H | VENTURES

PRODUCT CATALOGUE · EST. 1937

REFRACTORY PRODUCTS

Refractory Bricks · Monolithics · Calcined Kaolin · Engineered Shapes



THE ACR WORKS · ALEXANDRIA, EGYPT

MANUFACTURED BY

ACR · Alexandria Company for Refractories

Alexandria, Egypt · since 1937

ISO 9001 · 14001 · 45001

A.P. GREEN · USA LICENCE

A refractories maker since 1937

Alexandria Company for Refractories (ACR) has produced alumino-silicate refractories on the Egyptian Mediterranean coast since 1937. Its modern plant was built under licence of A.P. Green Industries (USA) and operates a quality system certified to ISO 9001 and ISO 14001.

ACR supplies shaped and unshaped, dense and light-weight refractories for the iron & steel, cement, lime, glass, petrochemical and ceramic industries. Alongside its home market it exports to Syria, Saudi Arabia, Jordan, Qatar, Libya, Iraq and Morocco · and to Denmark, Italy and Greece · the foundation on which its European distribution now builds.



The ACR plant and rotary kiln, Alexandria

1937	10+	ISO	A.P. Green
YEAR FOUNDED	EXPORT MARKETS	9001 · 14001 · 45001	USA LICENCE

One partner, the whole lining

Complete Product Range

Shaped and unshaped refractories from 25 to 97 % Al_2O_3 · dense, insulating, castable and mortar.

Engineered Shapes

Arches, wedges, ladle and pouring shapes, nozzles, EAF blocks and special shapes produced to drawing.

Calcined Kaolin & Chamotte

Rotary-kiln calcined kaolin and chamotte, crushed and sieved to any grain size on request.

Lining Design & Service

A dedicated department designs and maintains the refractory linings of any industrial furnace.

Quality System

ISO 9001, 14001 and 45001, supported by fully equipped physical and chemical testing laboratories.

Proven Export Supply

A dependable supply record across MENA and European markets, backed by consistent, standards-based quality.

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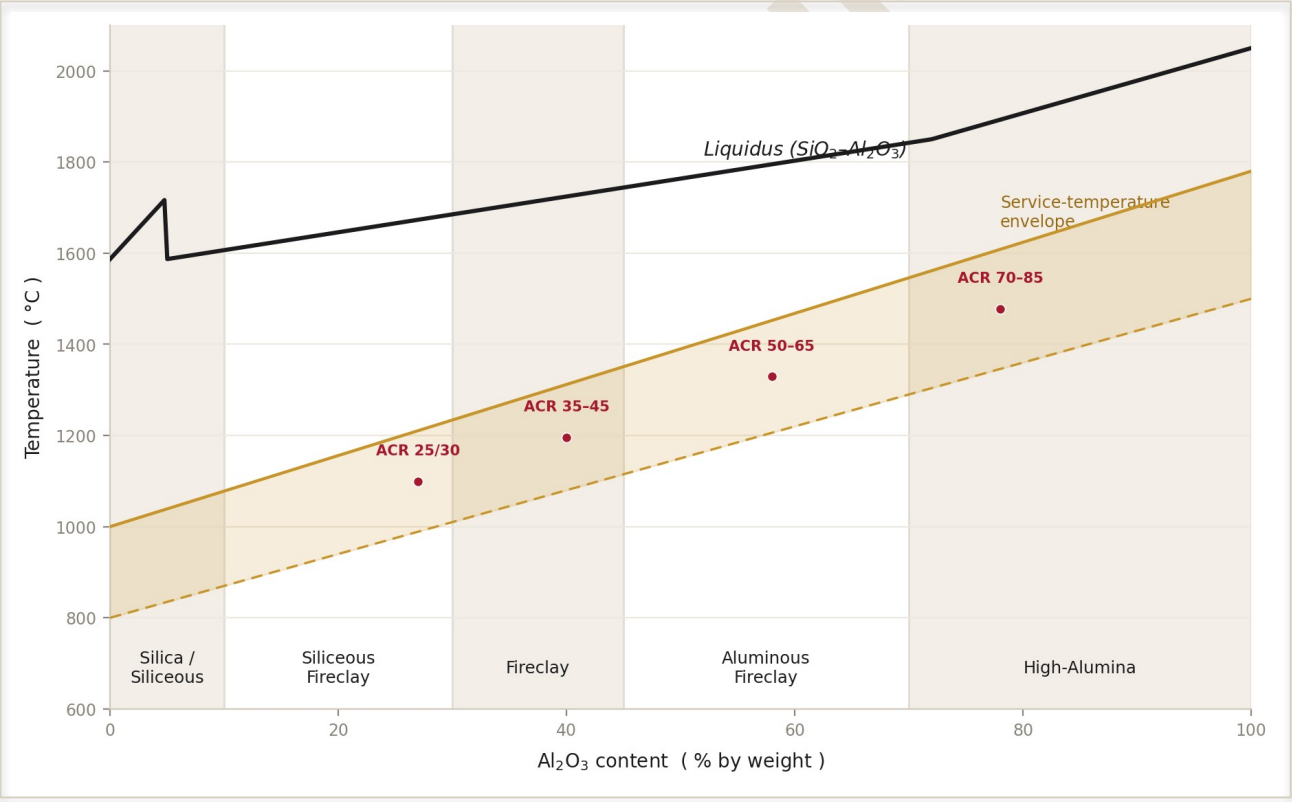
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Standardised and custom engineered shapes · general, kiln, ladle, pouring, nozzle, EAF and block ranges.

