

Kaocrete[®] Dense Monolithics

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SDS: 102

Product Description

Kaocrete B and Kaocrete 2600B are more plastic materials than most refractory monolithics. They are excellent for plastering, preferred for patching linings and baffles. Recommended only for relatively thin sections. They have extremely low rebound when gunned.

Kaocrete D is a monolithic for service up to 2500°F (1371°C). It has enhanced flow capability and is suitable for use in general duty casting applications.

Kaocrete HS and Kaocrete HS Gun are high strength cast and gun mixes for service up to 2600°F (1427°C). They incorporate an intermediate-purity calcium-aluminate cement and sized Kaolin aggregates. Kaocrete HS can be cast at normal water levels with excellent flow or reduced water to achieve extra-high strengths. Kaocrete HS has good gunning capabilities.

Kaocrete 26 is a general purpose, cast/gun, low iron monolithic. For applications up to 2600°F (1427°C), it combines good volume stability with low cost.

Kaocrete 28-LI is a general-purpose, cast/gun, low iron monolithic which contains intermediate-purity calcium aluminate cement. For applications up to 2800°F (1538°C), it is an economical choice for high-temperature applications.

Kaocrete 30 is a 3000°F (1649°C), 60% alumina monolithic designed for high strength applications at temperatures up to 3000°F (1649°C). Designed for cast applications only, especially good for pre-cast burner blocks.

Kaocast is a 68% alumina cast/gun refractory monolithic capable of withstanding up to 3000°F (1649°C). It possesses excellent volume stability at high temperatures. Many furnace operators select Kaocast for premium service where operating temperatures are up to 3000°F (1649°C).

Kaocrete 32-CM is a 3200°F (1760°C), casting grade, refractory monolithic with 70% alumina content. It possesses excellent volume stability and high strength.

Features

- Recommended use limit up to 3200°F (1760°C)
- Aggregate chemistry and grain sizing
- High purity binder systems
- Installed by cast, gun or plaster

Applications

- Around water-cooled boiler tubes
- Boiler ash hoppers
- Kiln cars
- Piers
- Car bottoms
- Seal tanks in FCCU vessels
- Burner blocks
- Ladle metallurgy lance material

Instructions for Using

Highest strength is obtained with monolithic refractory by using the least amount of clean mixing water that will allow thorough working of material into place by vibrating. A mechanical mixer is required for proper placement (paddle type mortar mixers are best suited). After adding the recommended amount of water, wet mix for 3 minutes. Place material within 30 minutes after mixing.

Precautions

Store bagged monolithics in a dry place, off the ground and, when possible, with the original shrink wrapping intact.

Watertight forms must be used when placing material. All porous surfaces that will come in contact with the material must be waterproofed with a suitable coating or membrane.

For maximum strength, cure 24 hours in a damp condition before initial heat-up. Keep freshly placed monolithic warm during cold weather, ideally between 50°F and 80°F (10°C and 27°C) until wet curing is complete. New monolithic installations must be heated slowly the first time.

Monolithic Product Name	<u>Kaocrete B</u>	<u>Kaocrete 2600 B</u>	<u>Kaocrete D</u>	<u>Kaocrete HS</u>	<u>Kaocrete HS Gun</u>	<u>Kaocrete 26</u>	<u>Kaocrete 28-LI</u>	<u>Kaocast</u>	<u>Kaocrete 30</u>	<u>Kaocrete 32-CM</u>
Material Class	Crystalline Silica and Portland Cement	Crystalline Silica								
Material method of installation	gun / ram	gun / ram	cast	cast	gun	cast / gun	cast / gun	cast / gun	cast	cast
Physical Properties										
Temperature use limit, °F	2000	2600	2500	2600	2600	2600	2800	3000	3000	3200
Temperature use limit, °C	1093	1427	1371	1427	1427	1427	1538	1649	1649	1760
Placement, average lb to place 1 ft ³	104	107	130	130	125	126	127	128	138	149
Placement, average kg to place 1 m ³	49	49	59	59	56	57	58	58	63	67
Shelf life, months	12	12	12	12	12	12	12	12	12	12

