Armil CFS, Inc
15660 LaSalle Street
South holland, IL 60473
phone: 708 339 6810
fax: 708 339 0517
www.armilcfs.com

DynaGuard™ Flexible Microporous Insulation

DynaGuard™ Flexible Insulation Systems

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

DynaGuard™ Flexible Materials of Construction

The DynaGuard™ Flexible 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. After compression, the material is quilted on 1" square centers with high temperature thread in order to provide both flexibility and greater vibration resistance for the material.

In addition to the microporous core, DynaGuard™ Flexible systems are 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™ Flexible systems are supplied standard at 16 lbs/ft^3 density, 36"x 36", in thicknesses of 1/8" to 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™ Flexible Insulation Systems Advantages
Lowest Thermal Conductivity

Because DynaGuard™ Flexible 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™ Flexible 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™ Flexible 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^2 - °F)*

DynaGuard™ Flexible 16 lbs/ft^3

Mean Temp. °F (°C)	Thermal Conductivity
0°F (-17°C)	0.15 (.022 W(m·K))
500°F (260°C)	0.19 (.027 W(m·K))
1,000°F (538°C)	0.29 (.042 W(m·K))
1,500°F (816°C)	0.42 (.064 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   16 lbs/ft^3 (258kg/m^3) Standard
                        10 lbs/ft^3 (161kg/m^3) Lightweight

Thickness   1/8" to 1/2" (3.17mm to 12.7mm)
Pad Size   36"x 36" (91.44cm x 91.44cm) Standard
                        Square Stitched
                        36"x 72" (91.44cm x 182.88cm) Available
                        Parallel Stitched

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

DynaGuard™ Compression Data For 16 lbs/ft^3
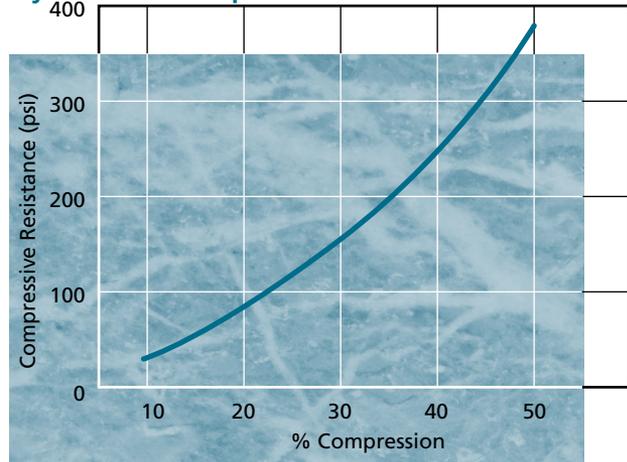
Application Comparison Example

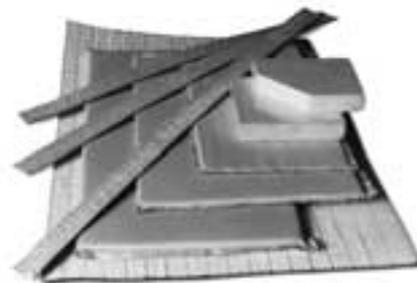| Material	DynaGuard™ Flexible 16 lbs/ft^3	Ceramic Fiber Blanket 8 lbs/ft^3
Thickness	1" (24.5mm)	1" (24.5mm)
Ambient	80°F (26°C)	80°F (26°C)
Convection	Natural	Natural
Hot Face	1,800°F (982°C)	1,800°F (982°C)
Resultant Cold Face	278°F (138°C)	470°F (243°C)
Heat Flux	475 Btu/hr/ft^2/°F	1,335 Btu/hr/ft^2/°F

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 = 192°F (89°C)
Difference in Heat Flux = 860 Btu/hr/ft^2/°F
Result = DynaGuard™ Flexible saves approximately $.02/kilowatt hr/ft^2 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^3 Ceramic Fiber Blanket is necessary to achieve equal thermal performance of 1" DynaGuard™ Flexible 16 lbs/ft^3.

DynaGuard™ Weight Savings

Amount of weight saved by using 1" of DynaGuard™ Flexible 16 lbs/ft^3 as opposed to 3" of 8 lbs/ft^3 Ceramic Fiber Blanket = .7 lbs/ft^2.

DynaGuard™ products offer a variety of solutions.

Industrial	Commercial
Power plant pipes, ducts	Lab furnaces
Incinerators	Gas boilers
Molten metal ladle backup	Appliances
Glass tank forehearth	Night storage heaters
Fuel cells	Vending machines
	Exhaust systems

Armil CFS, Inc   **phone (708)339 6810**
                                    fax (708) 339 0517   **www.armilcfs.com**