



The Company Zeochem

Zeochem is a world-wide supplier of molecular sieve adsorbents with manufacturing capabilities in Louisville KY, USA and Uetikon, Switzerland. The company was founded in 1978 as a joint venture between United Catalysts Inc. and CU-Chemie Uetikon AG, originally established as chemical company in Uetikon in 1818. Today, Zeochem is a wholly owned member of CPH Chemie + Papier Holding AG with Head Quarters in Perlen Canton Lucerne, Switzerland. The group gives work to almost 1000 employees worldwide. (www.cph.ch)

Commercial molecular sieve production began in 1979. This joint venture came out of the strengths of both parent companies in the catalysts, adsorbents and forming technologies to provide specific products to the process and manufacturing industries. Zeochem's focus has always been to offer high quality products and services to the markets it services. The company complements its broad-based foundation of manufacturing, engineering, and technical expertise with it's customer oriented R&D, technical service organization and growing sales force, all technically educated and trained with years of experience in the industries they service.

The Duty of Zeochem

Zeochem LLC and Zeochem AG provide coordinated global support to all molecular sieve adsorbent markets. This is particularly important to natural gas processing, petroleum refining, and petrochemicals where world-wide product and technical support is essential.

Zeochem emphasizes development of innovative, advanced products for the marketplace and customized state-of-the-art manufacturing technology to produce products specific to customers' needs. Zeochem welcomes such alliances with customers for product development. Agreements range from a "handshake" all the way to a formal contract.

The Product "ZEOCHEM[®] Molecular Sieves"

Zeochem's brand is registered under the trade name ZEOCHEM[®]. Molecular sieve adsorbents are crystalline aluminosilicates. Their unique structure allows the water of crystallization to be removed, leaving a porous crystalline structure. These pores or "cages" have a very high affinity for water and other molecules. Aided by strong ionic forces caused by the presence of cations such as sodium, calcium and potassium, the molecular sieve will adsorb a considerable amount of water or other fluids. If the fluid to be adsorbed is a polar compound, it can be adsorbed with high loadings even at very low concentrations of the fluid.

This strong adsorptive force allows molecular sieves to remove many gas or liquid impurities to very low levels (ppm) or less.

Another feature of molecular sieve adsorbents is its ability to separate gases or liquids by molecular size. The pore or "cage" openings are of the same size as many molecules. In the case of hydrocarbon paraffins, the normal, straight chained molecules can fit into the pores and be adsorbed while the branched chain molecules cannot enter the pores and pass by the molecular sieve adsorbents.



There are various types of crystals and cation forms of molecular sieves. Some of the more common types of molecular sieves and their applications include the following:

Type 3A – Will exclude most molecules except water. It is used for natural gas dehydration, cracked gas drying, olefins drying, ethanol drying, refrigerant drying, etc. It is usually made by ion exchanging potassium onto a Type 4A in place of sodium.

Type 4A – This sodium form of the crystal Type A is the least expensive adsorbent, typically used for general drying applications but can be used for removal of carbon dioxide and other compounds as well based upon molecular size.

Type 5A – This is the calcium exchanged form of the A crystal. The strong ionic forces of the divalent calcium ion makes it an excellent adsorbent for removing carbon dioxide, hydrogen sulfide and other weakly polar molecules. This product is also used for separating normal straight chain hydrocarbons from branched hydrocarbons.

Type 13X – The sodium form of the Type X crystal has a much larger pore opening than the Type A crystals. It also has the highest theoretical capacity of the common adsorbents and very good mass transfer rates. It can remove impurities too large to fit into a Type A crystal and is commonly used to separate nitrogen from oxygen.

The Applications

Natural Gas Processing

- Dehydration of natural gas and natural gas liquids
- Removal of CO₂, H₂S, COS, mercaptans, and other impurities from natural gas and natural gas liquids

Hydrogen Production

- Drying and purification of hydrogen utilizing both thermal swing and pressure swing adsorption

Ammonia production

- Purification of the natural gas feed
- Drying and purification of the reformer gas prior to the ammonia loop
- Treating of ammonia off gas streams

Ethylene Plants

- Drying of cracked gas, olefins and by-product liquids
- Acid gas removal from feed streams and selected product streams
- Hydrogen purification

Miscellaneous Petrochemicals

- Drying and purifying of finished products and feed streams to catalytic processes
- Off gas recovery
- Petroleum Refining
- Drying and purifying of cryogenic feed streams
- Drying and purification of feed to catalytic processes, including oxygenates
- Normal paraffin separation



