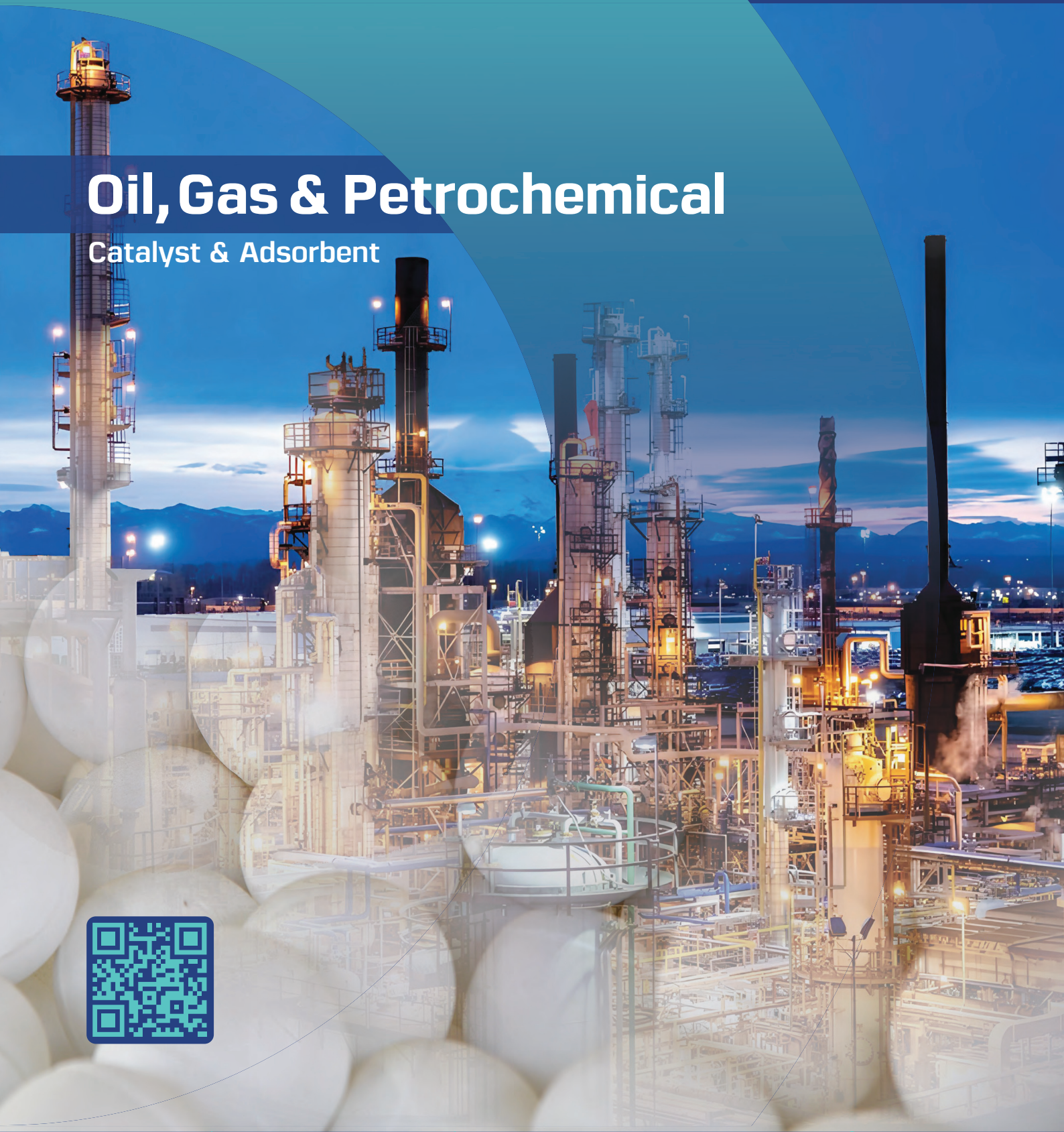
AIC HOLDING

سرامیک‌های صنعتی اردکان

# Oil, Gas & Petrochemical

## Catalyst & Adsorbent



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# AIC
# Introduction

# AIC Holding

## Outstanding Achievements and Future Prospects

Ardakan Industrial Ceramics Knowledge-Based Holding (AIC), established in 1995, stands as the first and largest producer of industrial ceramics. Committed to meeting the diverse needs of various industries, AIC has achieved remarkable success, particularly in the production of various kinds of catalysts, adsorbents, and high alumina balls. Additionally, this company is listed on Tehran Stock Exchange and is present on the main board of the first market.