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Where each ACR grade performs

ACR's shaped products span the SiO_2–Al_2O_3 system from siliceous fireclay to high-alumina. As alumina content rises, so do refractoriness and service temperature. The diagram maps each grade family against the liquidus and the practical service-temperature envelope, after G. Routschka.



SECTION

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01

Shaped Refractories

Dense siliceous-fireclay, fireclay, aluminous and high-alumina bricks, chemically-bonded high-alumina bricks, and light-weight insulating bricks.

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Siliceous Fireclay Bricks

Alumino-silicate dense brick · ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Siliceous fireclay bricks containing 25 to 33 % Al_2O_3 are produced from selected high-grade Egyptian raw siliceous fireclays. The two grades, ACR 25 and ACR 30, combine controlled porosity with dependable hot strength for moderate-temperature service.

TYPICAL APPLICATIONS

- Tunnel kilns for clay bricks
- Cyclone preheaters & preheater pipes, cement
- Runners
- Coke-oven regenerators
- Incinerators

25–33 %
ALUMINA CONTENT

1360 °C
SERVICE TEMP.

2
STANDARD GRADES

STANDARDS ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Brand	ACR 25	ACR 30
CHEMICAL COMPOSITION (WT %)		
Silica SiO_2	67.0–70.0	62.0–65.0
Alumina Al_2O_3	25.0–28.0	30.0–33.0
Titania TiO_2	2.0–2.2	2.1–2.4
Iron Oxide Fe_2O_3	1.6–2.0	1.4–1.8
Lime CaO	0.3–0.5	0.3–0.5
Magnesia MgO	0.1–0.2	0.1–0.2
Alkalies Na_2O+K_2O	0.2–0.4	0.2–0.4
PHYSICAL & THERMO-MECHANICAL PROPERTIES		
Bulk Density g/cm³	2.00–2.05	2.05–2.15
Apparent Porosity %	18–22	18–22
Modulus of Rupture kg/cm²	60–70	80–90
Cold Crushing Strength kg/cm²	300–350	300–350
Linear Thermal Expansion 1000 °C, %	0.6–0.9	0.5–0.8
Thermal Conductivity @ 400 °C W/m·K	1.20–1.30	1.15–1.25
Thermal Conductivity @ 700 °C	1.35–1.45	1.25–1.35
Thermal Conductivity @ 1000 °C	1.45–1.55	1.35–1.45
Refractoriness °C	1630–1650	1670–1690
Refractoriness Under Load T_a, °C	>1300	>1330
Recommended Service Temp. °C	1350	1360

Typical values, not a specification.

Fireclay Bricks

High-duty fireclay brick · ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

High-duty fireclay brick has been used successfully in industrial furnaces the world over. Careful, controlled blending of high-quality raw materials gives a wide range of properties and reliable service to 1450 °C. These bricks do not shrink at high temperature, keeping joints closed under severe operating conditions.

TYPICAL APPLICATIONS

- Blast furnaces · stack lining & stoves
- Pouring refractories · sleeves, stopper heads
- Ladles
- Cement kilns (unax cooler)
- Incinerators & tunnel kilns

35–45 %
ALUMINA CONTENT

1500 °C
SERVICE TEMP.

4
STANDARD GRADES

STANDARDS ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Brand	ACR 35	ACR 38	ACR 40	ACR 45
CHEMICAL COMPOSITION (WT %)				
Silica SiO_2	57.0–60.0	55.0–57.0	53.0–55.0	48.0–50.0
Alumina Al_2O_3	35.0–38.0	38.0–40.0	40.0–42.0	45.0–47.0
Titania TiO_2	2.20–2.50	2.20–2.50	2.20–2.50	2.20–2.68
Iron Oxide Fe_2O_3	1.30–1.60	1.30–1.50	1.30–1.50	1.30–1.50
Lime CaO	0.30–0.50	0.30–0.50	0.30–0.50	0.30–0.40
Magnesia MgO	0.10–0.20	0.20–0.30	0.20–0.25	0.15–0.20
Alkalies Na_2O+K_2O	0.20–0.40	0.30–0.60	0.30–0.60	0.30–0.50
PHYSICAL & THERMO-MECHANICAL PROPERTIES				
Bulk Density g/cm³	2.10–2.20	2.24–2.26	2.26–2.30	2.28–2.32
Apparent Porosity %	18–20	16–19	16–18	16–19
Modulus of Rupture kg/cm²	80–90	80–90	85–95	90–100
Cold Crushing Strength kg/cm²	350–400	400–450	450–500	450–500
Linear Thermal Expansion 1000 °C, %	0.60–0.70	0.50–0.55	0.50–0.60	0.55–0.65
Thermal Conductivity @ 400 °C W/m·K	1.10–1.20	1.10–1.20	1.10–1.20	1.15–1.25
Thermal Conductivity @ 700 °C	1.20–1.30	1.15–1.25	1.15–1.25	1.20–1.30
Thermal Conductivity @ 1000 °C	1.25–1.35	1.25–1.40	1.20–1.30	1.25–1.35
Refractoriness °C	1690–1710	1710–1730	1730–1750	≥1750
Refractoriness Under Load T_a, °C	>1350	>1400	>1420	>1440
Recommended Service Temp. °C	1380	1450	1480	1500

Typical values, not a specification.

Aluminous Fireclay Bricks

Aluminous fireclay brick · ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Excellent resistance to heat and spalling, high refractoriness and permanent volume make these bricks highly resistant to chemical attack, with service temperatures up to 1650 °C.

