Adsorbents and Catalysts

A Global Manufacturer

HengYe®

www.hengyeinc.com



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Why Choose Hengye Inc?

We offer you

- Molecular sieve, activated alumina, silica gel
- Ideal adsorption capacity and product durability
- ISO certified manufacturing, consistent quality

We will provide

- Reliable adsorbents and catalysts, proven success
- Engineering, technical service, and sales support
- Inventory in Houston, TX: Omaha, NE; Shanghai, CN
- Material analysis and capacity evaluation
- Change out, turnaround services

Products

Molecular Sieve

Beads, Pellets, Powder

Activated Alumina

Beads and Powder

Catalysts

Specialized Products

Silica Gel

White and Indicating



We can support

- Monitor efficiency, optimize productivity
- Product advice and solutions, industry tips
- Quick order processing, responsive communication
- Hands on site and remote technical support
- Operations training and product care education

Standard Molecular Sieves

Molecular sieve can be manufactured in a variety of sizes and with unique chemical properties. Our team of engineers and technical advisors can help select the ideal product for your application.



4x8 mesh | 8x12 mesh | 20x40 mesh | 1/8 Inch | 1/16 Inch

Type 3A Molecular Sieve

- Ideal for dehydrating solvents and polar liquids
- Greatest affinity for adsorbing water molecules
- Most selective of all molecular sieves

Type 4A Molecular Sieve

- Ideal for dehydrating hydrocarbon streams
- Ideal for bulk dehydration applications
- High adsorptive capacity for water

Type SA Molecular Sieve

- Ideal for dehydrating air streams
- Ideal for dehydrating hydrocarbon streams

Type 13X Molecular Sieve

- Ideal for generating high purity oxygen streams
- Ideal for refining and cryogenic separation processes
- Adsorbs sulfurous compounds, mercaptans, and more

Specialized Molecular Sieves

As the manufacturer, we've honed our technical product expertise and flexible production capabilities to create products that feature industry specific physical and chemical properties. These products are made to target process optimization opportunities for the end user.

Featured Products

- EthaDry for ethanol stream dehydration to fuel grade
- HYZSMS for fluid catalytic cracking units (FCCs)

Natural Gas

- WateRyd Series for dehydration
- SulfuRyd Series for Sulfur removal
- MercuRyd Series for Mercury removal
- NitroRyd Series for Nitrogen Rejection Units (NRUs)

Air Separation

- CryoDry Series for cryogenic air separation
- HydroFlo Series for high purity Hydrogen generation
- NitroFlo Series for high purity Nitrogen generation
- OxyFlo Series for high purity Oxygen generation

Petrochemicals

- BTXCleanse for aromatic dehydration
- EthylCleanse for Ethylene dehydration
- OleCleanse for mixed Olefin cracked gas dehydration

Refining

- ChloriClear Series for chloride adsorption
- IsoDry Series for isomerate stream purification

Activated Alumina HYAA300

Our manufacturing facilities operate under ISO certified processes when producing our adsorbents. We offer a wide variety of size and functional options with our activated alumina products.

Size and Form



5-8mm | 1/4 Inch | 3/16 Inch | 1/8 Inch | 7x14 Mesh | 1/16 Inch | Powder

- *Pseudoboehmite products also available*

Physisorption, Physical Adsorption

As a physical adsorbent, activated alumina is a versatile product that can be used in both PSA and TSA applications and can handle either gas or liquid phase processes including:

- Water purification
- Bulk dehydration
- Cryogenic air separation
- Wastewater treatment
- Desiccant air dryers
- Air purification

Chemi-sorption (Chemical Adsorption)

Activated alumina can be promoted with various compounds to enhance chemical adsorption abilities. Promoters are combined with activated alumina to target contaminants that standard activated alumina would not normally be able to remove.