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Monolithic Product Name	Kaocrete B	Kaocrete 2600 B	Kaocrete D	Kaocrete HS	Kaocrete HS Gun	Kaocrete 26	Kaocrete 28-LI	Kaocast	Kaocrete 30	Kaocrete 32-CM
Water, %, recommended										
casting by vibrating	-	-	10-12	9-11	-	10-12	10-12	12-14	8-9.5	8-9.5
Density, ASTM C 134, pcf										
dried 24 hrs @ 220°F	-	-	-	133-144	-	-	-	-	-	-
fired @ 1500°F	100-112	102-114	124-136	123-135	116-128	121-132	122-133	123-134	134-146	144-155
Density, ASTM C 134, kg/m ³										
fired @ 816°C	1602-1794	1634-1826	1986-2179	1970-2163	1859-2051	1938-2114	1954-2130	1970-2146	2146-2340	2323-2483
Modulus of Rupture, MOR, ASTM C 133, psi										
dried 24 hrs @ 220°F	200-500	300-700	1000-1500	1100-1600	600-1000	450-850	450-850	500-1000	500-1000	450-900
fired 5 hrs @ 1500°F	175-350	175-350	400-800	475-950	350-600	250-450	300-500	275-500	325-550	350-600
fired 5 hrs @ temperature use limit, °F	200-400	250-500	800-1400	950-1400	-	800-1500	800-1500	500-900	1000-1800	1200-2000
Modulus of Rupture, MOR, ASTM C 133, MPa										
dried 24 hrs @ 104°C	1.4 - 3.4	2.1 - 4.8	6.9 -10.3	7.6 - 11.0	4.1-6.9	3.1 - 5.9	3.1 - 5.9	3.4 - 6.9	3.4 - 6.9	3.1 - 6.2
fired 5 hrs @ 816°C	1.2 - 2.4	1.2 - 2.4	2.8 - 6.5	3.3 - 6.5	2.4-4.1	2.1 - 3.4	2.1 - 3.4	1.9 - 3.4	2.2 - 3.8	2.4 - 4.1
fired 5 hrs @ temperature use limit, °C	1.4 - 2.8	1.7 - 3.4	5.5 -9.7	6.5 - 9.7	-	5.5 - 10.3	5.5 - 10.3	3.4 - 6.2	6.9 - 12.4	8.3 - 13.8
Cold crushing strength, CCS, ASTM C 133, psi										
dried 24 hrs @ 220°F	1000 - 1800	1500 - 2700	4500 - 7500	5500 - 9000	3200-5000	2500 - 4000	2800 - 4500	2100 - 3500	3000 - 7000	3000 - 6000
fired 5 hrs @ 1500°F	700 - 1500	1100 - 2000	3500 - 6500	4200 - 8000	2700-4500	2000 - 3500	2300 - 4000	1800 - 3000	2600 - 5000	2500 - 5500
fired 5 hrs @ temperature use limit, °F	400 - 800	1200 - 2500	3000 - 6000	3500 - 7000	-	2800 - 4000	3500 - 7000	2000 - 4000	4000 - 8000	5000 - 9000
Cold crushing strength, CCS, ASTM C 133, MPa										
dried 24 hrs @ 104°C	6.9 - 12.4	10.3 - 18.6	31.0 - 51.7	37.9 - 62.0	22.1-34.5	17.2 - 27.6	19.3 - 31.0	14.5 - 24.1	20.7 - 48.3	20.7 - 41.4
fired 5 hrs @ 816°C	4.8 - 10.3	7.6 - 13.8	24.1 - 44.8	29.0 - 55.2	18.6-31.0	13.8 - 24.1	15.9 - 27.6	12.4 - 20.7	17.9 - 34.5	17.2 - 31.0
fired 5 hrs @ temperature use limit, °C	2.8 - 5.5	8.3 - 17.2	20.7 - 41.4	24.1 - 48.3	-	19.3 - 27.6	24.1 - 48.3	13.8 - 27.6	27.6 - 55.2	34.5 - 62.0
Permanent Linear Shrinkage, ASTM C 113, %										
dried 24 hrs @ 220°F (104°C)	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2	0 to -0.2
fired 5 hrs @ 1500°F (816°C)	-0.8 to -2.0	-0.3 to -0.7	-0.1 to -0.3	-0.1 to -0.3	-0.1 to -0.3	-0.1 to -0.3	-0.1 to -0.3	-0.1 to -0.3	-0.1 to -0.3	-0.1 to -0.3
fired 5 hrs @ temperature use limit, °F (°C)	-1.0 to -2.5	-0.7 to +0.7	-0.4 to -1.0	-0.4 to -1.0	-0.4 to -1.2	-0.4 to -1.0	-0.5 to -1.5	-0.2 to -1.0	-0.2 to -1.0	-0.2 to -0.7
Chemical Analysis, % weight basis after firing										
Alumina, Al ₂ O ₃	39	48	45	48	48	47	50	68	60	67
Silica, SiO ₂	46	41	40	-	40	43	41	24	34	28
Ferric Oxide, Fe ₂ O ₃	1.3	1	2.3	1.1	1.1	1.1	1.0	1.0	0.8	0.9
Titanium Oxide, TiO ₂	1.6	1.7	2.1	1.9	1.9	2.4	1.9	2.3	1.7	1.8
Calcium Oxide, CaO	8.5	7.8	9.8	8.4	8.4	6.4	5.6	4.7	3.2	2.4
Magnesium Oxide, MgO	0.3	0.2	trace	0.1	0.3	-	-	-	-	-
Alkalies as Na ₂ O and K ₂ O	-	-	0.3	0.2	0.2	0.1	-	0.2	-	-
Thermal Conductivity, BTU·in/hr·ft ² , per ASTM C201										
500°F	3.3	-	6.2	5.9	5.6	5.6	6	8.1	9.7	11.6
1000°F	3.5	-	6.6	6.2	6	6	6.3	7.8	9.6	11.1
1500°F	3.8	-	6.8	6.5	6.3	6.3	6.6	7.7	9.6	10.9
2000°F	4.1	-	6.9	6.7	6.4	6.4	6.7	-	9.7	10.4
Thermal Conductivity, W/m·K, per ASTM C201										
260°C	0.47	-	0.89	0.85	0.81	0.81	0.86	1.17	1.4	1.67
538°C	0.5	-	0.95	0.89	0.86	0.86	0.91	1.12	1.38	1.6
815°C	0.54	-	0.98	0.94	0.91	0.91	0.95	1.11	1.38	1.57
1093°C	0.59	-	0.99	0.97	0.92	0.92	0.97	-	1.4	1.5

Compliance data sheets for specific applications or job requirements are available upon request. The values given herein are typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. The data contained herein should not be used for specification purposes. Check with your Morgan Advanced Materials office to obtain current information.