TYPICAL APPLICATIONS

- Steel ladles
- Blast-furnace bottom lining
- Checker bricks for stoves
- Cement rotary kiln
- Reheat-furnace roofs
- Lime-calcination kilns
- Soaking-pit covers · torpedo ladles

50–65 %
ALUMINA CONTENT

1650 °C
SERVICE TEMP.

3
STANDARD GRADES

STANDARDS ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Brand	ACR 50	ACR 60	ACR 65
CHEMICAL COMPOSITION (WT %)			
Silica SiO_2	42.0–45.0	32.0–35.0	28.0–30.0
Alumina Al_2O_3	50.0–53.0	60.0–62.0	65.0–67.0
Titania TiO_2	2.4–2.6	2.5–2.7	2.6–2.8
Iron Oxide Fe_2O_3	1.4–1.6	1.4–1.6	1.5–1.6
Lime CaO	0.2–0.4	0.2–0.4	0.2–0.4
Magnesia MgO	0.1–0.2	0.1–0.2	0.1–0.2
Alkalies Na_2O+K_2O	0.3–0.5	0.3–0.5	0.3–0.5
PHYSICAL & THERMO-MECHANICAL PROPERTIES			
Bulk Density g/cm³	2.30–2.35	2.45–2.50	2.50–2.55
Apparent Porosity %	18–20	18–20	19–21
Modulus of Rupture kg/cm²	100–120	100–120	100–120
Cold Crushing Strength kg/cm²	500–550	500–550	500–550
Linear Thermal Expansion 1300 °C, %	0.40–0.50	0.50–0.60	0.55–0.65
Thermal Conductivity @ 400 °C W/m·K	1.30–1.35	1.35–1.40	1.40–1.45
Thermal Conductivity @ 700 °C	1.32–1.40	1.40–1.45	1.45–1.50
Thermal Conductivity @ 1000 °C	1.40–1.45	1.50–1.55	1.60–1.65
Refractoriness °C	1750–1770	1790–1825	>1825
Refractoriness Under Load T_a, °C	>1480	>1500	>1500
Recommended Service Temp. °C	1550	1600	1650

Typical values, not a specification.

High-Alumina Bricks

High-alumina brick · ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Extremely high refractoriness and good strength recommend these bricks where extended service life is required over 60 % alumina brick. Applied up to 1750 °C, they resist slag attack and the penetration of molten metals and slags.

TYPICAL APPLICATIONS

- Steel ladles
- Cement rotary kiln & cooler
- Lime kiln
- Electric-arc-furnace roofs
- Aluminium melting furnaces
- Reheating furnaces · soaking pits
- Glass-tank furnace & regenerator

70–85 %
ALUMINA CONTENT

1750 °C
SERVICE TEMP.

4
STANDARD GRADES

STANDARDS ES 4134/2003 · ASTM C-27 · DIN EN 12475-1

Brand	ACR 70	ACR 80	ACR 82	ACR 85
CHEMICAL COMPOSITION (WT %)				
Silica SiO_2	22.0–24.0	14.0–16.0	12.0–14.0	9.0–12.0
Alumina Al_2O_3	70.0–72.0	78.0–80.0	80.0–82.0	82.0–85.0
Titania TiO_2	2.80–3.00	3.20–3.50	3.20–3.60	3.00–3.40
Iron Oxide Fe_2O_3	1.50–1.60	1.60–1.70	1.60–1.65	1.60–1.65
Lime CaO	0.20–0.30	0.20–0.30	0.10–0.20	0.10–0.20
Magnesia MgO	0.10–0.20	0.10–0.20	0.10–0.15	0.10–0.15
Alkalies Na_2O+K_2O	0.30–0.50	0.30–0.40	0.20–0.30	0.20–0.30
PHYSICAL & THERMO-MECHANICAL PROPERTIES				
Bulk Density g/cm³	2.60–2.65	2.75–2.78	2.78–2.80	2.78–2.81
Apparent Porosity %	18–20	18–20	18–21	19–21
Modulus of Rupture kg/cm²	100–120	100–130	100–130	100–140
Cold Crushing Strength kg/cm²	550–650	600–850	600–800	600–800
Linear Thermal Expansion 1300 °C, %	0.75–0.80	0.85–0.90	0.95–1.00	1.00–1.05
Thermal Conductivity @ 400 °C W/m·K	1.45–1.50	1.55–1.60	1.75–1.80	1.80–1.83
Thermal Conductivity @ 700 °C	1.50–1.55	1.60–1.65	1.80–1.85	1.83–1.86
Thermal Conductivity @ 1000 °C	1.65–1.70	1.65–1.70	1.85–1.90	1.86–1.93
Refractoriness °C	1825–1850	1850–1880	>1880	>1880
Refractoriness Under Load T_a, °C	>1530	>1550	>1600	>1600
Recommended Service Temp. °C	1700	1750	>1750	>1750

Typical values, not a specification.

Phosphate-Bonded High-Alumina Bricks

Phosphate-bonded high-alumina brick · low apparent porosity

Phosphate-bonded high-alumina bricks are produced where an exceptionally inert, strong and dense brick is needed at very high temperature. Their low apparent porosity resists the penetration of fluid slag, metal and flux to 1700 °C, and gives high resistance to abrasion, erosion and mechanical abuse.