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**AIC Holding is composed of four companies:**

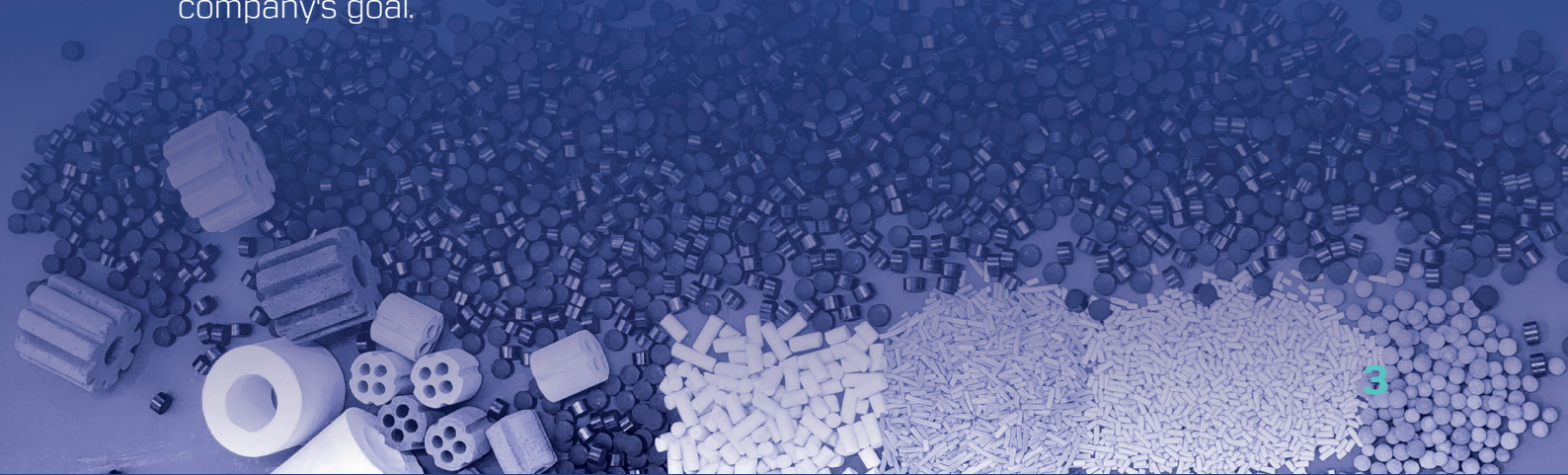
1. Ardakan Industrial Ceramics Co. (AIC)
2. Aluminum Pars Oxide of Kasra Co. (ALPACO)
3. Diba Ceram Novin Kasra Co.
4. Mineral Engineering Zarrin Powder Novin Kasra Co.

AIC's products serve a multitude of industries, including oil, gas and petrochemical, mining and steel, chemical, tile and ceramic, porcelain, glaze, paint, cement, refractory, and more.

AIC Holding has extensive future plans that focus on completing new projects, launching new production lines, designing and producing innovative products, and expanding into export markets.

With over 30 years of experience, AIC Holding is prepared to tackle new challenges and undertake new projects across various industries. The customer service and support team at AIC Holding is dedicated to providing comprehensive sales services.

AIC Holding has maintained high production quality and secured numerous quality certifications and customer satisfaction, both domestically and internationally. The holding has earned several international certificates and established an Integrated Management System (IMS), demonstrating its continuous efforts in advancing the company's goal.



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# AIC Milestone

**2025**

Planning for Development of Adsorbents, Molecularsieves & Guards for Various Applications.

**2016**

AIC Introduced DRI & Steam Reforming Catalysts with Estimated Capacity of 1500 TON/Year.

**2011**

Development of SRU Catalysts with Capacity of 1000 TON/Year.

**2008**

Increasing Production Capacity to 12000 TON/Year.

**2007**

AIC Listed on the Tehran Stock Exchange.

**2006**

High Alumina & Silica Ceramic Ball as a Catalyst Support. 2001 Increasing Productions Capacity to 3000 TON/Year.

**1995**

AIC Production Started with High Alumina, Ceramic Balls & Liners.

