

Kaolite® 2200-HS, 2200-HS Gun, 2500-HS, 2500-HS Gun, 2500 EXHS, Super HS Gun

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Product Description

Kaolite 2200-HS and Kaolite 2200-HS Gun are medium weight monolithics that have high strength and excellent volume stability. They possess the best thermal conductivity-to-weight ratio in the industry.

Kaolite 2500-HS and Kaolite 2500-HS Gun are medium weight, economical insulating monolithics for use up to 2500°F (1371°C) where high strength and good thermal stability are required. Kaolite 2500 EXHS Gun is an extra high-strength gun grade monolithic designed for temperatures up to 2500°F (1371°C).

Kaolite Super HS Gun is a medium weight, premium insulating monolithic for use up to 2400°F (1371°C). It has exceptional strength to weight characteristics and is well suitable for tough petrochemical F.C.C.U. applications.

Features

- Light weight and low thermal conductivity reduce both the quantity of heat storage and heat transfer producing significant savings in furnace fuel consumption
- Lower densities reduce the amount of supporting furnace steelwork required and provide more insulation with a thinner lining.

Applications

- Backup insulation in two component linings in petrochemical process units
- Hot face lining in ductwork from waste heat recovery boilers and process unit
- F.C.C.U. linings - regenerator
- Hydrogen or reducing atmosphere linings
- Radiant section in steam flood generators
- Steam flood generator convection sections and target walls
- Cat cracker regenerator linings

Instructions for Casting

Highest strength is obtained with a 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). Mix for 6 minutes to achieve a ball-in-hand consistency. Place material within 30 minutes after mixing.

Precautions

Store bagged monolithics in a dry place, off the ground and when possible, on pallets with the original shrink wrapping intact. Normal shelf life is 12 months from date of manufacture when properly stored.

Watertight forms must be used when placing castable 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 under damp conditions before initial heat-up. Keep freshly placed monolithic warm during cold weather, ideally between 60°F and 80°F until wet curing is completed. New monolithic installations must be heated slowly the first time.

Freshly placed lightweight monolithics are sometimes prone to a deteriorating condition called alkali hydrolysis when they are kept in a non-dried state for a sustained period of time. Under these conditions, the monolithics should be force-dried soon after placement to help retard the possible deterioration effects.

Instructions for Gunning

Use suitable gunite equipment. Material should be predampened uniformly with approximately

- Kaolite 2200-HS Gun 7-9%
- Kaolite 2500-HS Gun 5-7%
- Kaolite 2500 EXHS 6-8%
- Kaolite Super HS Gun 5-7%

by weight of clean water in a mechanical mixer before placing into gunite applications at gun. This will reduce rebound and dust. Add required water at nozzle for effective placement. Suggested air pressure at the nozzle is 25 to 35 psi.