TYPICAL APPLICATIONS

- Electric-arc-furnace roofs
- Aluminium melting furnaces
- Steel ladles
- Reheating-furnace bottoms
- Burner blocks

68–85 %
ALUMINA CONTENT

12–16 %
APPARENT POROSITY

4
STANDARD GRADES

Brand	ACR 70 P	ACR 75 P	ACR 80 P	ACR 85 P
CHEMICAL COMPOSITION (WT %)				
Silica SiO_2	20.0–24.0	16.0–18.0	12.0–14.0	8.0–10.0
Alumina Al_2O_3	68.0–72.0	74.0–76.0	78.0–80.0	82.0–85.0
Titania TiO_2	3.00–3.10	3.00–3.20	3.20–3.40	3.10–3.20
Iron Oxide Fe_2O_3	1.50–1.60	1.50–1.60	1.50–1.70	1.00–1.40
Lime CaO	0.20–0.30	0.20–0.30	0.20–0.30	0.20–0.30
Magnesia MgO	0.05–0.10	0.05–0.10	0.05–0.10	0.05–0.10
Alkalies Na_2O+K_2O	0.20–0.30	0.20–0.30	0.10–0.20	0.10–0.20
Phosphorus Pentoxide P_2O_5	2.00–3.00	2.00–3.00	2.00–3.00	2.00–3.00
PHYSICAL & THERMO-MECHANICAL PROPERTIES				
Bulk Density g/cm³	2.70–2.75	2.75–2.80	2.80–2.90	2.85–2.95
Apparent Porosity %	12–16	12–16	12–16	12–16
Modulus of Rupture kg/cm²	200–250	200–250	200–300	200–300
Cold Crushing Strength kg/cm²	750–900	750–900	900–1100	900–1100
Linear Change after firing 1350 °C, %	0.2–0.4	0.2–0.4	0.2–0.4	0.2–0.4
Refractoriness °C	1800	1850	>1850	>1850

Typical values, not a specification.

Lightweight Insulating Bricks

Insulating alumino-silicate brick · ACR-Ins range

ACR light-weight bricks span siliceous-fireclay to high-alumina compositions with 30 to 72 % Al_2O_3. Made entirely of high-quality materials, they combine high insulating value, structural strength and stable volume at temperature. High-alumina grades suit direct contact with flame and furnace gases where slagging does not occur.

TYPICAL APPLICATIONS

- Back-up insulation of furnace linings
- Hot-face insulation, non-slagging service
- Kilns, boilers and heaters
- Any lining requiring energy economy

30–72 %
ALUMINA CONTENT

1500 °C
SERVICE TEMP.

5
STANDARD GRADES

Brand	Ins 30	Ins 40	Ins 50	Ins 60	Ins 70
CHEMICAL COMPOSITION (WT %) & SERVICE					
Alumina Al_2O_3, %	30–35	38–40	50–52	60–62	70–72
Maximum Service Temp. °C	1300	1350	1400	1450	1500
PHYSICAL & THERMO-MECHANICAL PROPERTIES					
Bulk Density g/cm³	0.7–1.1	0.7–1.2	0.9–1.2	0.9–1.2	0.9–1.1
Cold Crushing Strength kg/cm²	40–60	40–60	40–60	40–70	50–70
Thermal Conductivity @ 400 °C W/m·K	0.27–0.30	0.36	0.40–0.42	0.43–0.45	0.48
Thermal Conductivity @ 700 °C	0.29–0.31	0.40–0.42	0.42–0.45	0.46–0.49	0.52
Thermal Conductivity @ 1000 °C	0.35–0.38	0.48–0.50	0.50–0.52	0.53–0.55	0.58

Bulk-density and thermal-conductivity figures span the standard density variants of each grade; ACR selects the grade to suit the service condition.

Typical values, not a specification.

SECTION

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02

Monolithic Refractories

Traditional and low-cement castables, light-weight castables, and air- and heat-setting mortars for laying and repairing every alumino-silicate lining.

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Traditional Castables

Conventional CAC-bonded castable · grain size 0–6 mm

ACR produces traditional alumino-silicate castables across a wide 40–95 % Al_2O_3 range, blending calcined kaolin, bauxite and/or alumina with calcium-aluminate cement as a hydraulic bond. They suit cold repair and casting of furnace linings working from 1400 up to 1750 °C according to alumina content.

TYPICAL APPLICATIONS

- Monolithic linings & repairs
- Casting of complex furnace geometry
- Iron & steel, cement, lime and petrochemical furnaces
- Any lining from 1400 to 1750 °C

40–95 %
ALUMINA CONTENT

1750 °C
SERVICE TEMP.

8
STANDARD GRADES

ACR-Cast	42	50	60	65	70	80	90	95
CHEMICAL COMPOSITION (WT %)								
Silica SiO_2	47–48	37–39	28–30	25–27	21–23	11–13	2–4	0.1–0.4
Alumina Al_2O_3	42–44	50–52	60–62	65–67	70–72	80–82	90–92	93–95
Iron Oxide Fe_2O_3	<2.0	<2.0	<1.5	<1.5	<1.5	<1.5	<0.5	<0.2
Lime CaO	<5.0	<5.0	<4.0	<3.0	<3.0	<3.0	<5.0	<5.0
PHYSICAL & THERMO-MECHANICAL PROPERTIES								
Max. Service Temp. °C	1400	1450	1550	1580	1600	1650	1700	1750
Grain Size * mm	0–6	0–6	0–6	0–6	0–6	0–6	0–6	0–6
Water Required %	9–11	9–11	9–11	9–11	9–11	9–11	8–11	8–11
Bulk Density (dried 110 °C) g/cm³	≥2.00	≥2.15	≥2.25	≥2.30	≥2.40	≥2.45	≥2.65	≥2.75
MOR · dried 110 °C kg/cm²	≥80	≥80	≥80	≥80	≥80	≥90	≥90	≥90
MOR · fired 1400 °C kg/cm²	≥100	≥100	≥100	≥110	≥110	≥110	≥110	≥120
CCS · dried 110 °C kg/cm²	≥400	≥400	≥400	≥400	≥450	≥500	≥550	≥600
CCS · fired 1400 °C kg/cm²	≥400	≥450	≥450	≥480	≥500	≥550	≥550	≥600
Perm. Linear Change 1400 °C %	−0.3	−0.3	−0.3	−0.9	−0.9	−1.0	−0.2	0.3
Thermal Conductivity 1000 °C	0.91	0.95	1.08	1.09	1.10	1.24	1.83	1.83

**ACR can provide any grain-size distribution as requested by the customer.*

Typical values, not a specification.