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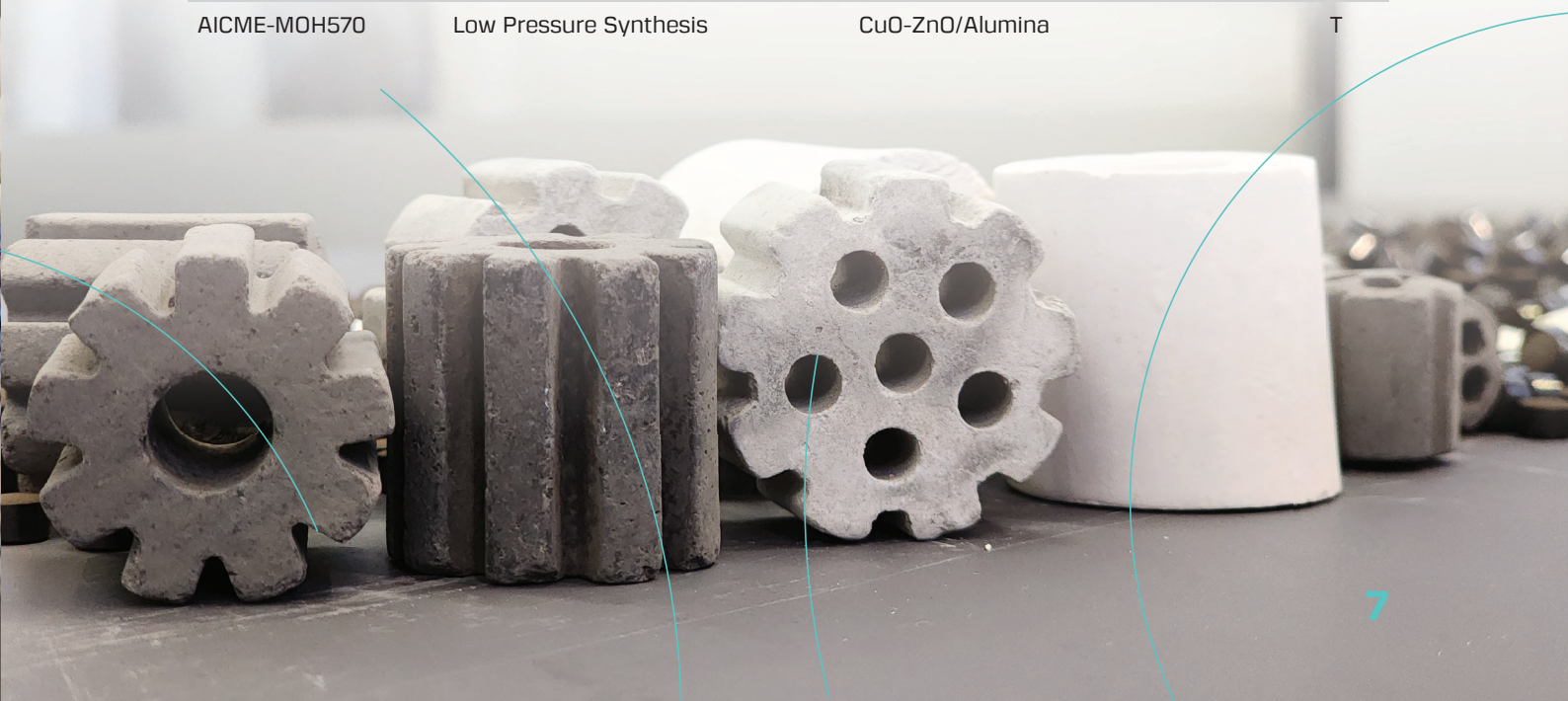
# CATALYSTS

# Catalysts

| Product Code | Application | Material | Shape |
|---|---|---|---|
| **Sulfur Recovery Unit (Claus Process)** | | | |
| AICCAT-AC440 | Sulfur Recovery | Activated Alumina | S |
| AICCAT-HT470 | Hydrolysis Claus | $TiO_2$ | E |
| AICCAT-LT460 | Hydrolysis Claus | Promoted Activated Alumina | S |
| AICCAT-PF450 | Oxygen Scavenger | Promoted Activated Alumina | S |
| AICCAT-CM480 | Tail Gas Treatment | CoMo or NiMo/Alumina | S |
| **DRI (MIDREX & PERED Processes)** | | | |
| AICDRI-HA410 | Producing Syngas for Direct Reduction of Iron for Steel Industries | Ni/Alumina | RR |
| AICDRI-SA420 | | Ni/MgO | RR |
| AICDRI-IR430 | | Alumina | R |
| **Steam Reforming** | | | |
| AICSR-P101 | Producing Syngas for Refinery & petrochemical Processes | Ni/ Alumina | T |
| AICSR-PR102 | | Ni/CalciumAluminate | S |
| AICSR-ATR103 | | Ni/Calcium-Aluminate | S |
| AICSR-AH104 | | Alumina | R |
| **Hydrotreating Catalyst (Naphtha-Diesel-Kerosene-VGO-Gasoline)** | | | |
| AICHY-HD520 | HDS & HDN | CoMo /Alumina | TE |
| AICHY-HT530 | HDS & HDN | NiMo /Alumina | T |
| **Methanation** | | | |
| AICM-MT540 | Nickel Based Methanation Catalyst | Ni/Alumina | T |
| **Water-Gas Shift Reaction** | | | |
| AICCS-LT550 | LTSC (Low Temp Shift Reaction) | Cu-Zn/Alumina | T |
| AICCS-HT560 | HTSC (High Temp Shift Reaction) | Fe-Cr | T |
| **Methanol Synthesis** | | | |
| AICME-MOH570 | Low Pressure Synthesis | CuO-ZnO/Alumina | T |



