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Arya Industrial Catalysts

Listed on Tehran Stock Exchange
(First Board, Primary Market)

Steel Industry

Catalysts & Adsorbents



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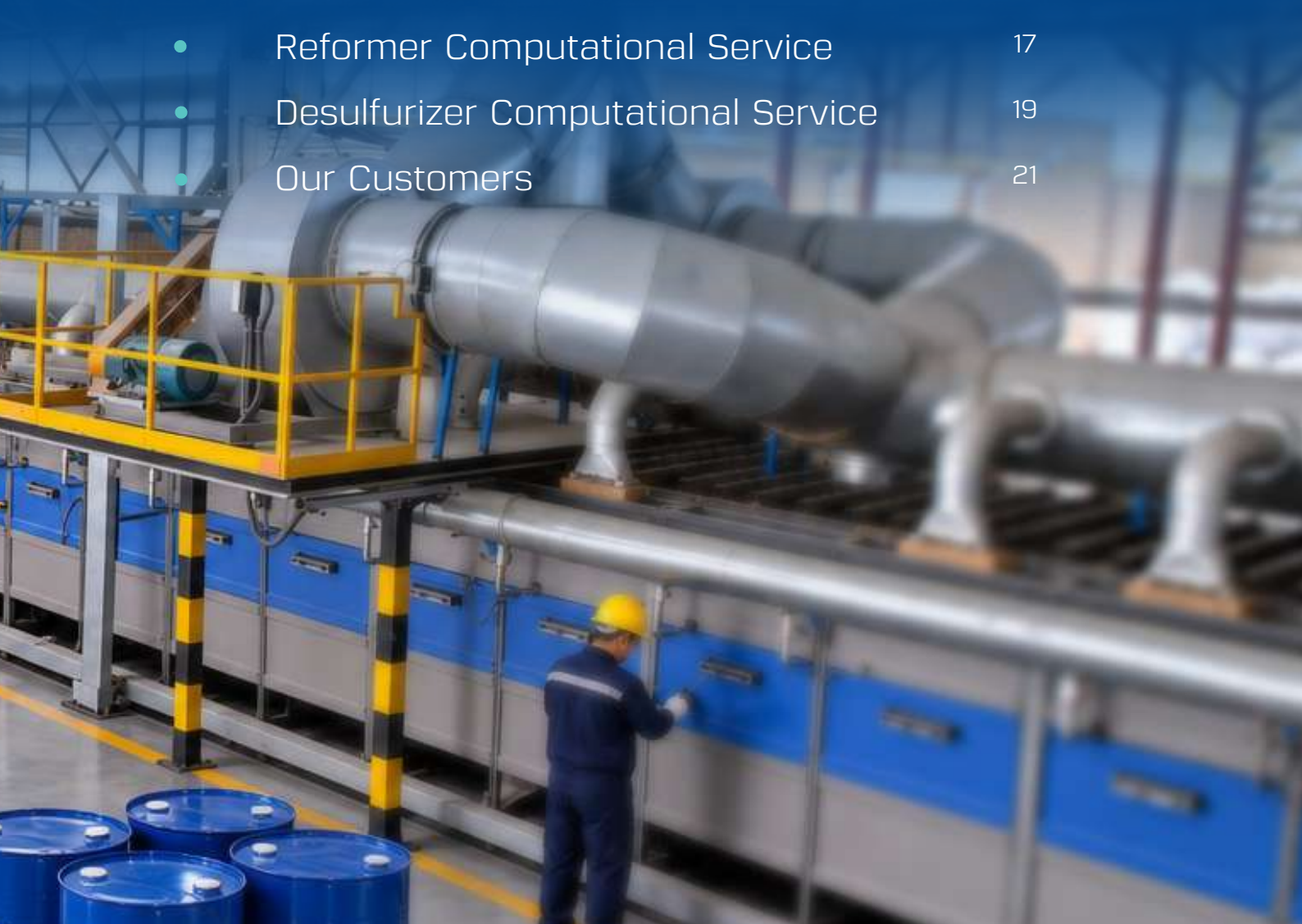
ENGINEERED MATERIALS, PROVEN PERFORMANCE

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AIC HOLDING

Arya Industrial Catalysts

A specialized manufacturer and supplier of catalysts, adsorbents, and catalyst supports, committed to a technical and knowledge-based mission focused on the investment, development, and localization of essential products for the oil, gas, petrochemical, steel, and chemical industries.