Catalysts

Catalysts are specialized products that are used to lower the required temperature for a reaction to occur. Typically, a catalyst has a high surface area and are commonly blended with proprietary compounds that allow the catalysts to faciliate reactions such as:

- Amalgamations, hydrogenation, redox reactions, etc.
- Organic chloride removal for catalytic reforming
- Recover elemental sulfur in SRUs
- Gas to Liquids (GTL) refining
- Inert gas purification

Featured Products

- A918 for use in Sulfur recovery units (SRUs)
- HYSHS600 for decomposing pollution in air
- HYCA23S removes HCl for catalytic reforming
- HYGB500A for Steam Methane Reforming (SMR)
- A999 for tail gas Hydrogenation in TGUs
- HYZSMS for Fluid Catalytic Cracking Units (FCCUs)
- HYZSMTG for methanol to gasoline (MTG) refining
- Pseudoboehmite-261 for FCCUs
- Pseudoboehmite-261 for use as a catalyst base
- A988 for hydrolyzing CS_2 and COS
- HYAS200 for removing sulfur from Hydrocarbons

Silica Gel

White, non-indicating

White silica gel is the most common form of silica gel for bulk dehydration, although it is not color indicating

- Beaded, 2-S mm
- Granular, 2-5 mm
- Beaded, 0.5-1 mm



Blue and Yellow, indicating

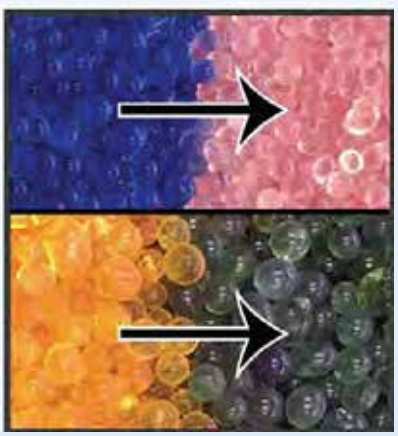
Indicating silica gel offers the user the ability to visually assess the remaining adsorption capacity.

Blue, indicates as Pink

- Beaded, 2-5 mm
- Beaded, 3-5 mm
- Beaded, 1-3 mm

Yellow, indicates as Green

- Beaded, 2-5 mm



Specialty Silica Gels

We also offer specialized products for various industries:

- HY-8 for turbidity reduction for malt beverages
- HY-H for natural gas processing
- HY-W for natural gas processing
- HY-CLC for chromatography
- HY-KL for cat litter

All of our silica gel products can be customized to fit your specific requirements including: pore size, particle form/shape, particle size, surface area, and more.

Product Information

Custom Products

Our facilities are capable of manufacturing products with physical and chemical properties that are fully customized to fit your specific requirements.

- Beads (spheres), pellets (extrudates), or powder
- Multiple mesh sizes including small beads (0.5 mm)
- Optimized physical and chemical properties
- Custom packaging options available

Inventory

We have inventory in Houston, TX; Omaha, NE; and Shanghai, CN. Our standard products may be available in small bags, drums, or Super Sacks. The products we stock and new packaging options can be added to fit the needs of our customers and market demand.

Shipping and Logistics

- we can arrange shipment options for any order
- competitive pricing, drop-ship options directly from our manufacturing facility
- most order processing in one business day

Packaging

- Molecular Sieve - drums or Super Sack options
- Activated Alumina - small bags or Super Sack options
- Catalysts - small bags or drums
- Silica gel - small bags or Super Sack options

Air Separation

Molecular sieves are used in a range of air separation, purification, and compression applications.

Pressure Swing Adsorption Technology

The selective adsorption properties of molecular sieves allow molecules from the air to be separated, creating pure streams of oxygen, hydrogen, nitrogen, and more. Pressure Swing Adsorption (PSA) is widely used in air separation plants and tends to replace the traditional cryogenic air separation because of its low investment, low energy consumption, and easy operation.

Product Options by Industry

Oxygen Production

- HYD10A - 13X, industrial Oxygen generation
- HYGB500B - 5A, industrial Oxygen generation
- HYGB100N - SodiumX, high purity Oxygen generation
- HYGB100D - LithiumX, high purity Oxygen generation