## SRU

**(CAT-AC440, CAT-HT470, CAT-LT460, CAT-PF450, CAT-CM480)**

These catalysts are utilized for the removal of $H_2S$ and converting it to elemental sulfur in the Sulfur Recovery Unit (SRU). Activated alumina serves as the main catalyst for the Claus reaction, while promoted alumina acts as an oxygen scavenger in this unit. Additionally, extrudate with high $TiO_2$ content is used for the hydrolysis of COS and $CS_2$.

## DRI

**(DRI-HA410, DRI-SA420, DRI-IR430)**

Direct Reduction of Iron is a crucial step in creating sponge iron in the steel industry. Two types of catalysts named Semi-Active and High Active, along with an Alumina Inert Ring are used to produce syngas for this process. These catalysts are based on Nickel supported on Alumina.

## Steam Reforming

**(SR-P101, SR-PR102, SR-ATR103, SR-AH104)**

Steam reforming is a crucial process in the production of syngas for ammonia, methanol, and hydrogen plants. This process utilizes three types of catalysts: pre-reforming, primary reforming and secondary reforming (ATR). These catalysts are based on Nickel supported on calcium Aluminate.

## Hydrotreating catalyst

**(HY-HD520, HY-HT530)**

Hydrotreating processes aim at the removal of impurities such as sulfur and nitrogen from distillate fuels, naphtha, kerosene, and diesel by treating the feed with hydrogen at elevated temperature and pressure in the presence of a catalyst. Catalysts, such as cobalt and molybdenum oxides on Alumina matrix are commonly used in this process.

## Methanation

**(M-MT540):**

Methanation is the reaction by which carbon oxides and hydrogen catalyzed by Ni/Al2O3 catalyst are converted into methane and water. This reaction requires catalysts including Nickel to facilitate the reac tion at reasonable pressure and temperatures.

## Water-Gas Shift reaction

**(LT550, HT560)**

Water gas shift reaction is a moderately exothermic reaction between carbon monoxide and steam to form carbon dioxide and hydrogen. In typical industrial applications, the WGSR is conducted as a two-stage process. The high temperature stage conducted over an Iron based catalyst and the low temperature stage conducted over copper-based catalysts.

## Methanol Synthesis

**(MOH570)**

Methanol is the most important chemical feedstock used in chemical industries. Copper and Zinc oxide on Al2O3 catalysts are chosen for methanol synthesis from syngas containing a CO, CO2 and H2 gas mixture. This catalyst has high activity, good thermal stability and high selectivity which can improve the output of methanol plant.