1. Arya Industrial Catalysts Co. (AIC)
2. Aluminum Pars Oxide of Kasra Co. (ALPACO)
3. Diba Ceram Novin Kasra Co. (DCNK)
4. Mineral Engineering Zarrin Powder Novin Kasra Co. (ZPNK)

Arya Industrial Catalysts Co.

ALUMINIUM PARS OXIDE OF KASRA Co.

Diba Ceram Novin Kasra Co.

ZPNK Eng Mineral Co.



- Over 30 years of expertise in industrial ceramics.
- First and largest producer of industrial ceramics in Iran.
- Supplier of advanced catalysts, adsorbents, and bed supports.
- Listed on Tehran Stock Exchange (First Board) with Financial Rating: A
- Committed to innovation, quality, and international standards (IMS certified).
- ~~Manufactured~~ Grade-1 Knowledge-Based National Products.
- Dedicated customer support team ensuring optimal service and technical guidance.
- ISO certifications, reflecting world-class standards in quality, sustainability, brand integrity, energy efficiency, and corporate governance.

10002	10004	10668	14001	24178	26000
29001	29990	34000	38500	45001	50001



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DRI Catalysts for MIDREX® Process

ENGINEERED MATERIALS
PROVEN PERFORMANCE
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The **MIDREX®** process is a leading direct reduction method that converts iron ore pellets into sponge iron using a shaft furnace. In this process, natural gas and recycled top gas are catalytically reformed into hydrogen (H_2) and carbon monoxide (CO) – the key reducing agents for iron oxide – through steam and CO_2 reforming reactions within the reformer tubes.

Operating under severe conditions – including high temperatures, low pressures, low steam-to-carbon ratios, and elevated CO_2 levels – demands a robust and optimized catalyst system.

AIC's DRI catalyst configuration is engineered to meet these challenges through a multi-layered arrangement:

High Active Catalyst

A premium nickel alumina-based catalyst engineered for high-efficiency performance in DRI reformers. This catalyst delivers exceptional reforming activity, minimal pressure drop, and superior resistance to coke formation, ensuring long-term operational reliability.

Key Features:

- Outstanding catalytic activity
- Low pressure drop across tubes
- Long operational lifetime and stability

Semi Active Catalyst

A nickel magnesium oxide (MgO)-supported catalyst optimized for low steam-to-carbon ratio conditions common in DRI plants. Its composition provides enhanced resistance to coking while maintaining stable reforming efficiency under demanding process environments.

Key Features:

- Strong resistance to coke formation
- Optimized performance
- Stable operation

Inert Ceramic Support

High-strength ceramic support materials designed for reformer tube preheating zones. They ensure uniform gas distribution, smooth heat transfer, and protection of active catalysts from hot spots and sintering.

Key Features:

- Robust stability
- Uniform gas flow and preheating

To accommodate variations in MIDREX® plant designs and gas compositions, AICERS develops customized catalyst formulations and geometries, delivering enhanced reforming efficiency, longer catalyst life, and improved reliability.

DRI Semi Active Catalyst

(AIC-DRI-SA420)

Nominal Content (wt%)	NiO	Min 6
	Carrier	Alumina
Physical Properties	Bulk Density (kg/L)	1.05 ± 0.1
	Crush Strength, Radial (kgf)	Min 120
Shape	Ribbed rings	9
	Holes	central
Size (mm)	Diameter	30 ± 1
	Height	28 ± 2
	Hole	11 ± 1

DRI Inert Support

(AIC-DRI-IR430)

Nominal Content (wt%)	Al_2O_3	Min 95
Physical Properties	Bulk Density (kg/L)	1.4 ± 0.1
	Crush Strength, Radial (kgf)	Min 250
Shape	-	Raschig ring
Size (mm)	Diameter	32 ± 3.5
	Height	32 ± 2.5
	Hole	17 ± 1.5



DRI High Active Catalyst

(AIC-DRI-HA410)