Nitrogen Production

- CMS - Carbon Molecular Sieve
- EcoSorb CX - Activated Carbon

Hydrogen Production

- HYGB500A - Molecular Sieve

Cryogenic Air Pre-Purification

- HYD10A - Molecular Sieve

Desiccant Air Dryers

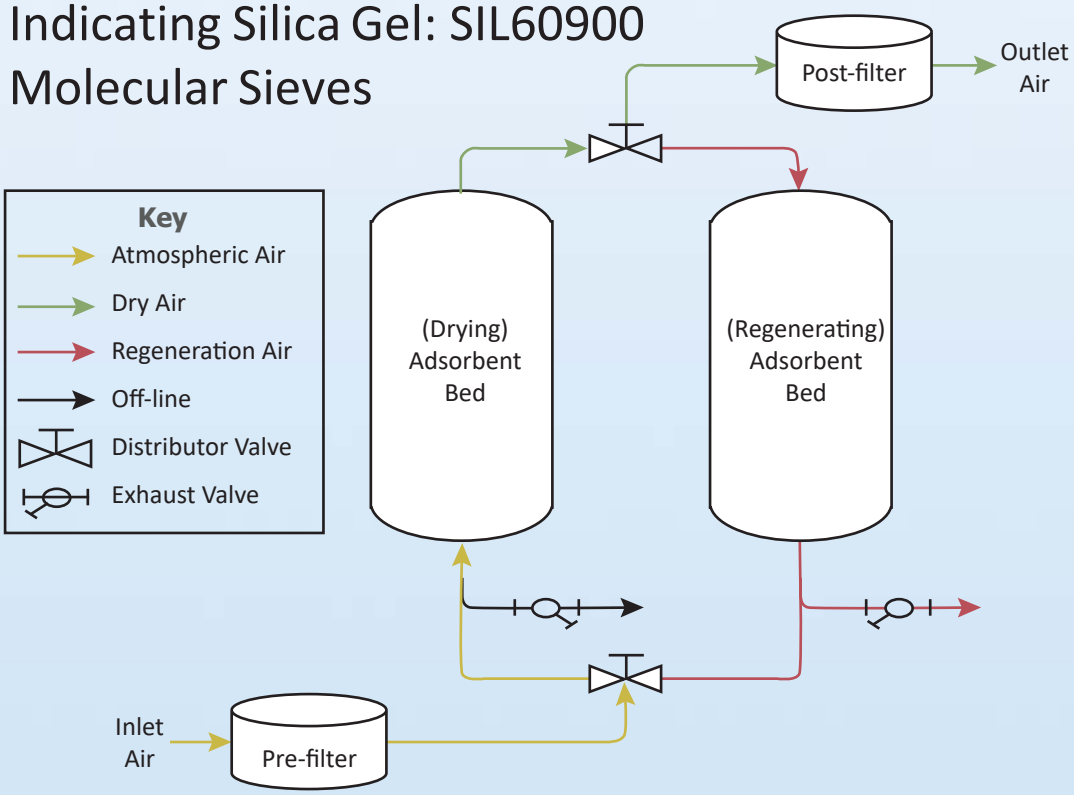
Desiccant dryers are used to dehydrate atmospheric air or pure gases including H_2, N_2, 0_2, CO_2, for use in pneumatic equipment.

Why Dehydrate Air?

It is important for these gases to be purified and dehydrated before use to prevent corrosion and damage to machinery.

Featured Products

- HYAA300
- White Silica Gel: SIL60300 *(beaded)* and SIL60315 *(granular)*
- Indicating Silica Gel: SIL60900
- Molecular Sieves



Natural Gas Processing

Dehydration, Compression, Cryogenics, Liquefaction, Peak Shaving, and Storage

HYAA300 adsorbents include: HYAS200 Molecular Sieve Type 3A, Molecular Sieve Type 4A, Activated and Silica Gel. These adsorbents can dehydrate gas streams to levels under 0.1 ppm.

Sweetening, Sulfur Removal

HYAS200 adsorbents include: Molecular Sieve Type 5A, Molecular Sieve Type 13X, and Activated Aluminas. These adsorbents remove sour gas such as sulfurous compounds, mercaptans, Carbon Dioxide, and more.

Mercury Removal

HYG10Ag adsorbents include: Molecular Sieve Type 3A and Molecular Sieve Type 13X. These regenerate-able adsorbents remove mercury from natural gas.

Nitrogen Rejection

CMS adsorbents include: Molecular Sieve carbon and Activated Carbon. These products selectively separate Nitrogen from Hydrocarbon Streams.

Hydrocarbon Dew Point Control

Silica alumina adsorbents for critical dew point control include: HY-H and HY-W. These products can alter the dew point of gas streams and allow natural gas liquids to be separated.

