







# AIC HOLDING

ARDAKAN INDUSTRIAL CERAMICS COMPANY



Activities: Science based Company  
The Producer of Different kinds of Ceramics based  
on Alumina. Silicate. Catalyst. Adsorbent,  
Alpha Alumina, Specular Hematite and, ....



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# ARDAKAN INDUSTRIAL CERAMICS COMPANY

Ardakan Industrial Ceramics (AIC) Company was established in 1995. As a knowledge-based company, AIC is known as the largest producer of High Alumina Ceramic Balls, Liners, catalysts and different grades of advanced industrial ceramics in Iran. The annual capacity of the company's production is about 12000 tons.

## *A Main Consumers of AIC's Products*

The Oil, Gas, Petrochemical, Chemical, Steel, Mining, Tile, Ceramics, Porcelain, Glaze, Pigment and Paints, Cement and Food Industries.

## *AIC's Products*

- 1) Sulfur Recovery Catalysts
- 2) Alumina and Silica Ceramic Balls as Bed Support
- 3) Activated Alumina (Adsorbent Materials)
- 4) High Alumina Grinding Balls and Liners
- 5) Wear Resistant High Alumina Liners
- 6) High Alumina Advance Parts
- 7) Acid Resistance Bricks
- 8) Adsorbent Ceramic Balls as Water Filtration
- 9) DRI Catalyst
- 10) Specular Hematite

## *1) Sulfur Recovery Catalysts*

After several years of research, the AIC company has succeed in producing Sulfur Recovery Catalysts (Claus Catalysts), which according to its technical knowledge and manufacturing capability, the following catalysts can be supplied in all grades based on consumer requirements ( Conversion, Hydrolysis, Oxygen Scavenging ).





## 2) Alumina and Silica Ceramic Balls as Bed Support

Other products of AIC; Various grades of ceramic balls, (ADM) which are used in Oil, Gas, Petrochemical and Chemical Industries as a support material of catalysts .

These products known as inert balls , ceramic balls, alumina balls and support balls based on their applications in different industries.

AIC company is one of the best manufacturer of these products among other companies around the world in terms of physical and chemical properties. All Products are manufactured with strict quality standards and supplied to the market.

Typical chemical(%)	ADM 220	ADM 920	ADM 990
AL <sub>2</sub> O <sub>3</sub>	25 ± 3	92	99
SiO <sub>2</sub>	66 ± 3	3.5	0.3
Fe <sub>2</sub> O <sub>3</sub>	1.5	0.1	0.1
Mg O (Max)	1	3.0	0.09
Na <sub>2</sub> O+K <sub>2</sub> O (Max)	4.0	-	0.05

Typical Physical	ADM 220	ADM 920	ADM 990
Bulk Density (gr/cm <sup>3</sup> ) Min	2.35	3.60	3.70
Hardness (Mohs scale)	7	9	9
Water Adsorption (%)	0.4	0.1	0.2
Porosity (%)	1.0	0.2	0.4
Crush Strength 1/8" (kg/ball)	60	150	100
Crush Strength 1/4" (kg/ball)	100	300	200
Crush Strength 3/8" (kg/ball)	140	700	500
Crush Strength 1/2" (kg/ball)	260	900	800
Crush Strength 3/4" (kg/ball)	600	1200	1000
Crush Strength 1" (kg/ball)	900	1800	1500
Max .Op. Temp (c°)	960	1600	1600
Packing Density (Kg/m <sup>3</sup> )	1450	2000	2100



## 3) Activated Alumina (Adsorbent Materials)

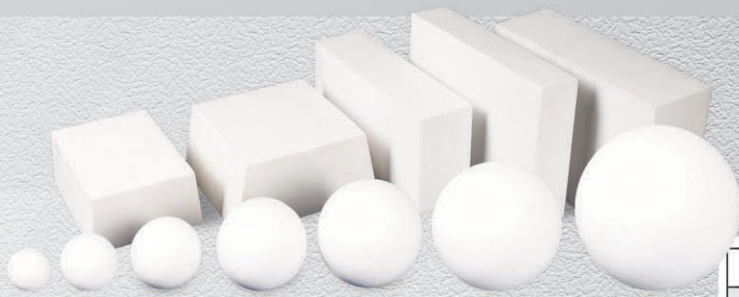
The Activated Alumina which AIC produce have highest quality, like high surface area, adsorption capacity and mechanical strength. It can be used in all processes that require adsorbent materials, includes (Air Compressors, Dryers, Air Instrumentation, etc.).



