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## **DynaGuard™ Board Microporous Insulation**

### **DynaGuard™ Board Insulation Systems**

DynaGuard Board Insulation Systems represent one of Thermo Dyne's microporous products for primary use in industrial and commercial applications. Each DynaGuard™ Board is a rigid, 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™ Board 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™ Board 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™ Board 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™ Board formulation ensures that the transmission of infrared radiation through the material is kept to the lowest possible levels.

### **DynaGuard™ Board Materials of Construction**

The DynaGuard™ Board 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™ Board systems are also supplied standard encased in a shrink-wrap shell. This shell provides additional minimization

of dusting from the material during transportation and handling, adds a degree of moisture resistance during installation, and allows for close fitting or butt-jointing of multiple DynaGuard™ Board parts with only minimal spaces between the material.

DynaGuard™ Board systems are supplied standard at 18 lbs/ft<sup>3</sup> density, 18"x 24", and in thicknesses of 1/2" to 1-1/2". Other densities, sizes, and thicknesses are available upon request.

### **DynaGuard™ Board Insulation Systems Advantages Lowest Thermal Conductivity**

Because DynaGuard™ Board 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™ Board 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™ Board 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 - ft<sup>2</sup> - °F)\*

DynaGuard™ Board 18 lbs/ft<sup>3</sup>

| 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))  |

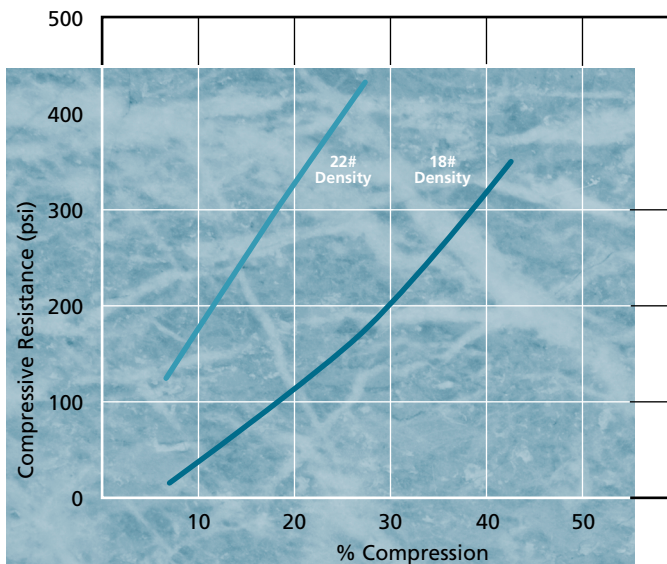
\*NOTE: All thermal conductivity values have been measured in accordance with ASTM Test Procedure C-177. When comparing similar data, it is advisable to check the validity of all thermal conductivity values and ensure the resulting heat flow calculations are based on the same condition factors. Variations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

## Typical Characteristics

|              |   |
|--------------|---|
| Core Density | 18 lbs/ft <sup>3</sup> (290kg/m <sup>3</sup> ) Standard     |
|              | 22 lbs/ft <sup>3</sup> (355kg/m <sup>3</sup> ) High Density |
|              | 25 lbs/ft <sup>3</sup> (403kg/m <sup>3</sup> ) High Density |
| Thickness    | 1/2" to 1-1/2" (12.7mm to 38.1mm)                           |
| Pad Size     | 18"x 24" (45.72cm x 58.80cm) Standard                       |
|              | 24"x 36" (58.80cm x 91.44cm) Available                      |

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

## DynaGuard™ Compression Data For 22 lbs/ft<sup>3</sup> and 18 lbs/ft<sup>3</sup>



## Application Comparison Example

| Material            | DynaGuard™ Board 18 lbs/ft <sup>3</sup> | Ceramic Fiber Blanket 8 lbs/ft <sup>3</sup> |
|---------------------|---|---|
| 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 <sup>2</sup> /°F          | 1,335 Btu/hr/ft <sup>2</sup> /°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 (88°C)

Difference in Heat Flux = 853 Btu/hr/ft<sup>2</sup>/°F

Result = DynaGuard™ Board saves approximately \$.02/kilowatt hr/ft<sup>2</sup> over Ceramic Fiber Blanket of equal thickness.

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

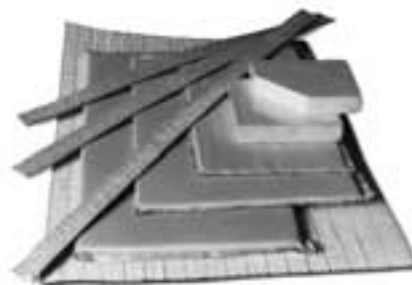
## DynaGuard™ Space Savings

A 3" layered thickness (66% more material) of 8 lbs/ft<sup>3</sup> Ceramic Fiber Blanket is necessary to achieve equal thermal performance of 1" DynaGuard™ Board 18 lbs/ft<sup>3</sup>.

## DynaGuard™ Weight Savings

Amount of weight saved by using 1" of DynaGuard™ Board 18 lbs/ft<sup>3</sup> as opposed to 3" of 8 lbs/ft<sup>3</sup> Ceramic Fiber Blanket is .5 lbs/ft<sup>2</sup>.

**Armil CFS, Inc**



**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

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