Sulfur Recovery

Sulfur Recovery Units

Sulfur Recovery Units (SRUs) are vital for many refining and natural gas operations. Many environmental regulations require sulfur to be recovered before tail gas is flared to reduce the amount of sulfur polluted into the atmosphere. The recovered sulfur can be used for an array of different purposes including fertilizer additives or in the production of sulfuric acid.

Tail Gas Units

Tail gas can be handled in many different ways, in some cases, it is sent to flare and any remaining sulfur compounds are incinerated. Tail Gas Units (TGUs) can be used to further process the sulfur in tail gas to meet environmental and specification requirements. A TGU is used to convert residual COS, CS_2, and $S0_2$ found in tail gas into H_2S, which is then recycled to sulfur recovery units to be processed again.

Featured Products

- A918 - High Alumina SRU Catalyst
- A958 - Promoted Alumina SRU Catalyst
- A968 - Titanium Dioxide Blended Catalyst
- A988 - High Titanium Dioxide Content Catalyst
- A999 - Tail Gas Hydrogenation Catalyst

Refining

Refining involves the restructuring a chemical feedstock into another form to increase its value in processes such as cracking, isomerization, and upgrading.

Isomerization

Before normal butane, n-pentane, and n-hexane can be isomerized, but water and sulfur must first be removed.

- IsoDry Series - Molecular Sieves

Hydrogen Purification

Formed as a byproduct in catalytic reforming processes, hydrogen must be purified before it can be used as a vital input gas in many refining processes.

- HYGB500A - Catalysts and Molecular Sieves

Catalytic Reforming

Hydrogen chloride is a common chemical additive in catalytic reforming that must be removed to protect reforming catalysts in the system.

- HYCA23S - Catalysts and Adsorbents

Steam Methane Reforming (SMR)

Methane must have sulfur compounds, chlorides, and other contaminants removed before it can be used in steam methane reforming to produce hydrogen streams that will fuel other refining processes.

- HYC401 - Catalyst

Petrochemicals

Basic Feedstock

Benzene, butadiene, ethylene, p-xylene, and propylene are basic feedstock for the petrochemical industry and can used to create numerous intermediates that can be used to make chemicals, cosmetics, electronic parts, lubricants, plastics, and synthetic fibers.

Olefins

Ethene, propylene, butene, and butadiene must be purified before they can be used to create goods such as plastics, industrial chemicals, and synthetic rubber.

- HYG03C - mixed olefin cracked gas purification
- HYD03B - ethylene purification
- ButylCleanse - butylene purification

Aromatics

BTX aromatics include benzene, toluene, and xylene. The compounds can be used to create dyes, detergents, and advanced polyurethanes for plastics and fibers.

- BTXCleanse - aromatic purification
- XyleCleanse - Xylene stream dehydration

Synthesis Gas (Syngas)

Composed of carbon monoxide and hydrogen, synthesis gas is an important source for making synthetic natural gas (SNG), ammonia, and methanol.