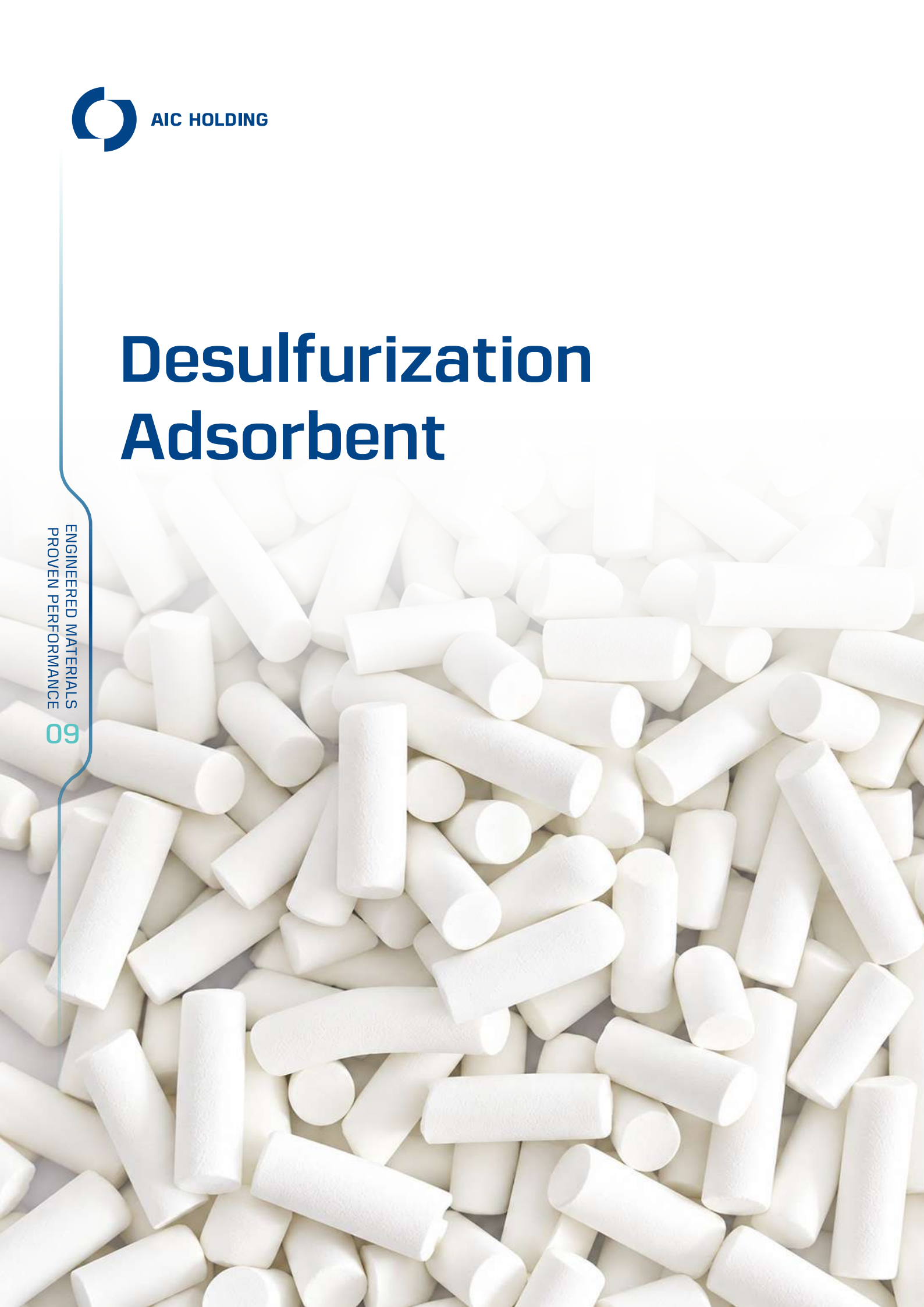
Nominal Content (wt%)	NiO	Min 12
	Carrier	Alumina
Physical Properties	Bulk Density (kg/L)	1.1 ± 0.1
	Crush Strength, Radial (kgf)	Min 110
Shape	Ribbed rings	9
	Holes	6
Size (mm)	Diameter	33 ±2
	Height	18 ± 1
	Hole	5 ± 0.5



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Desulfurization Adsorbent

ENGINEERED MATERIALS
PROVEN PERFORMANCE
09





The high-performance **zinc oxide sulfur adsorbent** has been developed through the combined technical expertise of the **Research Institute of Petroleum Industry (RIPI)** and **AIC**. It is specifically engineered for efficient H2S removal from reformer feed gas, helping to extend catalyst life and optimize overall process performance.