Low-Cement Castables

Low-cement castable · install with vibration · grain 0–6 mm

Minimising the calcium-aluminate bond with special admixtures yields dense low-cement castables (LCC) up to 97 % Al_2O_3, with better thermo-mechanical properties and longer service life than traditional castables. LCC grades are recommended from 1500 to 1800 °C.

TYPICAL APPLICATIONS

- High-duty monolithic hot-face linings
- Precast, vibration-installed shapes
- Iron & steel and cement applications
- Severe abrasion and high-temperature service

50–97 %
ALUMINA CONTENT

1800 °C
SERVICE TEMP.

7
STANDARD GRADES

ACR-LCC	50	60	65	70	80	90	97
CHEMICAL COMPOSITION (WT %)							
Silica SiO_2	42–44	32–34	27–29	22–24	12–14	4–6	<0.2
Alumina Al_2O_3	50–52	60–62	65–67	70–72	80–82	90–92	95–97
Iron Oxide Fe_2O_3	<2.0	<1.5	<1.5	<1.5	<1.5	<0.5	<0.2
Lime CaO	≤2.5	≤2.5	≤2.5	≤2.5	≤2.5	≤2.5	≤2.5
PHYSICAL & THERMO-MECHANICAL PROPERTIES							
Max. Service Temp. °C	1500	1600	1630	1650	1700	1750	1800
Grain Size * mm	0–6	0–6	0–6	0–6	0–6	0–6	0–6
Water Required ** %	6–9	6–9	6–9	6–9	6–9	6–9	6–9
Bulk Density (dried 110 °C) g/cm³	≥2.30	≥2.35	≥2.40	≥2.45	≥2.50	≥2.80	≥2.85
MOR · dried 110 °C kg/cm²	≥90	≥90	≥90	≥90	≥100	≥110	≥120
MOR · fired 1400 °C kg/cm²	≥110	≥110	≥120	≥130	≥130	≥140	≥150
CCS · dried 110 °C kg/cm²	≥450	≥450	≥450	≥500	≥550	≥600	≥650
CCS · fired 1400 °C kg/cm²	≥500	≥500	≥500	≥550	≥600	≥650	≥700
Thermal Conductivity 1000 °C	1.20	1.40	1.45	1.46	1.72	1.87	1.97

**Any grain-size distribution on request. **Install with vibrating equipment.*

Typical values, not a specification.

Lightweight Castables

Insulating castable · bulk density 0.90–1.40 g/cm³

Insulating castables with 35–52 % Al_2O_3 and 0.90–1.40 g/cm³ bulk density are produced from light-weight aggregates with hydraulic, chemical and ceramic bonds. After casting, drying and firing to 1200 °C they give dependable insulating and mechanical performance.

TYPICAL APPLICATIONS

- Back-up insulation behind dense linings
- Insulating monolithic layers
- Fire-proofing of steel structures
- Low-temperature furnace insulation

35–52 %
ALUMINA CONTENT

1350 °C
SERVICE TEMP.

3
STANDARD GRADES

Brand	Ins Cast 22	Ins Cast 25	Fire-proof 40
CHEMICAL COMPOSITION (WT %)			
Silica SiO_2	40–42	28–30	39–44
Alumina Al_2O_3	38–40	50–52	35–40
Iron Oxide Fe_2O_3	2–3	2–3	5–6
Lime CaO	12–14	12–14	10–12
PHYSICAL & THERMO-MECHANICAL PROPERTIES			
Max. Service Temp. °C	1250	1350	1200
Grain Size mm	0–4	0–4	0–6
Water Required %	38–42	38–42	20–30
Bulk Density (dried 110 °C) g/cm³	1.0 ± 0.1	1.0 ± 0.1	1.0–1.4
Modulus of Rupture (fired) kg/cm²	25	25	25
CCS · dried 110 °C kg/cm²	>70	>70	>120
CCS · fired 1100 °C kg/cm²	>60	>60	>100
Thermal Conductivity @ 400 °C W/m·K	0.26	0.35	0.26
Thermal Conductivity @ 700 °C	0.29	0.38	0.25
Thermal Conductivity @ 1000 °C	0.33	0.40	0.35

Typical values, not a specification.

Air-Setting Wet Mortars

Wet ready-mix · air-setting · chemically-ceramic bond

ACR air-set mortars are supplied in 30 kg drums as ready-mix plastic masses with 25–72 % Al_2O_3 for laying every type of alumino-silicate brick. High workability and water retention build thin, impermeable, volume-stable joints with excellent hot strength · outstanding on porous insulating brick and on boiler, kiln and ladle linings.

TYPICAL APPLICATIONS

- Laying dense & insulating alumino-silicate brick
- Back and face linings of boilers
- Ceramic and rotary kilns
- Iron & steel ladles, flues and stacks

25–72 %
ALUMINA CONTENT

1650 °C
SERVICE TEMP.