- SynCleanse - Syngas purification

Fluid Catalytic Crackers

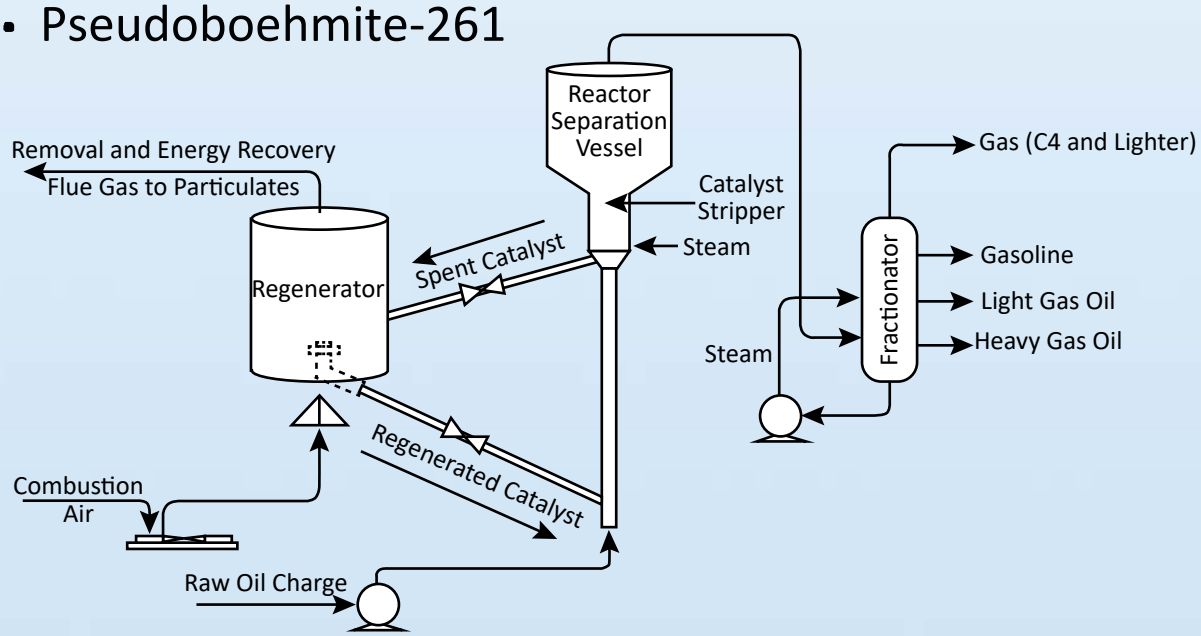
Fluid catalytic cracking (FCC) is used to break, or crack, large hydrocarbon chains into smaller chains that are suitable for use in gasoline blending. Fluid catalytic cracking units (FCCUs) are the most common of the catalytic cracking processes and involves a catalyst section and a fractionation section.

Adsorbents in FCCUs

Our FCC catalyst can be used to facilitate the cracking of Heavy or Vacuum Gas Oil (HVGO), which consists of large hydrocarbon chains, into shorter chains that can be used for gasoline blending. This cracking, under presence of a catalyst, increases the yield compared to traditional thermal cracking processes.

Featured Products

- HYZSMS
- Pseudoboehmite-261



Ethanol Dehydration

Ethanol has to be dehydrated to 99% purity or greater to be used as a fuel grade additive. Distillation alone cannot dehydrate ethanol to more than about 95% purity, so molecular sieve technology is applied to remove the residual water and produce a dry, high purity end product.

Adsorbents in Ethanol Dehydration Units

HYD03C is a Type 3A molecular sieve that is specifically designed for Ethanol Dehydration Units. This product offers an advantageous balance of crush strength and adsorption capacity while providing minimal ethanol co-adsorption properties. HYD03C has a superior selectivity between water and ethanol molecules, which increases both efficiency and dehydration capacity each cycle to help plants meet production goals and maximize output.

HYD03C

We considered the conditions required by dehydration units to operate at peak perform a nce and designed a molecular sieve with ideal physical properties and selectivity to optimize productivity.



Siloxane Removal

Removing Sloxane is an important step in cleaning methane gases for use as fuel since siloxane is a form of crystalline silica that will essentially turn into glass when burned or combusted. The collection of combusted Siloxanes inside of engine components can cause the buildup of heat, water, and other contaminants that can cause corrosion, leading to problems in the engine.

Adsorbents for Siloxane Removal

Hengye® Inc. offers a suite of products that are suitable for removing siloxane from methane streams, collected from landfill gas. Silica gel is a common, reusable filter, that can clean methane by removing siloxanes and other contaminants and help support successful equipment operations.

Featured Products

- 13X Molecular Sieve - HYD10A
- Activated Alumina - HYAA300
- White Silica Gel - SIL60300 or SIL60315

More about Biogas

Landfill gases are a large contributor to the annual emissions of greenhouse gases, the most detrimental gas being released is methane. This methane can be collected to protect the environment and also be used as a renewable fuel source.

A Global Manufacturer

In 2014, Hengye Inc. was established in the USA to meet the growing, dynamic adsorption needs in the American market. Our team provides a full range of services, including design work, bed sizing, technical support, optimization, turn around services, and more.

Feed streams are unique and the superior design of Hengye products can meet the industry specifications required to maximize the value of product streams. Our engineers and technical advisors will provide the data and education to support and bring confidence to those who use Hengye products.

Support Services

- Remote and on-site support available
- Dehydration unit optimization and operation analysis
- Design engineering and bed loading calculations
- Systems training and activities support
- Material application education and product selection
- Change out services and commissioning
- Analyze remaining working life of products
- Breakthrough testing, product performance analysis



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HENGYE®

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