolite A with a nominal pore opening of 4 Å (0.4 nm)
- 5Å Ca-Na zeolite A with a nominal pore opening of 5 Å (0.5 nm)
- 13X Na zeolite X with a nominal pore opening of 10 Å (1.0 nm)

Superior, extensive product line includes:

- Activated Spherical Alumina Catalysts
- Titania (TiO₂) Catalysts
- Alumina/Titania Composite Catalysts
- Promoted Alumina Catalysts
- Bed Supports
- CoMo Tail Gas Catalysts
Custom Manufacturing Services

Delivering superior processing capabilities with innovative solutions

- Delivering robust services backed by experience, flexibility, and certification
- Collaboration with customers for the acceleration of product commercialization
- Pioneered ground-breaking alumina technologies

Customize with BASF

At BASF, our expertise with adsorbents continues to expand to meet our customers’ growing needs. We work in unison with our customers to:

- Choose commercial products most suitable for the intended applications by balancing parameters such as the cost of forming various materials with the performance benefits each material offers.
- Scale up the product/material found most satisfactory in the lab or pilot plant trials by monitoring, interpreting and assessing pilot plant/commercial scale process data in order to optimize product performance for a specific application.
- Optimize the final formulation and process selection based on both technical and economic considerations with our expertise in product manufacturing and understand the associated costs.
- Develop new or modified oxide-based materials and test these products.

### Application Products

<table>
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<tr>
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<td>Hydrocarbon Recovery</td>
<td>Sorbead R, Sorbead H, Sorbead WS</td>
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<tr>
<td>$\text{H}_2\text{O}$</td>
<td>CPN, DD-6, DD-PG</td>
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<tr>
<td>$\text{COS, H}_2\text{S, CS}_2$</td>
<td>Selexsorb COS, D-1275/D-1280, Prosorb®, R3-12, R3-16, Selexsorb AS, Selexcat, E-315/R9-12</td>
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<tr>
<td>$\text{CO, CO}_2$</td>
<td>Selexsorb COS, Prostab, R3-16, R3-17, 4A, 5A, 13X</td>
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<tr>
<td>Chloride</td>
<td>CL-750, CL-760, CL-850</td>
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<tr>
<td>HF</td>
<td>HF-200, HF-200XP</td>
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<tr>
<td>Fluoride</td>
<td>CPN, DD-6</td>
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<tr>
<td>Arsine, Phosphine</td>
<td>Selexsorb AS, Prostab, R3-12, R3-16, E-315/R9-12</td>
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<td>$\text{O}_2$, $\text{H}_2$</td>
<td>R3-16, DeOxo™, R3-11G</td>
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<td>Oxygenates</td>
<td>Selexsorb CD, CDX, 13X</td>
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<td>Nitriles, Ammonia</td>
<td>Selexsorb CD, CDX</td>
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<tr>
<td>Mercaptans, Thiophenes,</td>
<td>Selexsorb CD, CDX, 5A, 13X</td>
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<td>Sulfides</td>
<td>D-1275/D-1280, Prostab, Selexsorb SG</td>
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<td>Organosilicates</td>
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<td>TBC (Styrene)</td>
<td>Selexsorb ST</td>
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<td>Aromatics Purification,</td>
<td>F-24, F-25, F-54, F-154</td>
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<td>BTX, Xylenes, Cumene</td>
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<tr>
<td>Claus Catalysts</td>
<td>S-100, S-100SR, S-400, DD-431, DD-831, DD-931, SRC-99i, Ti-1100e</td>
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<tr>
<td>Catalyst Precursors</td>
<td>CP-Powder, G-250, Ga-200, Ga-200L, C-167</td>
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<tr>
<td>Bed Supports</td>
<td>T-162, ABS</td>
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<tr>
<td>Chromatographic</td>
<td>CG-20</td>
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<tr>
<td>Refinery Off-Gas</td>
<td>R3-81, R8-21</td>
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<tr>
<td>Acetylene Off-Gas</td>
<td>R0-20, R3-15</td>
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<tr>
<td>Air Separation</td>
<td>13X</td>
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About Us

BASF’s Catalysts division is the world’s leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF’s Catalysts division develops unique, proprietary solutions that drive customer success.

BASF - We create chemistry

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