This adsorbent has been designed and optimized to deliver a higher adsorption capacity than comparable commercial products. It is protected by a domestic patent and is recognized as an innovative accomplishment in the field of catalysts and adsorbents.

This achievement is the result of extensive research focused on optimizing surface area, pore structure, composition, and key physicochemical properties. The adsorbent provides a **minimum sulfur pickup capacity of 30wt%** and can be customized to meet specific process requirements, including adjustable surface area, pore structure, and crush strength. Through precise pore engineering and composition control, AICERS ensures consistent performance and long-term operational reliability across a wide range of reformer configurations and gas compositions.

Key Features:

- High H2S removal efficiency
- Prolongs catalyst lifetime
- Enhances process reliability and efficiency

AIC sulfur adsorbent complements its DRI catalyst solutions, providing a complete system for maximizing reformer efficiency and operational longevity

Sulfur Adsorbent

(AIC-Z20)

Nominal Content (wt%)	ZnO	Min 90
Physical Properties	Bulk Density (kg/L)	1.2 ± 0.1
	Crush Strength, Radial (kgf)	Min 90
	Surface Area (m^2/g)	Min 30
Shape	-	Extrudate
Size (mm)	Diameter	4.7

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Drying Adsorbents

ENGINEERED MATERIALS
PROVEN PERFORMANCE

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AIC provides industrial drying solutions based on **activated alumina** and **molecular sieves (3A, 4A, 5A, 13X)** for moisture removal from gases and compressed air in the steel industry. These products support reliable operation of instrument-air systems, air separation units (ASUs), and other gas-treatment applications in direct reduction and steel production facilities. Product selection can be tailored to process conditions and required drying performance.

Molecular sieve (4A)

(AICIEVE-4A)

Physical Properties	Bulk Density (kg/L)	0.7 ± 0.05	
	Crush Strength (N)	Min 35	Min 80
	Static Water Adsorption (%)	Min 21	Min 21
Shape	-	Bead	
Size (mm)	Diameter	1.6-2.5	3-5

Activated Alumina

(AIC-DA10)

Nominal Content (wt%)	Al_2O_3	Min 92.5
Physical Properties	Bulk Density (kg/L)	0.75 ± 0.05
	Static Water Adsorption (%)	Min 18
	Surface Area (m^2/g)	Min 300
Shape	-	White sphere
Size (mm)	Diameter	3-5 and 5-7



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Ceramic Ball
for Desulfurizer Beds

AIC ceramic balls serve as a reliable support medium for desulfurization units in DRI plants. Positioned within the desulfurizer columns, these ceramic balls ensure uniform gas distribution, stable flow dynamics, and mechanical protection for the active sulfur adsorbent layer in customized sizes.

With **over 30 years of manufacturing experience, AIC** has developed advanced ceramic formulations optimized for strength, durability, and process compatibility. Unlike conventional alumina-based supports, ceramic balls are primarily made from high-purity silica, offering excellent thermal shock resistance, chemical stability, and superior performance in reducing environments typical of the steel industry.

Key Features:

- Excellent thermal shock resistance and strength
- Ultra low water adsorption
- Uniform gas flow

Ceramic Ball
(AIC-ADM220)

Nominal Content (wt%)	Al_2O_3	25 ± 3
	SiO_2	69 ± 3
	Leachable Iron	Max 0.1
Physical Properties	Bulk Density (kg/L)	1.45
	Acid Resistance (wt%)	Min 99
	Hardness (~~mohs~~)	7
	Water Adsorption (wt%)	0.4



Wear-Resistant Liners for Material Handling

AIC wear-resistant alumina liners provide durable protection for process equipment exposed to abrasion, erosion, and mechanical impact. These liners are widely applied in ball mills and other high-wear zones within DRI and steel production facilities, where continuous contact with abrasive materials demands exceptional strength and stability.

Manufactured from high-purity alumina with outstanding hardness, and chemical resistance, **AIC** liners ensure long-term reliability under mechanical conditions of material-handling systems. Their precise engineering and installation versatility help extend equipment life, reduce downtime, and maintain steady operational efficiency.

