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DynaGuard™ Panel Microporous Insulation

DynaGuard™ Panel Insulation Systems

DynaGuard™ Panel Insulation Systems represent one of Thermo Dyne's microporous products for primary use in industrial and commercial applications. Each DynaGuard™ Panel is a rigid, textile encased, comparatively dense material with high compression resistance and exceptional strength, and its superior thermal performance allows the maximum amount of thermal protection to be provided within minimum space and weight requirements.

DynaGuard™ Panel systems are also specially formulated to minimize heat transfer via conduction, convection and radiation through the material by use of the following:

Ceramic Powders with Intrinsically Low Thermal Conductivity

The microporous core materials used in the manufacture of DynaGuard™ Panel systems possess a thermal conductivity even lower than that of still air, and minimize the solid conduction of energy through the material.

Microporous Structure

The microporous structure of the DynaGuard™ Panel system inherently minimizes the possibility for air current convection through the material as void spaces too small for air currents to exist form between the core material components.

Special Opacifiers

The introduction of special opacifiers into the DynaGuard™ Panel formulation ensures that the transmission of infrared radiation through the material is kept to the lowest possible levels.

DynaGuard™ Panel Materials of Construction

The DynaGuard™ Panel microporous core material is an 1,800°F continuous use formulation, and is compressed into a uniform thickness and density to ensure the proper distribution of the core material.

In addition to the microporous core, DynaGuard™ Panel systems are also supplied encased in a high temperature

textile shell. This shell provides additional structure, strength, ease of handling and installation, and consistent distribution of the core material, and may also be used to increase the overall composite temperature use limit of the assembly as specified by individual customer needs.

DynaGuard™ Panel systems are supplied standard at 17 lbs/ft³ density, 24" x 36", in thicknesses of 1/2" to 1-1/2", and with a fiberglass textile shell (1,000°F use limit). Other densities, sizes, thicknesses and cloth facings are available upon request.

DynaGuard™ Panel Insulation Systems Advantages Lowest Thermal Conductivity

Because DynaGuard™ Panel systems inherently possess a thermal conductivity lower than that of still air, even at elevated temperatures, they are ideal in environments where materials with low thermal conductivity, thermal diffusivity and heat storage are necessary.

Space and Weight Savings

Because smaller amounts of DynaGuard™ Panel are needed for thermal management, it is an ideal material for industrial and commercial applications where considerable space and/or weight savings are valuable in increasing capacity or efficiency without sacrificing the thermal performance of the system.

High Temperature Capability

DynaGuard™ Panel systems can be manufactured to meet continuous high temperature environments up to 1,800°F, but are also capable of performing in intermittent exposure to 2,000°F temperatures.

Easy Fabrication

Shapes can be fabricated in the field by various cutting methods, but Thermo Dyne also provides a virtually limitless range of custom pre-fabricated and intricate shapes upon request.

Thermal Conductivity Data (Btu - in/hr - ft² - °F)*

DynaGuard™ Panel 17 lbs/ft³

Mean Temp. °F (°C)	Thermal Conductivity
0°F (-17°C)	0.165 (.024 W(m·K))
500°F (260°C)	0.193 (.028 W(m·K))
1,000°F (538°C)	0.293 (.042 W(m·K))
1,500°F (816°C)	0.423 (.061 W(m·K))

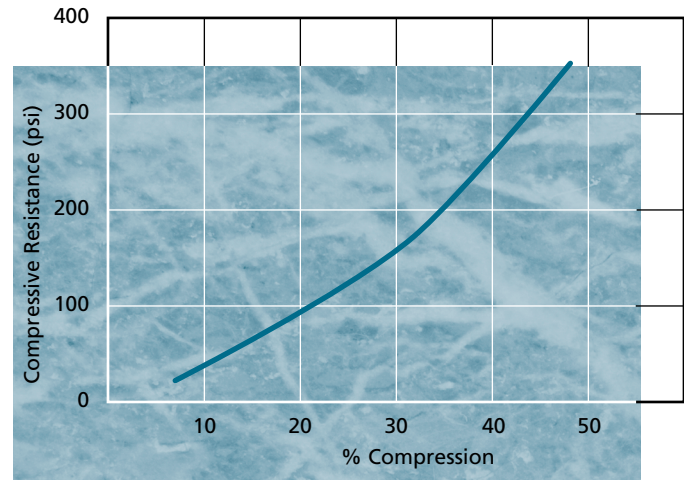
*NOTE: All thermal conductivity values have been measured in accordance with ASTM Test Procedure C-177. When comparing similar data, it is advisable to check the validity of all thermal conductivity values and ensure the resulting heat flow calculations are based on the same condition factors. Variations in any of these factors will result in significant differences in the calculated data.

Typical Characteristics

Core Density	17 lbs/ft ³ (290kg/m ³)	Standard
Thickness	1/2" to 1-1/2" (12.7mm to 38.1mm)	
Pad Size	24" x 36" (58.80cm x 91.44cm)	Standard

NOTE: Other non-standard sizes are available in many thicknesses and densities.

DynaGuard™ Compression Data For 17 lbs/ft³



Application Comparison Example

Material	DynaGuard™ Panel 17 lbs/ft ³	Ceramic Fiber Blanket 8 lbs/ft ³
Thickness	1" (24.5mm)	1" (24.5mm)
Ambient	80°F (26.7°C)	80°F (26.7°C)
Convection	Natural	Natural
Hot Face	1,800°F (982°C)	1,800°F (982°C)
Resultant Cold Face	280°F (138°C)	470°F (243°C)
Heat Flux	482 Btu/hr/ft ² /°F	1,335 Btu/hr/ft ² /°F

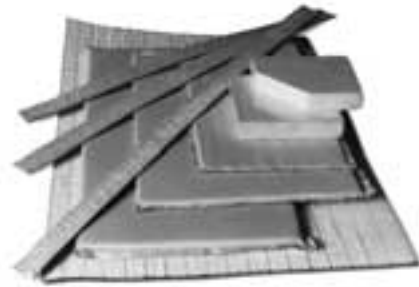
NOTE: Figures are based on computer simulations using thermal performance calculations conforming to ASTM C-680, and should be used for comparisons and approximations rather than for exact design specifications.

For technical and installation support for DynaGuard™ Microporous Insulation, please contact Thermo Dyne's application engineering team.

Approximate Energy Savings Comparison

The two materials used in the above example have the following differences in temperature and heat flux:
 Difference in Cold Face Temperature = 190°F (87°C)
 Difference in Heat Flux = 853 Btu/hr/ft²/°F
 Result = DynaGuard™ Panel saves approximately \$.02/kilowatt hr/ft² over Ceramic Fiber Blanket of equal thickness.

NOTE: Assumes 1kWh = 3,413 Btu, \$.065/kWh estimated energy cost.



DynaGuard™ Space Savings

A 3" layered thickness (66% more material) of 8 lbs/ft³ Ceramic Fiber Blanket is necessary to achieve equal thermal performance of 1" DynaGuard™ Panel 17 lbs/ft³.

DynaGuard™ Weight Savings

Amount of weight saved by using 1" of DynaGuard™ Panel 17 lbs/ft³ as opposed to 3" of 8 lbs/ft³ Ceramic Fiber Blanket is .6 lbs/ft².

DynaGuard™ products offer a variety of solutions.

Industrial

Power plant pipes, ducts
 Incinerators
 Molten metal ladle backup
 Glass tank forehearth
 Fuel cells

Commercial

Lab furnaces
 Gas boilers
 Appliances
 Night storage heaters
 Vending machines
 Exhaust systems