

THAT TH

## Oil, Gas & Petrochemical

Catalyst & Adsorbent





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.





- 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.



Introduction

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.



# **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.

#### 1996

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



## CATALYSTS





#### **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.

#### SRU

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

These catalysts are utilized for the removal of H<sub>2</sub>S 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 ith high TiO<sub>2</sub> content is used for the hydrolysis of COS and CS<sub>2</sub>.

#### 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.

#### 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.

#### 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.

#### 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 reaction 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.

#### CATALYSTS

Catalysts						
Product Code	Application	Material				
Sulfur Recovery Unit	(Claus Process)					
AICCAT-AC 440	Sulfur Recovery	Activated Alumina	S			
AICCAT-HT 470	Hydrolysis Claus	TiO 2	Е			
AICCAT-LT 460	Hydrolysis Claus	Promoted Activated Alumina	S			
AICCAT-PF 450	Oxygen Scavenger	Promoted Activated Alumina	S			
AICCAT-CM 480	Tail Gas Treatment	CoMo or NiMo/Alumina	S			
DRI (MIDREX & PERE	D Processes)					
AICDRI-HA 410	Producing Syngas for Direct	Ni/Alumina	RR			
AICDRI-SA 420	Reduction of Iron for Steel	Ni/MgO	RR			
AICDRI-IR 430	Industries	Alumina	R			
Steam Reforming						
AICSR-P 101		Ni/ Alumina	Т			
AICSR-PR 102	Producing Syngas for Refinery & petrochemical	Ni/CalciumAluminate	S			
AICSR-ATR 103	Processes	Ni/Calcium-Aluminate	S			
AICSR-AH 104		Alumina	R			
Hydrotreating Catalyst (Naphtha-Diesel-Kerosene-VGO-Gasoline)						
AICHY-HD 520	HDS & HDN	CoMo /Alumina	TE			
AICHY-HT 530	HDS & HDN	NiMo /Alumina	Т			
Methanation						
AICM-MT 540	Nickel Based Methanation Catalyst	Ni/Alumina	Т			
Water-Gas Shift Reaction						
AICCS-LT 550	LTSC (Low Temp Shift Reaction)	Cu-Zn/Alumina	Т			
AICCS-HT 560	HTSC (High Temp Shift Reaction)	Fe-Cr	т			
Methanol Synthesis						
AICME-MOH 570	Low Pressure Synthesis	CuO-ZnO/Alumina	т			

T



## **Guard Beds & Adsorbents**



#### **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 CS2, COS, mercaptans, etc. It can work in severe conditions with high sulfur absorption capacity, high activity, high strength and good sustainability.

#### Guard Beds & Adsorbents

#### **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, HCI 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.

#### Guard Beds & Adsorbents

Guard Beds & Adsorbents						
Product Code	Application	Material				
Molecular Sieves						
AICIEVE3-A			S			
AICIEVE4-A	Specific Molecules Removal from	Zeolite	S			
AICIEVE5-A	Gases & Liquids		S			
AICIEVE13-X			S			
Sulfur Removal						
AIC-Z20		ZnO ,Binder	S			
AIC-ZU30	Sului Removal	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			
<b>Purification Series (A</b>	rsine & Floride Removal)					
AICSORB-PCR51	Removal of Polar Compounds &	P-Alumina-Zeolite Composite	S			
AICSORB-PCR52	Oxygenated Hydrocarbon	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	Pb0/Alumina	S			
AICTRAP-ArR83	Removal from Propane & Propylene	Cu0/Alumina	S			
AICTRAP-FR102	HF Removal & Floride Removal	Promoted Activated Alumina	S			
Mercury Removal						
AICTRAP-MR91		Metal Oxide, Sulfide, Al2O3	S			
AICTRAP-MR92	Mercury Removal from Gas & Liquid Stream	Mixed Metal Oxide	S			
AICTRAP-MR93		Proprietary Formulation	S,E			
Chloride Removal						
AICTRAP-CIR111	HCI Removal from Hydrogen Rich	Promoted Activated Alumina	S			
AICTRAP-CIR112	Gas, LPG & Reformate	Promoted Activated Alumina	S			
AICTRAP-CIR113	HCl & Organic Chloride Removal	ZnO/Na20 Promoted Al2O3	S			



# **Bed Supports**

#### 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.

	<u></u>	Bed Supports	
Product Code	Application	Material	Shape
Alumina Ball			
AICSUP-ADM920	Conserved Diverses	Alumina Deced Dalla	S
AICSUP-ADM990	General Purpose	Alumina-Based Balls	S
Ceramic Ball			



## Acid & Wear Resistant Liners and Tiles

#### Acid & Wear Resistant Liners and Tiles

#### **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.