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# Guard Beds & Adsorbents

# Guard Beds & Adsorbents

| Product Code | Application | Material | Shape |
|---|---|---|---|
| **Molecular Sieves** | | | |
| AICIEVE-3A | Specific Molecules Removal from Gases & Liquids | Zeolite | S |
| AICIEVE-4A | | | S |
| AICIEVE-5A | | | S |
| AICIEVE1-3X | | | S |
| **Sulfur Removal** | | | |
| AIC-Z20 | Sulfur Removal | ZnO ,Binder | S |
| AIC-ZU30 | | Promoted ZnO | S |
| **Drying Series** | | | |
| AICSORB-DA10 | Drying Air, Gas & Liquid | Activated Alumina | S |
| AICSORB -DA20 | Hydrolysis Claus | Activated Alumina | S |
| AICSORB -SA30 | Special Adsorbent for the Multibed Technology | Activated Alumina | S |
| AICSORB -SA31 | Oxygen Scavenger | Activated Alumina | S |
| **Purification Series (Arsine & Floride Removal)** | | | |
| AICSORB-PCR51 | Removal of Polar Compounds & Oxygenated Hydrocarbon | P-Alumina-Zeolite Composite | S |
| AICSORB-PCR52 | | Activated Alumina | S |
| AICSORB-SD61 | Water and TBC Removal | Promoted Activated Alumina | S |
| AICSORB-AGR72 | Acid Gases & Water Removal Gases | Promoted Activated Alumina | S |
| AICGUARD-AFR121 | Arsenic & Floride Removal | Promoted Activated Alumina | S |
| AICGUARD-LFR123 | Floride Removal for Bottled Water Plant | Proprietary Formulation | S |
| AICTRAP-ArR82 | Arsine & Phosphine & Sulfur Removal from Propane & Propylene | PbO/Alumina | S |
| AICTRAP-ArR83 | | CuO/Alumina | S |
| AICTRAP-FR102 | HF Removal & Floride Removal | Promoted Activated Alumina | S |
| **Mercury Removal** | | | |
| AICTRAP-MR91 | Mercury Removal from Gas & Liquid Stream | Metal Oxide, Sulfide, $Al_2O_3$ | S |
| AICTRAP-MR92 | | Mixed Metal Oxide | S |
| AICTRAP-MR93 | | Proprietary Formulation | S,E |
| **Chloride Removal** | | | |
| AICTRAP-ClR111 | HCl Removal from Hydrogen Rich Gas, LPG & Reformate | Promoted Activated Alumina | S |
| AICTRAP-ClR112 | | Promoted Activated Alumina | S |
| AICTRAP-ClR113 | HCl & Organic Chloride Removal | ZnO/$Na_2O$ Promoted $Al_2O_3$ | S |

## Purification Series

**(SORB-PCR51, SORB-PCR52, SORB-SD61, SORB-AGR72, GUARD-AFR121, GUARD-LFR123, TRAP-ArR82, TRAP-ArR83, TRAP-FR102)**

These products are used in purification processes such as:

-Removal of polar contaminants from various streams.

-Adsorption of water and mercaptan in feedstock.

-Removal of Arsenic, Fluoride, Phosphine and HF

from liquid and gaseous hydrocarbon feedstock.