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Monolithic Product Name	Kaolite 2200-HS	Kaolite 2200-HS Gun	Kaolite 2500-HS	Kaolite 2500-HS Gun	Kaolite 2500-EXHS	Kaolite Super HS Gun
Material Class	Crystalline Silica					
Material method of installation	cast	gun	cast	gun	gun	gun
Physical Properties						
Temperature use limit, °F	2200	2200	2500	2500	2500	2400
Temperature use limit, °C	1204	1204	1371	1371	1371	1315
Placement, average lb to place 1 ft ³	76	76	83	83	86	78
Placement, average kg to place 1 m ³	34	34	38	38	39	35
Pounds per bag, lb	50	50	50	50	50	50
Pounds per bag, kg	23	23	23	23	23	23
Shelf life, months	12	12	12	12	12	12
Water, %, recommended						
casting by vibrating	38-44	-	29-35	-	-	-
Density, ASTM C 134, pcf						
dried 24 hrs @ 220°F	80-92	80-92	87-98	87-98	89-100	80-91
fired @ 1500°F	70-81	70-81	79-89	79-89	81-91	73-83
Density, ASTM C 134, kg/m ³						
dried 24 hrs @ 104°C	1282-1474	1282-1474	1394-1570	1394-1570	1426-1603	1281-1458
fired @ 816°C	1121-1298	1121-1298	1265-1425	1265-1425	1298-1458	1154-1330
Modulus of Rupture, MOR, ASTM C 133, psi						
dried 24 hrs @ 220°F	225-350	250-400	250-400	250-400	300-550	450-900
fired 5 hrs @ 1500°F	150-300	200-350	225-375	250-500	275-500	350-600
fired 5 hrs @ temperature use limit, °F	200-300	250-500	300-550	350-600	375-650	500-1000
Modulus of Rupture, MOR, ASTM C 133, MPa						
dried 24 hrs @ 104°C	1.6-2.4	1.72-2.76	1.72-2.76	1.72-2.76	2.07-3.79	3.10-6.21
fired 5 hrs @ 816°C	1.03-2.07	1.38-2.41	1.38-2.41	1.72-2.76	1.90-3.44	1.38-4.14
fired 5 hrs @ temperature use limit, °C	1.38-2.07	1.72-3.44	2.07-3.79	2.41-4.14	2.59-4.48	3.44-6.9
Cold crushing strength, CCS, ASTM C 133, psi						
dried 24 hrs @ 220°F	850-1600	900-1600	900-1500	900-1500	1000-1600	2200-5000
fired 5 hrs @ 1500°F	800-1600	900-1700	850-1600	900-1600	950-1700	1800-3500
fired 5 hrs @ temperature use limit, °F	750-1400	800-1500	900-1500	900-1600	1100-1800	2500-5000
Cold crushing strength, CCS, ASTM C 133, MPa						
dried 24 hrs @ 104°C	5.86-11.03	6.20-11.03	6.20-10.34	6.20-10.34	6.89-11.03	15.1-34.5
fired 5 hrs @ 816°C	5.52-11.03	6.20-11.72	5.86-11.03	6.20-11.03	6.55-11.72	12.4-24.1
fired 5 hrs @ temperature use limit, °C	5.17-9.65	5.52-10.34	6.21-10.34	6.20-11.03	7.58-12.41	17.2-34.5
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
fired 5 hrs @ 1500°F (816°C)	-0.1 to -0.5	-0.2 to -0.55	-0.1 to -0.4	-0.2 to -0.5	-0.2 to -0.5	-0.1 to -0.4
fired 5 hrs @ temperature use limit, °F (°C)	-0.3 to -1.0	-0.5 to -1.5	-1.5 to +1.5	-1.0 to +0.5	-1.0 to +0.5	-0.5 to -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.

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Chemical Analysis, % weight basis after firing

Alumina, Al ₂ O ₃	44	41	43	40	42	28
Silica, SiO ₂	27	31	35	40	38	53.5
Ferric Oxide, Fe ₂ O ₃	3.2	3	2.2	2.2	2.2	2.6
Titanium Oxide, TiO ₂	1.8	1.5	1.6	1.4	1.3	1.2
Calcium Oxide, CaO	22 (17)	22 (17)	17 (12)	15 (11)	16 (11)	11.5
Magnesium Oxide, MgO	0.4	0.2	0.2	0.2	0.2	0.7
Alkalies as Na ₂ O and K ₂ O	0.9	0.9	0.7	0.7	0.8	2.3

Thermal Conductivity, BTU•in/hr•ft², per ASTM C201

Mean Temperature @ 500°F	1.71	1.71	2.8	2.8	2.8	2.7
1000°F	1.83	1.83	3	3	3	2.9
1500°F	2.01	2.01	3.2	3.2	3.2	3
2000°F	2.23	2.23	3.4	3.4	3.4	3.2
2500°F	-	-	3.5	3.5	3.5	-

Thermal Conductivity, W/m•K, per ASTM C201

Mean temperature @ 260°C	0.25	0.25	0.4	0.4	0.4	0.39
538°C	0.26	0.26	0.43	0.43	0.43	0.42
815°C	0.29	0.29	0.46	0.46	0.46	0.43
1093°C	0.32	0.32	0.51	0.51	0.51	0.46
1371°C	-	-	0.53	0.53	0.53	-

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