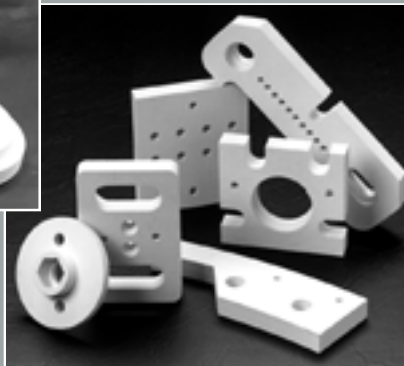
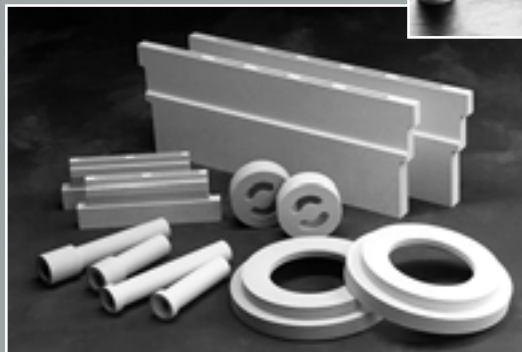
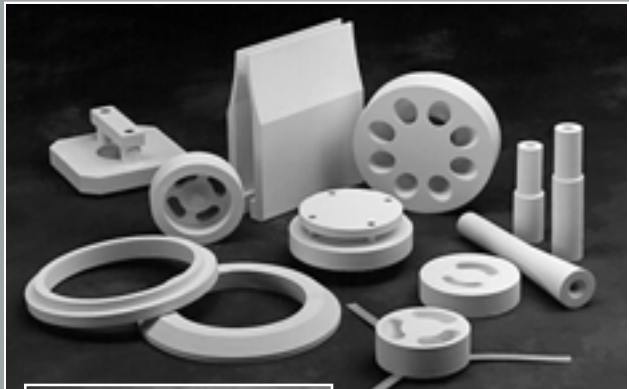




BNZ Materials, Inc.

Structural Insulations

Summary Data Sheet



CS85™, Marinite®, and Transite®

BNZ manufactures a variety of non-asbestos calcium silicate structural insulations that combine high strength and excellent thermal insulating characteristics for use in a variety of heat processing, fire protection, and electrical resistance applications. Our Tobermorite crystalline structure provides excellent thermal shock resistance as evidenced in its typical use as a direct contact board for non-ferrous metals and in fire training burn rooms. It is fire resistant to temperatures approaching 2000°F. The Tobermorite crystal is also unique by providing low thermal conductivities that remain relatively constant over a broad range of operating temperatures.



Structural Insulations

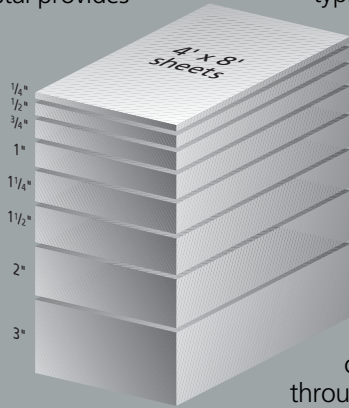
Summary Data Sheet

Description

BNZ structural insulations are monolithic, incombustible and non-asbestos. They are available in thicknesses ranging from 1/4" to 3" and are easily fabricated from 4' x 8' sheets. The diverse selection of boards are produced by chemically reacting formulations of silica, lime, and reinforcing fibers followed by hydraulic pressure and various forms of curing and heat treating to create the insulation that is best suited for a particular application. The resulting Tobermorite crystal provides several advantages.

Standard Sizes

Machined shapes are easily fabricated from 4 ft. x 8 ft. boards that range in thickness from 1/4" to 3".



Advantages

Thermal shock resistance & stability

Tobermorite calcium silicate provides excellent thermal shock resistance and stability compared to other forms of insulation, including other calcium silicates. Its low moisture content actually performs as a buffer to the crystal as

Consistent Insulating Values

Our Tobermorite calcium silicate is unique by providing thermal conductivities that remain relatively consistent at varying temperatures.