## Molecular Sieves

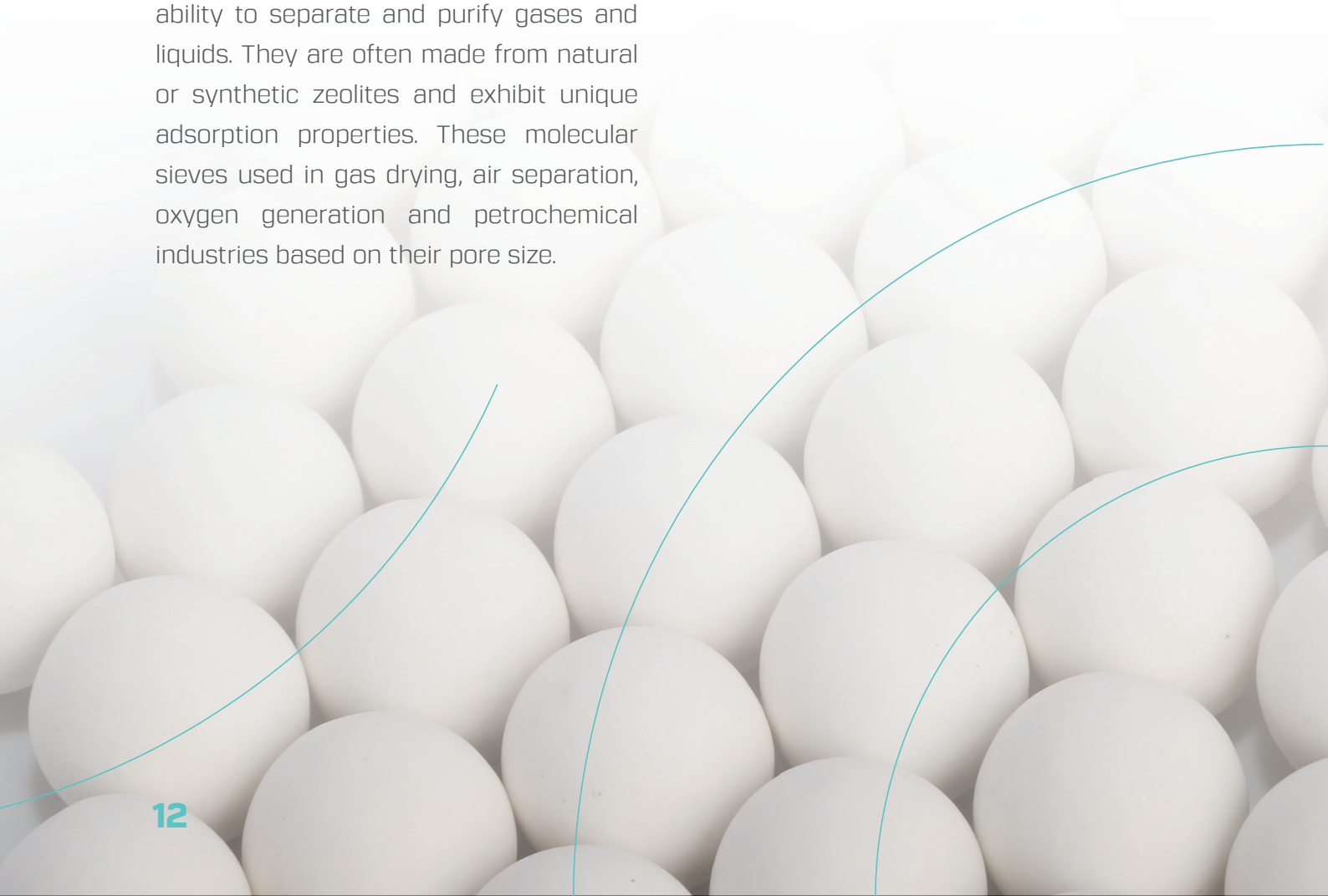
**(CIEVE-3A, 4A, 5A,13X)**

Molecular sieves are crystalline, porous materials known for their exceptional ability to separate and purify gases and liquids. They are often made from natural or synthetic zeolites and exhibit unique adsorption properties. These molecular sieves used in gas drying, air separation, oxygen generation and petrochemical industries based on their pore size.

## Sulfur Removal

**(Z20, ZU30)**

Zinc oxide desulfurizer is mainly used for the purification and refining of raw materials such as gas, oil, hydrocarbon and synthesis gas to remove hydrogen sulfide and to absorb small molecular organic sulfides such as $CS_2$, COS, mercaptans, etc. It can work in severe conditions with high sulfur absorption capacity, high activity, high strength and good sustainability.



## Drying Series

**(SORB-DA10, SORB -DA20, SORB -SA30, SORB -SA31)**

Spherical activated alumina with high attrition resistance and adsorption capacity, designed for purification or drying for both liquid and vapor streams. These products are used in following processes:

-Drying of organic liquids as LPG, aromatics, hydrocarbon condensate.

-Drying of air and industrial gases including Hydrogen, Oxygen, Nitrogen, CO2, Methyl Chloride, natural gas, synthesis gases...

-Purification of gases and liquids including removal of metal traces, Fluorides, HF, TBC, HCl and H2SO4.

## Mercury Removal

**(TRAP-MR91, TRAP-MR92, TRAP-MR93)**

Metal oxide & sulfur impregnated activated alumina, which is designed to efficiently remove mercury from various vapor streams, i.e. natural gas and syngas.

It is highly promoted microporous alumina adsorbent which can minimize capillary condensation of heavy hydrocarbon for better performance.

## Chloride Removal

**(TRAP-CIR111, TRAP-CIR112, TRAP-CIR113)**

Promoted activated alumina designed for chloride removal with high Cl-Loading Capacity. It is suitable for both vapor and liquid phase applications. These adsorbents are used in processes such as Catalytic Reforming, Isomerization, Dehydrogenation & Synthetic gas production.