Key Features:

- Superior wear and impact resistance
- Long service life and reduced maintenance needs
- Available in different sizes

Wear-Resistant Alumina Liners (AIC-LA)

Nominal Content (wt%)	Al_2O_3	Min 92
Physical Properties	Particle Density (kg/L)	3.6
	Hardness (mohs)	9
	Porosity (%)	0
Shape	-	Tile
Color	-	White

AICERS

Elite Computed Refinery Materials Solutions For Steel Industry

AICERS (the AIC Department of Elite Computed Refinery Materials Solutions) stands at the forefront of scientific innovation and applied industrial research.

As a center of research excellence, AICERS integrates advanced computational modeling, materials synthesis, and technical engineering to deliver high-performance catalysts, adsorbents, and process solutions for the steel industry.

AICERS is organized into three main divisions, providing a suite of interrelated services:

Elite Computational Center

- DRI Reforming Kinetic Modeling
- DRI Reforming Reactor Simulation
- ZnO Adsorbent Performance Analysis
- ZnO Adsorbent Lifetime Prediction

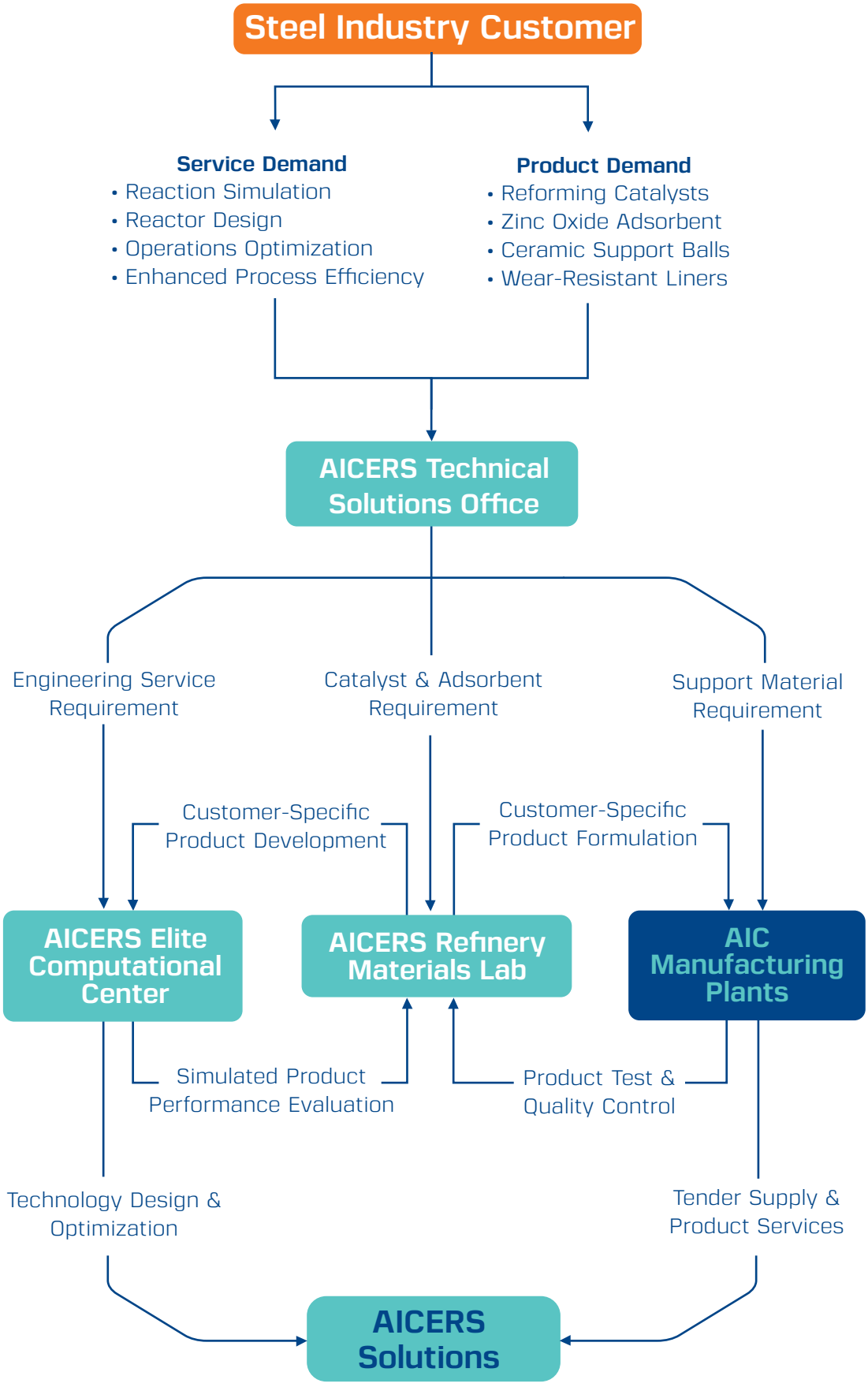
Refinery Materials Laboratory

- DRI Semi-Active Catalyst Synthesis
- DRI Active Catalyst Synthesis
- ZnO Adsorbent Synthesis
- Materials Characterization Tests

Technical Solutions Office

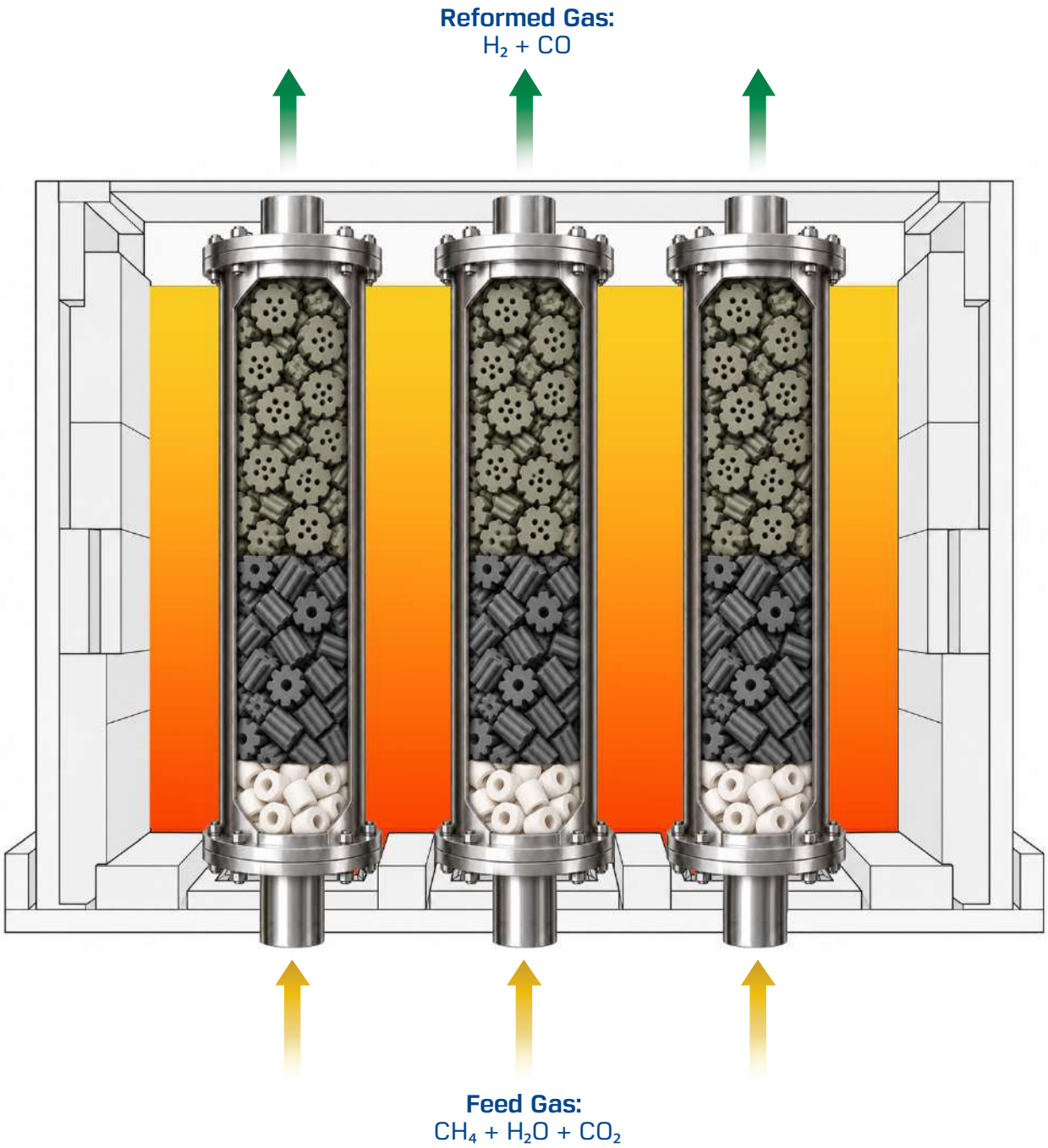
- Pre-Sales Service
- After-Sales Service
- Technical Partnership
- Support Materials Supply