6
STANDARD GRADES

ACR-AM	30	40	45	50	60	70
CHEMICAL COMPOSITION (WT %)						
Silica SiO_2	56.0–61.0	49.0–53.0	47.0–49.0	40.0–42.0	29.0–31.0	20.0–22.0
Alumina Al_2O_3	25.0–30.0	38.0–42.0	44.0–47.0	50.0–52.0	60.0–62.0	70.0–72.0
Titania TiO_2	<1.9	<2.0	<1.9	<2.1	<2.2	<2.3
Iron Oxide Fe_2O_3	<1.4	<1.4	<1.4	<1.5	<1.6	<1.6
Alkalies Na_2O+K_2O	<3.5	<3.5	<3.4	<3.4	<3.4	<3.4
Loss on Ignition L.O.I	1.0–1.5	1.0–1.5	1.0–1.5	1.0–1.5	1.0–1.5	1.0–1.5
PHYSICAL & THERMO-MECHANICAL PROPERTIES · WET READY-MIX · AIR-SETTING · CHEMICALLY-CERAMIC BOND						
Max. Service Temp. °C	1200	1350	1450	1500	1600	1650
Refractoriness °C	1500	1550	1600	1650	>1700	>1700
Grain · over 0.3 mm %	<2	<2	<2	<2	<2	<2
Grain · under 0.075 mm %	>70	>70	>70	>70	>70	>70

Typical values, not a specification.

Heat-Setting Dry Mortars

Dry mix · heat-setting · ceramic bond

Heat-set mortars are supplied as dry mixes of fireclay, aluminous-fireclay and high-alumina types with up to 80 % Al_2O_3. Fine calcined kaolin, bauxite and/or alumina grains develop a ceramic bond on firing, giving high refractoriness, volume stability and resistance to chemical attack · essential for laying brick in iron & steel ladles and tundishes.

TYPICAL APPLICATIONS

- Laying fireclay & high-alumina brick
- Iron & steel ladles and tundishes
- High slag-attack service
- Linings requiring a strong ceramic joint

30–82 %
ALUMINA CONTENT

1750 °C
SERVICE TEMP.

6
STANDARD GRADES

ACR-HM	30	40	50	60	70	80
CHEMICAL COMPOSITION (WT %)						
Silica SiO_2	50.0–55.0	50.0–52.0	40.0–44.0	30.0–34.0	20.0–24.0	10.0–14.0
Alumina Al_2O_3	30.0–35.0	38.0–40.0	48.0–52.0	58.0–62.0	68.0–72.0	78.0–82.0
Titania TiO_2	2.6–2.8	2.6–3.0	2.0–2.2	2.1–2.3	2.4–2.6	2.6–2.8
Iron Oxide Fe_2O_3	≤2.0	≤1.5	≤1.5	≤1.6	≤1.6	≤1.4
Loss on Ignition L.O.I	4.0–5.0	4.0–4.5	3.0–3.5	3.0–3.5	3.0–3.4	2.2–2.4
PHYSICAL & THERMO-MECHANICAL PROPERTIES · DRY · HEAT-SETTING · CERAMIC BOND						
Max. Service Temp. °C	1350	1500	1600	1650	1700	1750
Refractoriness °C	1640	>1730	>1760	>1800	>1800	>1800
Grain · under 0.075 mm %	>70	>70	>70	>70	>70	>70
Water Required %	25–27	25–27	25–27	22–25	20–23	20–22

Typical values, not a specification.

SECTION

H | VENTURES

03

Calcined Kaolin & Chamotte

Rotary-kiln calcined kaolin and sized, fine and crushed chamotte · the core raw material behind ACR refractories, and a product in its own right.

IN THIS SECTION

Calcined Kaolin & Chamotte · Sized & Fine 20

Rotary-Kiln Kaolin 0–30 mm & Crushed Grades 21

Calcined Kaolin & Chamotte

Sized and fine chamotte · shared chemistry · refractoriness 1725–1745 °C

Crushed raw kaolin is calcined in a modern, high-efficiency rotary kiln; the fired grains have high density and stable volume. Calcined kaolin is both the backbone of ACR's own refractories and a raw material exported in its own right · supplied as rotary-kiln output, as sized and fine chamotte, and crushed and sieved to any grain size the customer requires.

TYPICAL APPLICATIONS

- Refractory brick, castable & mortar batches
- Sized chamotte for the ceramic industry
- Fine chamotte for bodies & glazes
- Foundry and technical-ceramic use
- Any grain size, crushed & sieved to order

≥1730 °C
REFRACTORINESS

36–42 %
ALUMINA CONTENT

7
GRADES & SIZES

Grade	0–1 mm	1–5 mm	3–5 mm	0–5 mm	Fine
PHYSICAL PROPERTIES					
Refractoriness °C	1725–1745	1725–1745	1725–1745	1725–1745	1725–1745
Firing Temperature °C	1400	1400	1400	1400	1400
Grain Density g/cm³	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60	2.50–2.60
CHEMICAL COMPOSITION (WT %)					
Silica SiO_2	55.00–58.00	55.00–58.00	55.00–58.00	55.00–58.00	55.00–58.00
Alumina Al_2O_3	38.00–40.00	38.00–40.00	38.00–40.00	38.00–40.00	38.00–40.00
Titania TiO_2	2.20–2.70	2.20–2.70	2.20–2.70	2.20–2.70	2.20–2.70
Iron Oxide Fe_2O_3	1.10–1.40	1.10–1.40	1.10–1.40	1.10–1.40	1.10–1.40
Lime CaO	0.20–0.30	0.20–0.30	0.20–0.30	0.20–0.30	0.20–0.30
Magnesia MgO	0.10–0.15	0.10–0.15	0.10–0.15	0.10–0.15	0.10–0.15
Soda Na_2O	0.10–0.20	0.10–0.20	0.10–0.20	0.10–0.20	0.10–0.20
Potash K_2O	0.10–0.20	0.10–0.20	0.10–0.20	0.10–0.20	0.10–0.20

All sized and fine grades share one chemistry. Fine-grade fineness: 65 # 10 % · 100 # 70 % · 200 # 20 %. Any grain size crushed & sieved on request.