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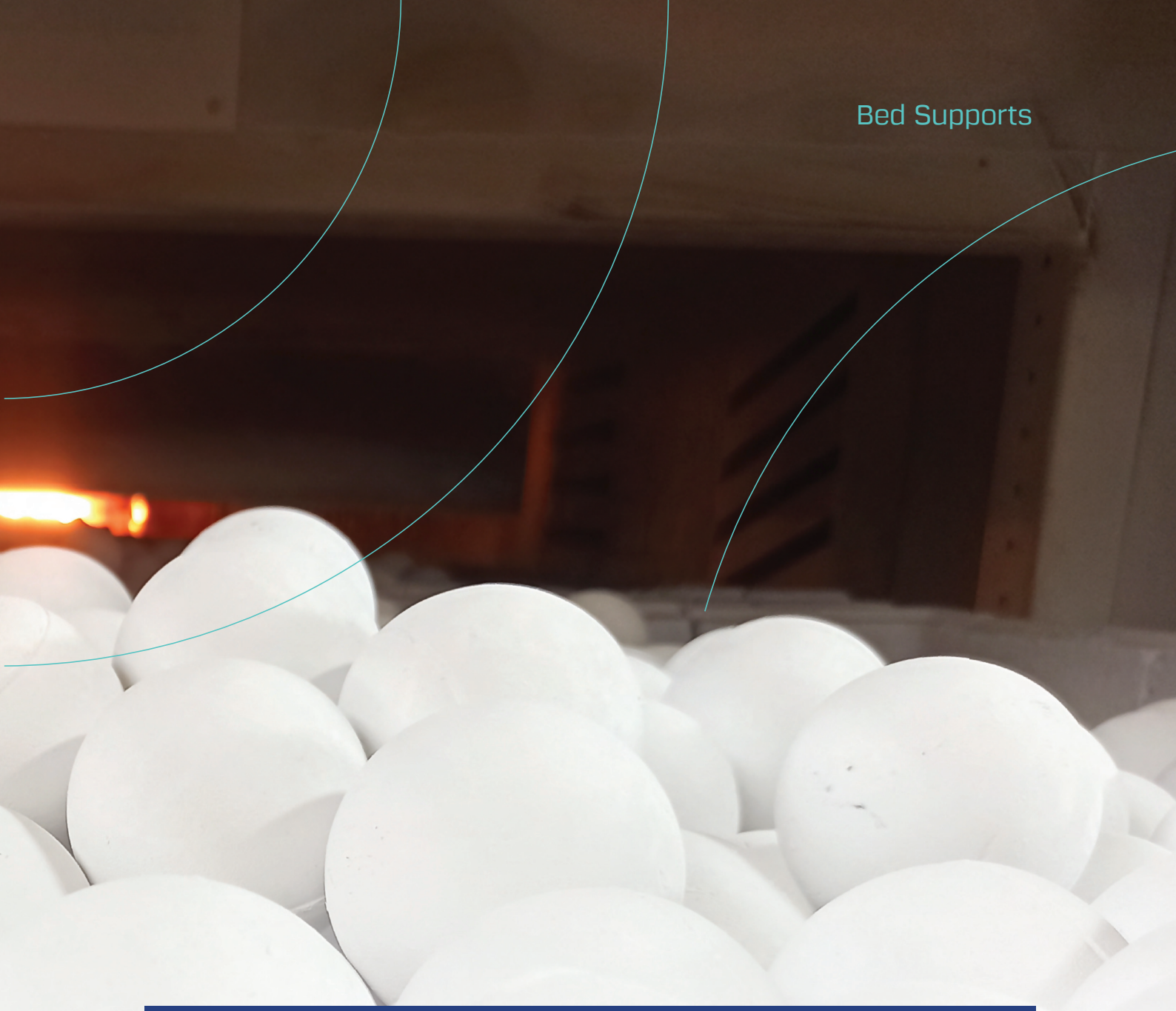
# Bed Supports



## Bed Supports

| Product Code | Application | Material | Shape |
|---|---|---|---|
| **Alumina Ball** | | | |
| AICSUP-ADM920 | General Purpose | Alumina-Based Balls | S |
| AICSUP-ADM990 | | | S |
| **Ceramic Ball** | | | |
| AICSUP-ADM220 | General Purpose | Silicate-Based Balls | S |

### Alumina/Ceramic Balls

Alumina Ceramic Balls (Inert Balls) are widely used as catalyst support materials in various chemical processes including petrochemical, refining, and environmental applications. These products resist high temperature, high pressure, thermal shock, acid, alkali and other organic solvents due to their high purity and strength.

