

Organic RCF Vacuum Formed Products



Datasheet Code US: 514-700

SDS Code US: 203, 211, 260, 275

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Features

- Rigid, lightweight, hot face insulation
- Resistant to particulate and hot gas erosion
- Engineered formulations for high strength and temperature resistance
- Low thermal conductivity and heat storage
- Highly resistant to thermal shock
- Resists most chemical attacks
- Non-wetting to molten aluminum and other non-ferrous metals
- Easy to cut, handle and install
- Up to 50% reduction in furnace lining thickness, as compared to firebrick and castable

Product Description

Vacuum formed products are rigid, self-supporting fiber insulation manufactured from a slurry of ceramic fibers, binders and other proprietary ingredients. Customers are provided with optimized, engineered solutions from our wide range of formulations.

Kaowool® M is a general duty product for a wide range of applications.

Kaowool PM is a thin, lightweight product that is manufactured to close tolerances with an excellent surface finish and good thermal properties.

Kaowool HP is a high strength product made from high purity fiber.

Kaowool HD is a high strength product recommended for tough mechanical stress areas.

Kaowool A is a high strength product.

Kaowool HS is a high strength product recommended for tough mechanical stress areas at higher temperatures. Kaowool HS45 is designed for a temperature rating of 2500°F (1371°C) with very high compressive and flexural strengths. It is non-wetting to molten aluminum and exhibits good resistance to chemical attack.

Kaowool HT is a high temperature product designed for use up to 2600°F (1427°C).

Kaowool 2600 uses high temperature alumina fibers in the manufacturing process. It is an excellent dimensionally stable product and has minimal shrinkage at its use limit of 2700°F (1510°C).

Kaowool 80 has a continuous use limit of 2950°F (1621°C). It has excellent temperature stability, density and strength.

Kaowool 3000 is processed with a blend of high purity fibers, high temperature alumina fibers and binders. It has a continuous use limit of 2950°F (1621°C).

Applications

- Furnace and kiln hot face linings
- Back-up insulation for monolithic and brick refractories
- Ladle liners and covers
- Aluminum trough liners and special shapes
- Riser sleeves, tap out cones and hot tops
- Combustion chambers for boilers and heaters
- Hot gas duct, flue and chimney liners
- Appliance and heat processing insulation
- Bullnose tiles
- Burner blocks
- Expansion joint material
- Glass regenerator, tank side, end wall and port neck insulation
- Heat Shields
- High temperature gaskets and seals
- Back-up insulation in steel ladle and torpedo cars

Chemical Properties

Thermal Ceramics products have the capability to withstand chemical attack. Exceptions include hydrofluoric acid, phosphoric acid and strong alkalis. A small amount of combustible organic binder will burn out at approximately 300°F. Caution should be exercised during initial heating, ensuring that adequate ventilation is provided to avoid potential flash ignition.