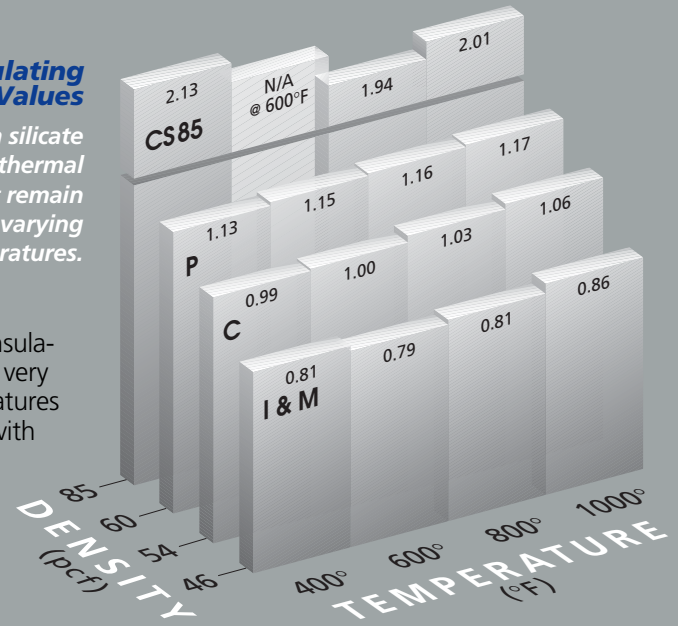
intense heat attacks the insulation. The insulation is also very stable at elevated temperatures witnessed by Marinite A with typical linear shrinkage of 0.1% at 1350°F, or CS85 with 0.3% linear shrinkage at 1800°F.

Consistently low thermal conductivity

BNZ's Tobermorite crystalline structure provides thermal conductivities that you can rely on to be consistent

throughout the operating temperatures the insulation will accommodate. This is particularly important in obtaining the energy savings desired.

For example, a unit can be designed with a thinner wall, while accommodating a wide range of temperatures. This means if a unit constructed of BNZ calcium silicate needs to have its pro-



cessing heat increased beyond its designed operating temperature (i.e. due to increased production rates, or a higher temperature required for a new process), then you can rely on similar thermal conductivities to occur.

High structural strength at elevated temperatures

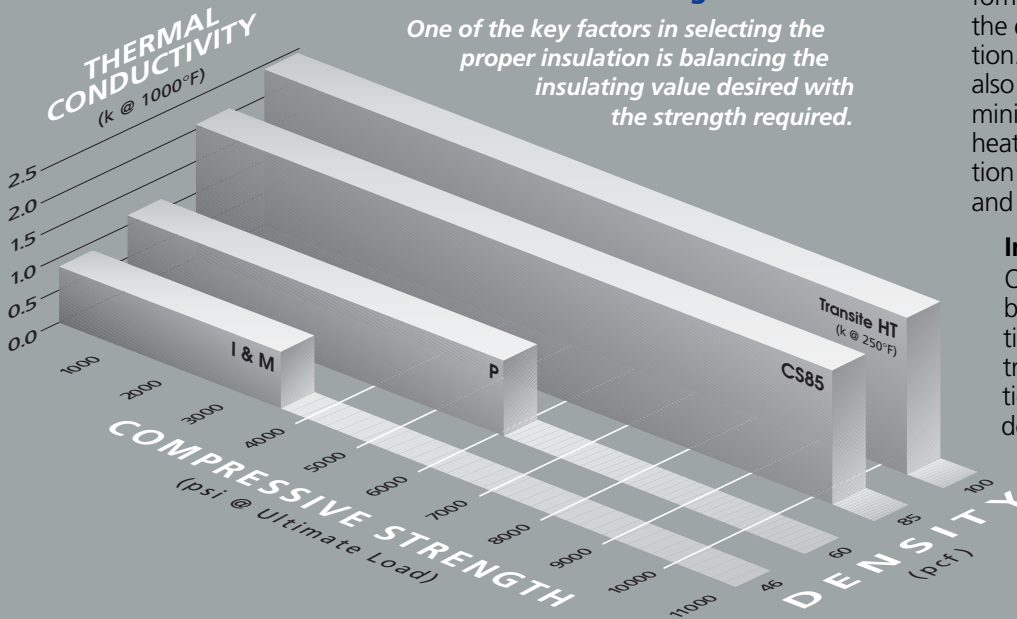
Calcium silicate insulation from BNZ combines high compressive and flexural strength with high insulating efficiency in a self-supporting board. Insulated housings (including ovens) can be built and insulated in one operation, eliminating the need for 'through metal' supports. This reduces heat loss, prevents localized hot spots, provides uniform temperature control throughout the equipment and simplifies construction. These structural insulations are also often used in applications requiring minimal hot load deformation, such as heated platen presses, back-up insulation in rotary kilns and torpedo cars, and pre-insulated pipe supports.