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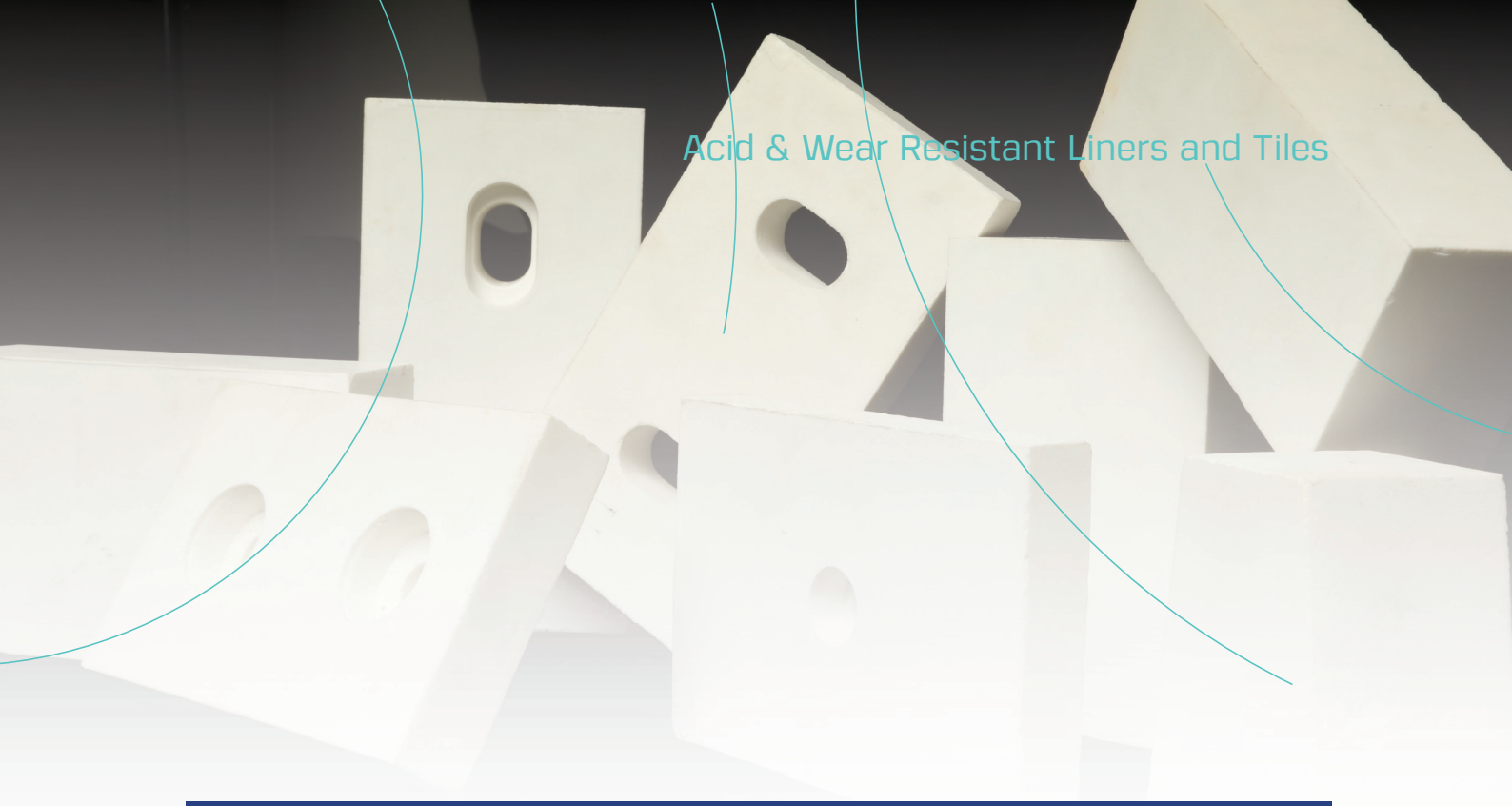
# Acid & Wear Resistant Liners and Tiles



## Acid & Wear Resistant Liners and Tiles

| Product Code | Application | Material | Shape |
|---|---|---|---|
| **High alumina wear resistant liner** | | | |
| LA 156<br>LA 123<br>LA 401<br>LA 180<br>LA 151<br>LA 301<br>LA 201<br>LA 153 | Help Extend the Equipment Life & Maintain Consistent Operational Efficiency | Alumina-Based | Hex Tile & Liner<br>(Custom Order) |
| **Acid Resistant Liner & Tile** | | | |
| Hex Tile<br>Liner | Corrosion Protection & Increased Durability | Silicate-Based Balls | (Custom Order) |

### High Alumina Wear Resistant Liner

These products address the wear issues of equipment in the mining, steel, and cement industries. In humid environments with high operating temperature and corrosive substance, using hard materials and metals can be challenging. However, high alumina wear-resistant ceramics are a suitable alternative to hard metal liners due to their unique mechanical properties and hardness.

### Acid Resistant Liner & Tile

These products are designed for use in acidic environments to protect equipment from acid damage.

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ZPNK Eng Mineral Co.

ALUMINIUM PARS OXIDE OF KASRA CO.

گلوله های سرامیکی دیبا سرام نوین کسرا


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