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Physical Properties	Kaowool										
	M	PM*	HP	HD	A	HS	HS-45	HT	2600	80	3000
Color	beige	white	beige	beige	beige	beige	white	yellow	blue	white	pink
Density, pcf (kg/m ³)	16 - 18	16	20 - 23	26	28	28	42	22 - 25	15	25	12
Continuous Temperature Use Limit, °F (°C)	2000 (1093)	2150 (1177)	2100 (1149)	2300 (1260)	2100 (1149)	2300 (1260)	2400 (1316)	2450 (1343)	2600 (1426)	2950 (1621)	2950 (1621)
Maximum Temperature Rating, °F (°C)	2200 (1204)	2300 (1260)	2300 (1260)	2400 (1316)	2300 (1260)	2400 (1316)	2500 (1371)	2600 (1426)	2700 (1482)	3000 (1649)	3000 (1649)
Modulus of Rupture, psi (MPa)	100 - 130 (0.69 - 0.90)	200 - 250 (1.38 - 1.72)	200 (1.38)	150 - 175 (1.03 - 1.21)	250 (1.72)	230 - 260 (1.59 - 1.79)	450 - 550 (3.10 - 3.79)	200 (1.38)	115 (0.79)	75 (0.52)	70 (0.48)
Compressive Strength, psi (MPa)											
@ 5% deformation	20 - 30 (0.14 - 0.21)	20 - 30 (0.14 - 0.21)	75 (0.52)	50 - 70 (0.34 - 0.48)	100 (0.69)	60 - 80 (0.41 - 0.55)	200 - 250 (1.38 - 1.72)	75 (0.52)	30 (0.21)	25 (0.17)	20 (0.14)
@ 10% deformation	30 - 40 (0.21 - 0.28)	30 - 40 (0.21 - 0.28)	100 (0.69)	70 - 90 (0.48 - 0.62)	125 (0.86)	80 - 100 (0.55 - 0.69)	250 - 300 (1.72 - 2.07)	100 (0.69)	40 (0.28)	50 (0.34)	25 (0.17)
Permanent Linear Shrinkage, %, 24 hrs.											
@ 1500°F (816°C)	1.2	0.2	0.7	0.1	-	0.8	0.5	-	0.3	-	0.3
@ 1800°F (982°C)	2.2	2.0	1.6	1.4	1.6	1.9	0.7	-	0.3	-	0.1
@ 2000°F (1093°C)	2.8	2.4	2.8	2.5	2.8	2.1	0.4	-	0.6	-	0.0
@ 2200°F (1204°C)	3.4	3.4	3.8	2.8	3.8	0.2	0.6	2.3	0.7	1.3	0.4
@ 2400°F (1316°C)	-	-	-	-	-	+0.3	+0.8	2.6	0.8	1.8	0.5
@ 2600°F (1426°C)	-	-	-	-	-	+1.1	-	3.0	-	0.1	0.6
@ 2800°F (1538°C)	-	-	-	-	-	-	-	-	-	+0.3	+1.5
@ 2900°F (1593°C)	-	-	-	-	-	-	-	-	-	-	+2.5
Chemical Analysis, %, Weight Basis After Firing											
Alumina, Al ₂ O ₃	42	44	41 - 43	41	43 - 45	18	55	50 - 52	51	70 - 72	66
Silica, SiO ₂	56	56	56 - 59	53	54 - 57	81	35	47 - 49	49	25 - 28	34
Calcium oxide + Magnesium oxide, CaO + MgO	-	-	-	5	-	-	8	-	-	-	-
Other	-	<1	-	-	<1	-	2	-	<1	<1	-
Organic material	-	3 - 6	-	4 - 7	-	4 - 7	4 - 7	-	6 - 8	-	6 - 8
Loss on ignition, L.O.I.	4 - 7	4 - 7	6 - 8	5 - 8	7 - 9	5 - 8	5 - 8	5 - 7	7 - 9	3 - 5	7 - 9
Thermal Conductivity, BTU•in/hr•ft ² •°F, (W/m•K), ASTM C 201											
Mean temperature @ 500°F (260°C)	0.5 (0.08)	0.4 (0.06)	0.5 (0.08)	0.6 (0.09)	0.5 (0.08)	0.7 (0.10)	1.0 (0.15)	0.5 (0.08)	0.5 (0.08)	0.5 (0.08)	0.5 (0.08)
@ 1000°F (538°C)	0.7 (0.10)	0.6 (0.09)	0.7 (0.10)	0.8 (0.12)	0.7 (0.10)	0.8 (0.12)	1.0 (0.14)	0.7 (0.10)	0.7 (0.10)	0.7 (0.10)	0.7 (0.10)
@ 1500°F (816°C)	1.0 (0.14)	0.9 (0.13)	1.0 (0.14)	1.1 (0.16)	0.9 (0.13)	1.1 (0.16)	1.2 (0.17)	0.9 (0.13)	1.0 (0.15)	0.9 (0.13)	1.0 (0.14)
@ 2000°F (1093°C)	1.5 (0.22)	1.3 (0.19)	1.4 (0.20)	1.6 (0.23)	1.3 (0.19)	1.6 (0.23)	1.7 (0.25)	1.3 (0.19)	1.5 (0.22)	1.3 (0.19)	1.4 (0.20)
Standard Sizes											
Thickness, in*	½, 1, 1½, 2, 3 (*Kaowool PM boards are also available in ⅜ and ¼)										
Length x Width, in.	18 x 6		18 x 12		18 x 18						
	24 x 12		24 x 18		24 x 24						
	36 x 6		36 x 12		36 x 18		36 x 24		36 x 36		
	48 x 12		48 x 24		48 x 36						

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. Therefore, the data contained herein should not be used for specification purposes. Check with your Thermal Ceramics office to obtain current information.