Incombustible

Our structural insulations will not burn, providing excellent fire protection for personnel protection, cable trays, fire doors, and marine applications. In fact, Marinite was originally developed to isolate and prevent the spread of fires aboard ships.

Insulation with Strength

One of the key factors in selecting the proper insulation is balancing the insulating value desired with the strength required.



Electrical Insulation

All forms of BNZ calcium silicate insulations possess electrical insulating properties when dry. They are frequently used for low voltage applications that are accompanied with heat. Note that calcium silicate is hygroscopic, so its electrical resistance is reduced when it absorbs moisture.

Easily machinable

Our insulations are fabricated into pre-

cise shapes everyday by our worldwide network of fabricators/distributors who are well equipped to machine the most intricate parts. These insulations can also be machined with standard wood-working tools at slower speeds, utilizing carbide or diamond tipped tooling.

Insoluble in water & non-corroding

Calcium silicate is non-corroding and will not disintegrate even after prolonged immersion in water. It is well

sued for excessive moisture conditions where metal may suffer from severe corrosion and other insulations can become mushy and dissolve. As an extra precaution in conditions with excessively high moisture and thermal cycling (including freeze-thaw), BNZ suggests the use of oligomeric siloxanes, sodium silicates (water glass), or acrylic latex to help prolong the longevity of the insulation.

Please request a data sheet for the specific insulating board of interest.

Properties

Aluminum Contact Boards	Marinite®					Transite®	
	A	C					
High Temperature Structural Insulation	CS85		P	I & M			
Low Temperature Industrial Board						HT	1000
Available thicknesses	¼" – 3"	½" – 3"	1" – 2"	½" – 2"	½" – 2"	¼" – 3"	½" – 3"
Sheet sizes	ALL SHEETS ARE 4 ft. x 8 ft.						
Density							
pcf (kg/m ³)	85 (1362)	65 (1041)	54 (865)	60 (961)	46 (737)	100 (1602)	98 (1570)
Modulus of Rupture (Flexural Strength)							
psi (kg/cm ²)	3000 (210)	1400 (98)	900 (63)	1400 (98)	800 (56)	2600 (183)	3000 (211)
Compressive Strength							
Ultimate load, psi (kg/cm ²)	10300 (724)	3000 (211)	2200 (155)	— —	— —	10,400 (731)	13,350 (939)
@ 5% deformation, psi (kg/cm ²)	6400 (450)	2400 (169)	1600 (112)	3050 (214)	1000 (70)	6500 (457)	— —
Moisture Content (normal), % of dry weight	1.0	2.5	2.5	3.0	3.0	12	7
Thermal Conductivity							
Mean Temperature, Btu-in/ft ² , hr, °F							
250°F	—	—	—	—	—	2.40	2.40
400°F	2.13	—	.99	1.13	0.81	—	—
600°F	—	—	1.00	1.15	0.79	—	—
800°F	1.94	1.92	1.03	1.16	0.81	—	—
1000°F	2.01	1.95	1.06	1.17	0.86	—	—
Mean Temperature, (W/m ² K)							
121°C	—	—	—	—	—	0.34	0.34
204°C	0.31	—	0.14	0.16	0.12	—	—
316°C	—	—	0.14	0.17	0.11	—	—
427°C	0.28	0.28	0.15	0.17	0.12	—	—
538°C	0.29	0.28	0.15	0.17	0.12	—	—
Shrinkage							
24 hrs @	1600°F	1350°F	1350°F	1200°F	1200°F	600°F	600°F
Linear (Length or width), %	0.24	0.1	2.3	0.6	0.4	0.85	0.14
Thickness, %	2.0	0.8	9.4	2.1	1.4	3.7	0.41
Electrical							
Arc Resistance, seconds, ASTM D 495	304	—	—	—	—	260	272
Volume Resistivity, ohm-cm, ASTM D 257	4.52 x 10 ¹²	—	—	5.0 x 10 ⁸	9.8 x 10 ⁷	7.1 x 10 ¹⁰	1.25 x 10 ¹³
Dielectric Strength, v/mil, ASTM D 495	61	—	—	46	45	35	56
Screw Holding Strength							
@ ¾" penetration, lbs (kg)	875 (397)	240 (109)	220 (100)	500 (227)	200 (91)	— —	— —

Note: All BNZ products are non-asbestos.