Typical values, not a specification.

Rotary-Kiln Kaolin 0–30 mm

Rotary-kiln output and crushed calcined kaolin grades

Rotary-Kiln Output	Grade A (0–30)	Grade B (0–30)	Crushed
CHEMICAL COMPOSITION (WT %)			
Silica SiO_2	57.0–59.0	53.0–57.0	52.0–56.0
Alumina Al_2O_3	36.0–38.0	38.0–42.0	40.0–42.0
Titania TiO_2	2.50–2.70	2.50–2.70	2.0–2.5
Iron Oxide Fe_2O_3	1.20–1.50	1.00–1.50	1.0–1.5
Lime CaO	0.30–0.40	0.30–0.40	0.2–0.4
Magnesia MgO	0.10–0.15	0.10–0.15	0.1–0.2
Alkalies Na_2O+K_2O	0.15–0.30	0.15–0.30	0.2–0.4
PHYSICAL PROPERTIES			
Grain Density g/cm³	2.5–2.6	2.55–2.65	2.55–2.65
Moisture / Humidity %	0.00–0.20	0.00–0.20	<0.2
Apparent Porosity %	–	–	7.0–8.0
Refractoriness °C	≥1730	≥1730	≥1730

Size: >30 mm ≤ 10% · <30 mm ≥ 90%. Crushing, grinding & sieving facilities produce any grain-size on request.

Typical values, not a specification.

SECTION

H | VENTURES

04

New Products

Cordierite-bonded kiln furniture, developed by ACR's research staff for the ceramic and clay-brick industries.

IN THIS SECTION

Cordierite-Bonded Kiln Furniture · ACR-Cord 1 & 2 23

Cordierite-Bonded Kiln Furniture

ACR's research staff has developed cordierite-bonded products, processed from Egyptian and imported materials and fired to temperature. They serve principally as kiln furniture for the tunnel kilns of the ceramic and clay-brick industries, where high thermal-shock resistance is decisive.

TYPICAL APPLICATIONS

Kiln furniture for ceramic tunnel kilns
Setter plates & supports, clay-brick kilns
Service under rapid heating & cooling
Repeated thermal-cycling duty

>50	41–42 %	2
THERMAL-SHOCK CYCLES	ALUMINA (CORD 1)	STANDARD GRADES

Technical data for the ACR-Cord 1 and ACR-Cord 2 grades is available on request.

H I VENTURES

SECTION

H | VENTURES

05

Shapes & Dimensions

Standardised and custom engineered shapes · general, kiln, ladle, pouring, nozzle, electric-arc-furnace and block ranges, produced to ES / DIN / ISO and to customer drawing.

IN THIS SECTION

Engineered Shapes Overview	25
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Engineered shapes, to standard and to drawing

ACR manufactures the full range of standard refractory shapes and produces any special shape to the customer's drawing. Standard formats follow ES, DIN and ISO 80-1; crushing, grinding and sieving deliver any grain size on request.

General-purpose bricks

Straight, arch, wedge and double · A, B, M and N formats

Skew & suspended-arch bricks

WK, GH, FW and V series for sprung and suspended arches

Expansion-joint & anchor bricks

FE series, keyed and anchored for secure linings

Cement-kiln shapes

ISO 80-1 shapes and wedges, with matching key bricks

Ladle & ladle-bottom bricks

P-series taper bricks and B bottom blocks for steel ladles

Pouring & grouting shapes

Sleeves, trumpet tubes, nozzles and pocket blocks

Electric-arc-furnace shapes

Dome bricks, double wedges and electrode blocks

Blocks

Large-format blocks to 550 mm for heavy-duty settings

General-Purpose Bricks

Dimensions in mm · straight, arch, wedge and double formats

Type	b	c	d_1	d_2	Q	Radius
STRAIGHT						
A-64	230	114	64	–	–	–
A-76	230	114	76	–	–	–
B-64	250	124	64	–	–	–
B-76	250	124	76	–	–	–
ARCH						
1A 6	230	114	67	61	6	1273
1A16	230	114	72	56	16	513
1A50	230	114	89	39	50	203
1B16	250	124	72	56	16	558
WEDGE						
2A 6	114	230	67	61	6	2568
2A16	114	230	72	56	16	1093
2A50	114	230	89	39	50	409
DOUBLE ARCH						
1AA16	230	230	72	56	16	1093
1AA50	230	230	89	39	50	409

Representative shapes. Full A (230×114), B (250×124), M (300×120) and N (345×154) series produced in straight, arch, wedge and double formats · and any special shape to drawing.