Chemical Storage

- Underground cavern drying and treating
- Storage tank drying and treating
- Product recovery from vent streams

Fuel and High Purity Alcohol Production

- Bulk water removal at the ethanol/water azeotrope
- Drying and purifying food grade and industrial grade alcohols

Air separation (Industrial Gases)

- Drying and CO₂ removal from air to a cryogenic unit
- Drying and purifying high purity oxygen, nitrogen, argon, carbon dioxide, and blended gases

Oxygen production

- Separation of oxygen from air via pressure swing (PSA) or vacuum swing (VSA) adsorption
- Medical oxygen production in small scale PSA concentrators

Others

- Refrigerant separation
- Plastic pellet drying
- Benzene and other cyclics removal in SM/EB plants
- Hydrocarbon and odor removal
- Olefins removal
- Desiccant packs



Manufacturing

Zeochem's proprietary manufacturing processes utilize the latest custom design, computer based technology and machinery. Designed and specified by Zeochem engineers and scientists, special efforts have been made to instrument, monitor, and control all phases of manufacturing, including complete electronic and computer control systems.

Zeochem continues to upgrade and advance. Continuous growth and improvement will allow Zeochem to meet the challenges of the future.

In support of new products and custom products, Zeochem also has the flexibility to operate pilot-sized equipment, modify existing manufacturing processes, and develop new processes.

Research and Development

Since its creation, Zeochem has been a leading developer of molecular sieve technology. The company was one of the proponents of the benefits of beaded over extruded sieve shape, now a widely accepted fact. ZEOCHEM[®] Z3-04 and Z3-06 is the leading sieve to provide three angstrom selectivity with 4A durability for natural gas drying, and the advancements continue in gas processing as well as the other industries Zeochem serves.

Zeochem's customer-oriented research organization is geared to working on real world applications and working jointly with customers. Supported by a wide range of laboratory equipment keyed to adsorption, Zeochem researchers are also backed up by the R&D facilities in the USA and Switzerland. Additionally, Zeochem has relationships with several universities and private laboratories that provide specialized facilities and expertise.

Technical Service

Zeochem's staff of technical service engineers bring years of adsorption design, operations, and laboratory experience to the market.

From the beginning of a project, Zeochem engineers provide conceptual advice and design. As the project moves forward, Zeochem provides review of detailed designs, consultation of last-minute changes, and start-up assistance when the unit is first commissioned.

Follow-up service is also available for troubleshooting of operations and/or optimizing unit performance.

Of increasing importance is the training Zeochem can provide customers' engineers, supervisors, and operators. Zeochem's expertise in this field has been recognized and demonstrated the world over in seminars, conferences, papers, and individual presentations.



Quality Assurance

Quality begins with the raw materials which are set by specifications and monitored by quality control procedures. Detailed operating procedures and state of the art process controls ensure efficient and reliable manufacturing. These are backed up by additional quality control tests at key steps in the process.

The finished product must be certified by a quality control lab independent of the manufacturing organization. Several customized tests specific to a given application have been developed to ensure the Zeochem product will give the expected performance in a given application.

Zeochem has met the certification standards of several organizations and customers. It will continue to meet the standards and procedures of the future as required by the customers and the markets.

Product Packaging and Storage

Zeochem provides products in steel containers or polyethylene-lined polypropylene-woven sacks for the process industry. The product can be palletized or containerized if requested. Special packaging is also available upon request.

Zeochem warehouses all products. Products for the process industry are also warehoused in numerous warehouses throughout the world owned by our distributors for this market segment.

Properly packaged, Zeochem molecular sieve adsorbents can be stored almost indefinitely in an all-weather warehouse. If an on-site warehouse is not available, contact Zeochem for assistance.

Sales

Zeochem has a growing stall of trained and experienced salesmen that handle all customer inquiries. All are trained engineers or scientists knowledgeable of the process markets and the other molecular sieve markets they serve. The process markets salesmen can handle almost all design and technical questions and are backed up by the technical services and research and development departments.

In addition to the Zeochem sales professionals, Zeochem also works with several distributors world-wide, leaders in their field and areas of service.

Contacts

You are welcome to visit our web site where you can find your competent person to talk to, be it for technical support, sales or administration. (http://www.zeochem.com/en/contact/sales_support.htm)