Steel Industry Customer
Service Demand
• Reaction Simulation
• Reactor Design
• Operations Optimization
• Enhanced Process Efficiency
Product Demand
• Reforming Catalysts
• Zinc Oxide Adsorbent
• Ceramic Support Balls
• Wear-Resistant Liners
AICERS Technical Solutions Office
Engineering Service Requirement
Catalyst & Adsorbent Requirement
Support Material Requirement
Customer-Specific Product Development
Customer-Specific Product Formulation
AICERS Elite Computational Center
AICERS Refinery Materials Lab
AIC Manufacturing Plants
Simulated Product Performance Evaluation
Product Test & Quality Control
Technology Design & Optimization
Tender Supply & Product Services
AICERS Solutions

AICERS

Reformer Computational Service



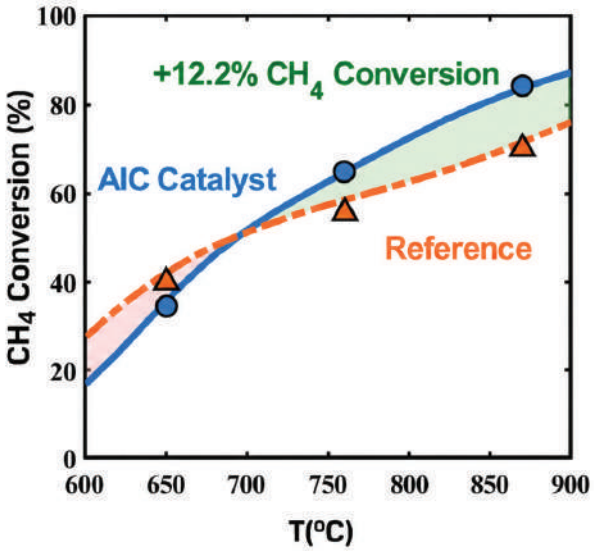
Unlock the full potential of your DRI reformers with **AICERS** Reformer Computational Service. Using advanced kinetic modeling and reactor simulation, we provide data-driven insights into catalyst behavior and reaction engineering, helping you maximize hydrogen yield, methane conversion, and overall process efficiency.

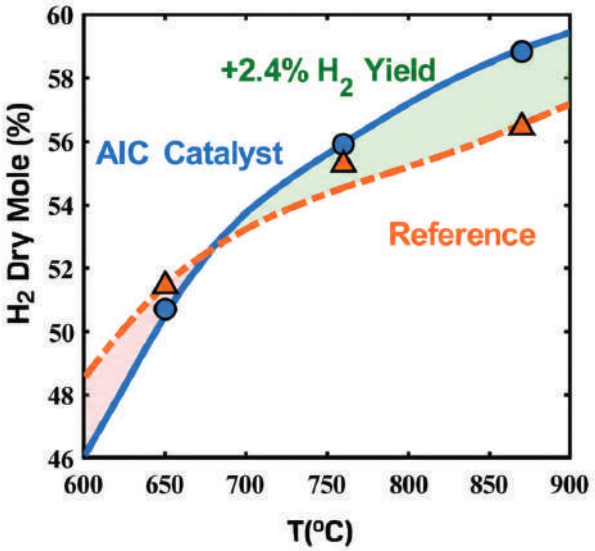
Key Features:

- **Reaction Mechanism Study** – Understand fundamental reaction pathways.
- **Kinetic Modeling** – Compute reaction rates and activation energies.
- **Reactor Simulation Program** – Predict performance under your process conditions.
- **Reformer Optimization Recommendations** Practical guidance to enhance yield and catalyst performance.

AICERS transforms complex kinetics of catalytic reactions into actionable strategies for improved DRI operations, ensuring your catalyst and reformer perform at their best condition.

Pilot tests conducted at the **Research Institute of Petroleum Industry (RIPI)** show that the **AIC** High Active DRI Catalyst delivers a **2.4% higher hydrogen yield** and a **12.2% improvement in methane conversion** compared to a reference commercial catalyst.