Skew, Expansion-Joint & Anchor Bricks

Dimensions in mm · volume in dm³

SKEW BRICKS

Shape	a	b	h	L	α	Vol
WK1	250	135	233	64	60°	2.99
WK2	250	50	233	64	45°	2.46
GH1	250	100	290	100	60°	5.30
FW1	250	112	260	64	56°	3.24
FW2	250	112	260	124	56°	6.28
FW3	124	38	130	250	33°	2.63
FW4	187	101	130	250	33°	4.68
V2L-76	250	150	375	76	15°	5.70
V3L-76	300	180	450	76	15°	8.21
V3L-100	300	180	450	100	15°	10.80

EXPANSION-JOINT BRICKS

Shape	L	L_1	b	b_1	h	Vol
FE 4	250	63	250	124	64	3.49
FE 5	187	63	250	124	64	2.48
FE 9	187	63	124	60	64	1.23
FE 10	250	63	124	60	64	1.73

ANCHOR BRICKS

Shape	L	L_1	b	b_1	h	x	Vol
FE 6	250	63	250	124	64	80	3.42
FE 7	187	63	250	124	64	80	2.41
FE 8	250	–	124	–	64	60	1.92
FE 11	187	63	124	61	64	60	1.16

Representative shapes; the complete FE and V ranges are produced, plus special shapes to drawing.

Cement-Kiln Shapes (ISO 80-1) & Wedges

Dimensions in mm · lining diameter in mm · volume in dm³

ISO SHAPES · UPPER WEDGE 103 MM

Symbol	B	H	L	Vol	Ø 1.5 j.	Ø no j.
216	86	160	198	2.99	1971	1936
320	89	200	198	3.80	2991	2940
420	92.5	200	198	3.87	3988	3920
520	94.7	200	198	3.91	5046	4960
620	96.2	200	198	3.94	6159	6056
820	97.8	200	198	3.98	8050	7923

WEDGE (B) SHAPES

Symbol	B	H	L	Vol	Ø 1.5 j.	Ø no j.
B220	65	200	198	2.83	2446	2400
B320	66.5	200	198	2.83	3120	3060
B420	68	200	198	2.83	4371	4286
B520	68.5	200	198	2.83	5066	4964
B620	69	200	198	2.83	6040	5920

KEY BRICKS

Symbol	A	B	H	Vol
P201	71	65	200	2.69
P202	78	71	200	2.95

Representative selection. The complete ISO 80-1 range is produced in H = 160 / 180 / 200 / 220 / 250 mm; other kiln formats to drawing.

Ladle, Sleeve & Trumpet-Tube Shapes

Dimensions in mm · radius / volume as noted

LADLE BRICKS

Shape	a	b	h	L	k	Radius
1P 8	129	121	90	250	8	1384
1P26	138	112	90	250	26	395
2P10	130	120	124	250	10	1513
4P 8	104	96	187	250	8	2291
6P10	105	95	250	250	10	2425
6P26	113	87	250	250	26	856

LADLE-BOTTOM BRICKS · VOL DM³

Shape	A	B	C	Vol
B1	187	155	124	3.59
B2	210	187	155	6.09
B3	340	210	88	6.28

SLEEVES (SR) · VOL DM³

Mark	l_1	d_1	d_2	d_3	d_4	Vol
SR0	270	40	90	62	60	1.37
SR1	330	47	105	72	70	2.27
SR3	330	47	140	72	70	4.50
SR5	330	60	170	97	95	6.54
SR6	330	60	210	97	95	10.48

TRUMPET TUBES (TR) · VOL DM³

Mark	l_1	d_1	d_2	d_3	d_4	Vol
TR1	330	65	120	90	88	2.64
TR3	330	90	155	122	120	4.13
TR5	330	110	190	144	140	6.23
TR6K	270	120	200	154	150	5.43

Representative shapes; complete P, SR and TR ranges produced to pouring-system drawings.

Nozzles & Pocket Blocks

Dimensions in mm · volume in dm³

NOZZLES · SERIES 0A · 12A

Item	d_1	d_2	d_3	h	Vol
0A25	135	120	105	160	1.46
1A25	155	139	115	210	2.39
2A25	155	133	115	240	2.81
3A25	180	153	135	285	4.64
4A25	180	147	135	315	5.15
8A65	147	135	120	240	2.15
12A70	250	190	200	345	10.15

POCKET BLOCKS (L)

Mark	□a	h_1	h_2	d_1	d_3	Vol
L0	250	107	90	220	143	5.01
L2	320	165	130	260	169	13.26
L4	360	222	185	300	194	22.71
L6	320	123	100	260	143	10.45
L8	360	190	155	300	157	20.69
L12	420	254	185	320	260	32.36

Bore sizes 10 · 90 mm across every series; produced to caster requirement.

HIVE

Electric-Arc-Furnace Shapes & Blocks

Dimensions in mm · dome radius / volume as noted

DOME BRICKS (R)

Shape	a	b	h	l_1	Dome R	Vol
R32	81	75	250	130	3000	2.44
R52	79	75	250	126	5000	2.37
R72	78	75	250	124	7000	2.34
R43	81	75	300	129	4000	2.91
R93	77.5	75	300	124	9000	2.79

ELECTRODE BLOCKS (D…N)

Shape	a	b	h_1	h_2	l	Vol
D1N	81	29.5	115	95	260	1.31
D3N	118.5	45	140	130	320	3.18
D5N	111	64	150	140	375	4.34
D7N	108	67.5	180	170	450	6.42
D9N	92	72	180	170	450	6.07

BLOCKS · VOL DM³

Shape	a	b	c	Vol
B55-2	550	200	200	22.00
B55-4	550	200	400	44.00
B50-3	500	200	300	30.00
B45-3	450	250	300	33.75
B40-4	400	250	400	40.00
B35-3	350	300	300	31.50
B30-4	300	300	400	36.00

Representative shapes across every range. Any special shape produced to the customer's drawing.

H | VENTURES

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