



Excelblok™ Microporous Insulation

Excelblok™ Insulation Systems

Excelblok™ insulation systems represent one of ThermoDyne's specially formulated microporous products for use in the rigorous conditions and standards of an aerospace environment. Each system 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. Excelblok™ microporous insulation is comprised of a blend of ceramic powders and fibers, producing a high temperature material that provides excellent thermal stability, low thermal diffusivity and the lowest thermal conductivity.

Excelblok™ insulation 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**, which ensure thermal conductivities lower than still air.
- **A Microporous Structure**, which forms void spaces too small for convection currents to exist.
- **Special Opacifiers**, which minimize the transmission of infrared radiation through the material.

Excelblok Materials of Construction

All Excelblok™ core materials are 1832°F continuous use materials, and are available in standard (20 lb/ft³) and higher densities, depending upon the needs and requirements of the application. They can be provided in standard sizes of 18"x36", cut to custom specifications as outlined by individual customers, or molded and/or machined into cans, castings or casings.

Excelblok™ Product Forms

Excelblok™ ST

Excelblok™ ST provides the highest machinability and greatest ease of fabrication and manipulation of Excelblok™ products. It is ideal for environments that require a rigid, dense material to be molded into a casting or cavity before being machined to specific dimensions or designs. Typical applications include thermal batteries, high temperature testing and measurement equipment, and auxiliary power units.

Excelblok™ DR

Excelblok™ DR is a highly specialized Excelblok™ material that is ideal for environments where data recording circuitry needs to be temporarily protected from steady-state high temperatures, particularly in the event of a high temperature fire. The Excelblok™ DR formulation includes a patent-pending, endothermically enhanced mixture that is designed to absorb a portion of heat energy as it passes through the material, thus delaying its time to steady state, and can also combined with an additional patent-pending coating to enhance the overall survivability of the system. Typical applications include flight, rail, voyage and event data recorder systems.

Excelblok™ HP

Excelblok™ HP provides the highest purity of any of the Excelblok™ materials, and includes no organic components which might off-gas when brought to elevated temperatures. It is also non-reactive to lead telluride and/or silicon-germanium based materials found in devices such as thermoelectric batteries.

Excelblok™ IS

Excelblok™ IS is an isotropic formulation of Excelblok™ materials and ensures that heat energy encounters similar resistance through the microporous structure of the material, regardless of the direction of the heat flow. It also contains no organic components which might off-gas when brought to elevated temperatures, and is easily custom machinable or moldable according to individual customer requirements.

Thermal Conductivity for 20 PCF

Material in Btu-in/hr-ft²-°F / (W/m²*K) *
Mean Temp °F (°C)

Excelblok™ ST

Excelblok™ DR

0°F (-17°C)

.097 (.014)

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500°F (260°C)

.104 (.015)

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1000°F (538°C)

.118 (.017)

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1500°F (816°C)

.201 (.029)

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Typical Core Density (#/ft³)***

20

35

Typical Thickness (in) / (mm)***

1/2" - 2" (12 - 51mm)

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Typical Size (standard) (in) / (mm)***

18"x36" (457x914mm)

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Specific Heat (Btu/lb - °F)

.25

.25

Emissivity

.85

.85

Linear Shrinkage (% @ 4hrs @ 1800°F)

.75

.75

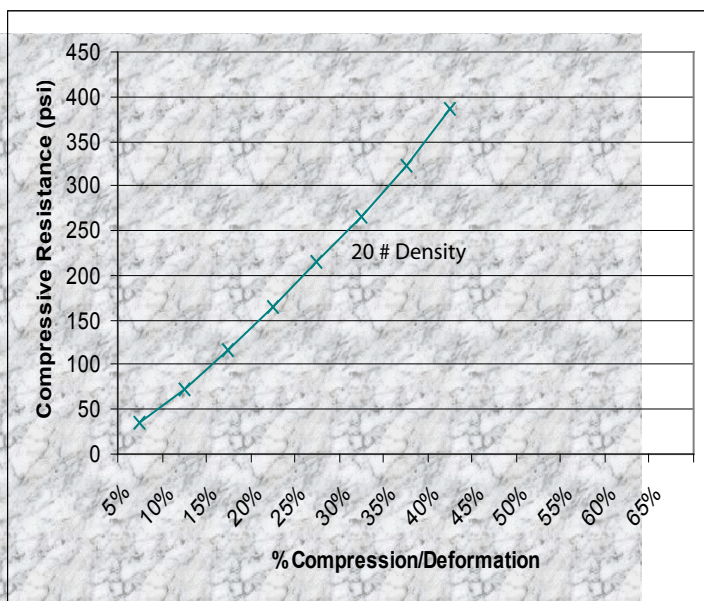
* All thermal conductivity values have been measured in accordance with ASTM Test Procedure C-177. When comparing similar data, it is advisable to check the validity of all thermal conductivity values and ensure the resulting heat flow calculations are based on the same condition factors. Variations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

** Thermal conductivity values for Excelblok™ DR materials are difficult to obtain given that the material's inherent endothermic compounds delay the time to steady-state in the environments for which they are intended. For additional information about thermal conductivity values associated with this material, please contact the ThermoDyne Engineering Dept.

*** Additional sizes, thicknesses and densities are available upon request, particularly for Excelblok™ materials that are molded into castings, casings or housings.

Note: Additional information on Excelblok™ HP and Excelblok™ IS is available from ThermoDyne upon request. For questions regarding the performance and applications possibilities of either of these materials, please contact the ThermoDyne Engineering Department at 574.522.3606 or Fax 574.293.0047.

Excelblok™ ST Compression Data for 20 lbs/ft³



Excelblok™ Systems offer a variety of solutions for the following types of applications:

Thermal battery systems
Weapons avionics housings
Data recorder systems
Missile engine firewalls
High performance ovens
Aircraft galley equipment
Nuclear vitrification
Explosives detection devices
Aircraft avionics & electronics
Hazardous waste disposal
Nuclear powerplants
Fuel cells & reformers



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