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Desulfurizer Computational Service

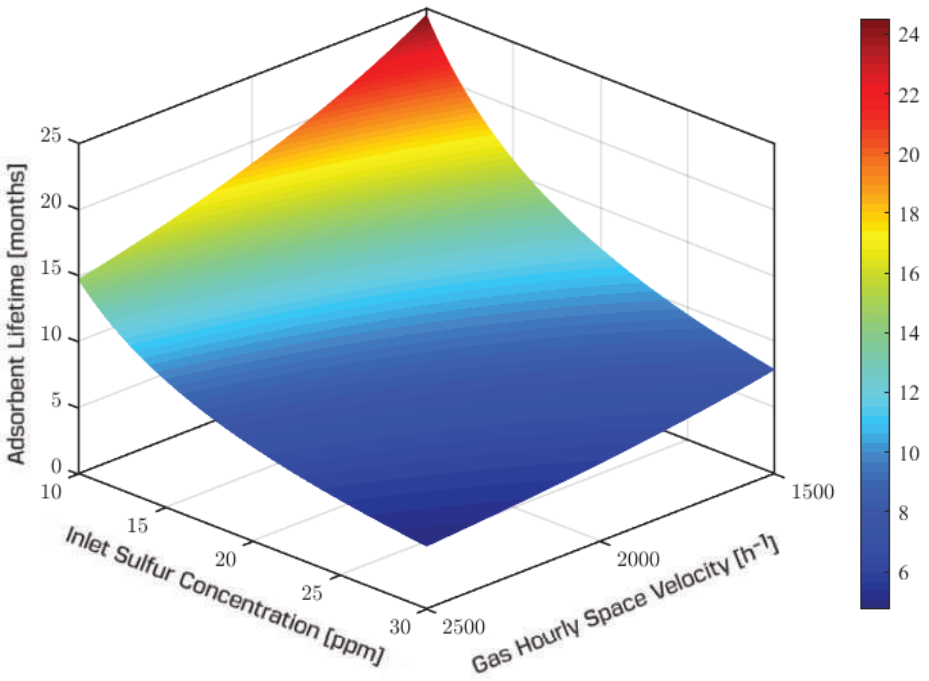


AICERS Computational Service transforms your desulfurization process through advanced reactor-scale and pellet-scale modeling. Gain actionable insights that extend adsorbent life, maximize H2S capture, and enhance overall process performance.

Key Features:

- **Adsorption Kinetic Modeling** – Compute sulfur uptake rates and adsorbent capacities tailored to your specific operating conditions.
- **Reactor Simulation Program** – Forecast desulfurizer performance, breakthrough timing, and bed utilization to make informed process decisions.
- **Pressure Drop Predictions** – Ensure stable operation with accurate flow and pressure insights.
- **Desulfurizer Optimization Strategies** – Receive actionable recommendations to extend ZnO lifetime, maximize sulfur removal, and enhance process stability and economy.

AICERS tackles process and operational challenges by delivering innovative, computation-driven solutions for more reliable and efficient desulfurization.



Our Customers

Trusted by **Steel Industry Leaders** in Iran

Mobarakeh Steel Co.

شرکت توسعه آهن و فولاد گل گهر
GOLGOHAR IRON & STEEL DEVELOPMENT CO.

KSC
شرکت فولاد خوزستان

فولادسبا

شرکت معدنی و صنعتی چادرملو (سهامی عام)

PASCO
مجتمع صنعتی
ذوب آهن پاسارگاد

KSC.CO
شرکت مجتمع فولاد خراسان

ARFA
IRON & STEEL Co.
شرکت آهن و فولاد ارفع (سهامی خاص)

شرکت آهن و فولاد غدیر ایرانیان
Iranian Ghadir Iron & Steel Co.

شرکت فولاد سفید دشت
چهارمحال و بختیاری

مجتمع فولاد غدیر نی ریز (سهامی خاص)
NEYRIZ GHADIR STEEL COMPLEX
(NGHSCO)

SSIC
شرکت صنعت فولاد شادگان



ENGINEERED MATERIALS, PROVEN PERFORMANCE

AIC HOLDING



EliteComputed RefineMat Solutions

STEEL INDUSTRY



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