### AIC Activated Alumina - Typical Chemical and Physical

Typical Characteristics	Unit	Value
Bead Size Nominal	mm	3-5mm,5-7mm
Crystal Type	-	Y-Alumina
Al <sub>2</sub> O <sub>3</sub>	wt%	Min 92
Na <sub>2</sub> O	wt%	Max 0.3
SiO <sub>2</sub>	wt%	Max 0.05
Fe <sub>2</sub> O <sub>3</sub>	wt%	Max 0.05
Specific Surface Area	M <sup>2</sup> /gr	Min 300
Total Pore Volume	Cm <sup>3</sup> /gr	Min 0.4
Tapped Bulk Density	Kg /l	0.7- 0.8
Crush Strength Size 3-5	Kgf	Min 10
Crush Strength Size 5-7	Kgf	Min 18
Water Adsorption Capacity(@ 25 c, 60%RH)	%	Min 18
Loss of Ignition (at1000 c )	%	7
Attrition Loss	wt%	1





#### 4) High Alumina Grinding Balls and Liners

High alumina balls and liners are other products of AIC which are used in industrial ball mills ; Tile, Ceramics, Porcelain, Glaze, Pigment , Paints and Cement Industries.

**An exceptionally, the Properties of High Alumina Grinding Ball and Liners are:**

- High degree of hardness and resistant to wear
- High compressive Strength
- Zero porosity and water adsorption
- High density and low wear resistant rate resulting in reduction of ball-mill rotation time and balls consumption.
- Absence of unusual impurities in the formulation of grinding materials
- Reducing electrical energy consumption
- Reduction in ball and liners consumption

20mm = 3/4"
25mm = 1"
30mm = 5/4"
40mm = 1 1/4"
45mm = 1 3/4"
50mm = 2"
60mm = 2 1/4"

Al <sub>2</sub> O <sub>3</sub>	92
SiO <sub>2</sub>	3.0
Fe <sub>2</sub> O <sub>3</sub>	0.15
Na <sub>2</sub> O	0.1

Bulk Density (gr/cm <sup>3</sup> )	Min 3.60
Hardness (Mohs Scale)	9
Porosity (%)	0
Color	White

#### 5) Wear Resistance High Alumina Liners

In the mine, steels and cements industries the main problem and cost are wear of the equipments. To overcome this huge problem, the wear resistant high alumina liners can be used.

In environment exposed to humidity, contact with corrosive substances and high operating temperature, the use of hard materials and metals have been challenging, but high alumina wear resistant ceramics can be suitable in substitute for hard metals lining due to their unique mechanical and hardness properties.

Today these unique properties make it possible to replace high alumina liners instead of metals in different parts of the industries which involve aggressive wear and corrosion.

Major industry consumers of these liners are steel, mining and powder industries.

**An exceptionally, the Properties of Wear Resistance High Alumina and Liners:**

- Very high degree of hardness
- Neutral and lack of reaction with various chemicals involving acids and alkaline
- Less density than metals which causes less load on equipment
- Easier installation with variety of methods (gluing , welding and bolting)
- High temperature resistance
- Low cost installation, repair and maintenance
- Reasonable price



Code	Type	Length (mm)	Width (mm)	Thickness (mm)	Weight (kg)
LA 156	Flat	210	100	50	3.80
LA 123	Flat	150	100	50	2.70
LA 401	Flat	140	70	40	1.42
LA 180	Flat	140	100	25	1.27
LA 151	Flat	150	100	25	1.36
LA 301	Slope	140	70 / 66	40	1.42
LA 201	Slope	140	70 / 67.5	40	1.42
LA 153	Slope	150	100 / 96.5	50	2.70

Al <sub>2</sub> O <sub>3</sub>	92
SiO <sub>2</sub>	3.0
Fe <sub>2</sub> O <sub>3</sub>	0.15
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Bulk Density (gr/cm <sup>3</sup> )	Min 3.60
Hardness (Mohs Scale)	9
Porosity (%)	0
Color	White



## 6) High Alumina Advance Parts

According to some industries requirements to high alumina ceramic in advance parts, the research and development department of AIC will work on those parts in order to obtain the customer satisfaction with specific chemical and physical characteristics. In case, if these parts are accepted by the specialists and experts of AIC and the customer, the order will be proceed.



## 7) Reforming Catalysts

The Midrex Direct Reduction process is based upon the reducing gas or syngas moves counter-current to the lump iron oxide ore or iron oxide pellet solids in the bed. The reducing gas is produced from the reforming of natural gas using two nickel based catalyst types (a highly active DRI reforming catalyst based on alumina carrier and lower nickel oxide content based on a magnesium oxide (MgO) carrier) and one inert ceramic support.