Test results represent typical average values obtained in accordance with accepted test methods.

Grades and Typical Applications

Various compositions and densities of BNZ Tobermorite calcium silicate structural insulations, along with a sampling of some typical applications, are listed below. Individual product data sheets and an extensive list of potential applications are available at your request.

CS85

This board was developed to be a high temperature replacement for asbestos Transite. It offers our highest strength and electrical resistance combined with minimal shrinkage for applications up to and exceeding 1800°F. Potential applications include platen press insulation, foundry core and blow plates, induction furnace casing, electrical resistance insulation, hot glass handling and numerous others.

Marinite A and Marinite C

These boards are heat treated formulations for use in conveying, containing and forming molten aluminum and other non-ferrous metals. Applications include holding furnace linings, tips for continuous casters, transition plates, rings, plugs, baffles, troughs, spouts, floats and filter boxes.

Marinite P, Marinite I and Marinite M

Oven dried formulations of BNZ boards are used in a variety of heat insulating processes, fire protection and machined parts. Selection is commonly based on a balance between strength and insulating qualities. Examples include oven walls and linings, soldering insulation, fire doors, fire training burn buildings, cable trays, personnel protection, and as USCG-approved insulation for marine ships and off-shore rigs. Back-up insulation applications include ladles, torpedo cars and tundishes in the iron and steel industry, lime and cement plant rotary kilns, and aluminum die cast holding furnaces.

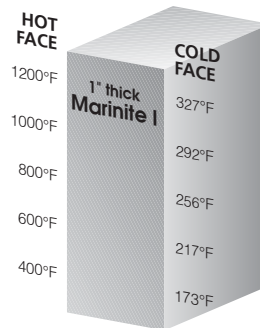
Transite HT and Transite 1000

These non-asbestos, monolithic fiber cement industrial boards are used in environments up to 1000°F where high strength is the primary concern. These fiber cement boards are used in the foundry industry for flask liners, core, drying and carry plates, and induction furnace casings. Electrical applications include busbar supports, aluminum pot insulation, and electrode arm insulators. Transite HT and Transite 1000 are also used as load bearing gasketing, spacers, supports, and machined parts for OEM applications.

Temperature Control

These solid, self-supporting panels insulate very efficiently, as shown by the large drop in temperature from the hot face to cold face in a 1"-thick

Marinite I panel.



Warranty

BNZ Materials warrants that its products are manufactured in accordance with its applicable material specifications and are free from defects in workmanship and materials using BNZ's specifications as a standard. Every claim under this warranty shall be deemed waived unless in writing and received by BNZ within thirty (30) days of the date the defect was discovered and within one (1) year of the date of the shipment of the product.

BNZ MAKES NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION, THE WARRANTY OF MERCHANTABILITY OR THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, OTHER THAN THE LIMITED WARRANTY SET FORTH ABOVE.

Limitation of Liability

It is expressly understood and agreed that the limit of BNZ's liability shall be the resupply of a like quantity of non-defective product and that BNZ shall have no such liability except where the damage or claim results solely from breach of BNZ's warranty.

IT IS ALSO AGREED THAT BNZ SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES FOR ANY ALLEGED NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, OTHER THAN THE LIMITED LIABILITY SET FORTH ABOVE.



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Marinite, Transite and CS 85 Plant Location

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BNZ Materials manufactures and is a worldwide supplier of a range of specialty industrial insulations. Our calcium silicate insulation has been manufactured continuously at Billerica, Massachusetts for more than 60 years.

In addition to our calcium silicate product line, BNZ also manufactures Insulating Fire Brick and refractory specialties at the world's most advanced IFB plant located in Zelenople, PA. Over sixteen types of IFB are available for use in applications from 2000°F to 3200°F to meet the specific needs of a variety of industries.

Contact BNZ for more information on these products and their applications.