**Several significant features of the robust DRI reforming catalysts are as follows:**

- High catalytic activity for converting feedstock
- High resistance against coke formation
- High heat transfer coefficient
- Low pressure drop and high geometric surface area
- Excellent stability of catalyst performance.



**DIBA CERAM NOVIN KASRA**  
Ceramic Ballets Company

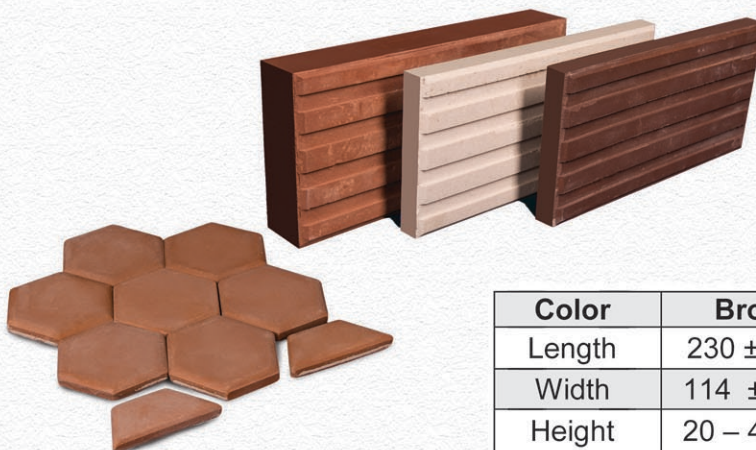
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## A) Diba Ceram Novin Kasra Acid Resistant Bricks

Acid Resistance Bricks are used in equipment which necessary to protecting against the acids.

## Adsorbent Ceramic Balls as Water Filtration

Used in the purification industry, water purification, etc., with 12% water absorption and density of 1.2. This product is manufactured in 7mm, 10mm and 12 mm sizes and also present as NT code.



Color	Brown
Length	230 ±1 mm
Width	114 ± 0.5
Height	20 – 40 mm

### Test Report Acid Resistant Bricks

Characteristic	NT
Apparent porosity %	<1.5
Water absorption %	< 1
Bulk density ( $gr/cm^3$ )	>2.3
Resistance to acid % (loss in weight)	< 0.5
Cold crushing strength( $kg/cm^2$ )	> 610
Flexural Strength ( $N/mm^2$ )	> 31

### Chemical Properties

SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	CaO+MgO%	Na <sub>2</sub> O+K <sub>2</sub> O%
59.98	18.48	7.95	0.83	3.45	4.61



## B) ALUMINUM PARS OXIDE of KASRA (ALPACO)

Aluminum Pars Oxide of Kasra (ALPACO) is the Iran's Leading Producer of Alpha Alumina with installed capacity of 20 metric tons per year, we currently operate a factory in the qom province. Our operation in central Iran, biggest single source of Alpha Alumina able to supply 80 percent of the market. Our development plans to increase Alpha Alumina capacity and production of other refractory materials are our priority in 2023.

For nearly 3 year, our AIC based center of excellence has been developing innovative equipment and processes for cleaner, more efficient Alumina production with various grads and particle size. Technology developed by this group of scientific, engineering, chemistry and support staff has steadily increased our system-wide. In addition, **ALPACO** established micronized production line capable of manufacturing particle size of one micron upward.



**Aluminium Pars oxide of Kasra**

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## C) Zarrin Powder Novin Kasra Mineral Company Hematite Iron Ore

Zarrin Powder Novin Kasra Mineral Engineering Co., has started its activity with own mining in the field of extraction and processing of Hematite iron ore and with new methods of exploration ,extraction and processing of final product , manufacturing at least 100,000 tons of final processed material per year ,as the largest producer of hematite (as drilling fluids) according to API standard, material for corrosion resistance pigments based on Micaceous Iron Oxide (MIO). Also this company is the manufacturer of Hematite concentration for metallurgy utilization with purity of up to 66%.

### Hematite chemical and physical specification

Requirement	unit	Specification
Density	gr/cm <sup>3</sup>	Min 4.7
Water – soluble alkaline earth metals, as calcium	Mgr/kg	Max 100
Magnetite absorption	%	Max 5
Residue on ASTM sieve No : 200 (wet method)	%	Max 3
Residue on ASTM sieve No : 325 (wet method)	%	10±3
PH at room temp.	-	Max 5
Moisture	%	Max 0.2