FeatherFlex™ Microporous Insulation

FeatherFlex® Insulation Systems

ThermoDyne’s FeatherFlex® Insulation Systems are the flexible version of ThermoDyne’s Microporous insulation product line. The superior thermal performance of FeatherFlex® Insulations allows the minimum amount of thermal protection to be provided within space and weight requirements. FeatherFlex Microporous Insulation is a blend of ceramic powders and fibers concentrated to produce a high temperature material that provides excellent thermal stability, low thermal diffusivity and the lowest thermal conductivity.

FeatherFlex® is specially formulated to block all three forms of heat transfer. Conduction is minimized through the use of a ceramic powder, which has minimally low thermal conductivity. In addition, the powder is formed to create a porous structure, minimizing the energy conducted through the solid material. Convection is minimized by using a powder with an extremely fine particle size, which forms void spaces, which are on the order of magnitude of the mean free path of the air molecules. The radiation portion of the heat transfer, indirectly increasing becomes the dominant mode as application temperature increases. The infrared heat transmission through the insulation is reduced to the lowest possible by the addition of special specularities with in the excellent refractive index of the ceramic powders.

Materials of Construction

FeatherFlex® Insulation Systems are composed of a high-temperature core material, which is encapsulated between two layers of high temperature cloth. This assembly is then compacted into a uniform thickness and density and then sewn to form the finished composite. The stitching provides structure, strength, and consistent distribution of the core material, while allowing the insulation to be flexible enough to be wrapped around irregular shapes.

The FeatherFlex core has a 100°F continuous use rating, and is capable of withstanding a 200°F surface for 15 minutes. FeatherFlex insulation systems are supplied with our standard E-1000 fabric covering for easy installation and for the thermal stability necessary for most applications. Other fabrics are available upon request, which provide protection up to 2300°F. No core material selection is based on application temperature requirements, and is typically glass or quartz. FeatherFlex is available in standard 10 PCF (.018 in.) and lightweight (8 or 10pcf) densities and thicknesses from 1/8” to 1/2”.

FeatherFlex® Insulation Systems Advantages

With a Microporous core and versatile composite options, FeatherFlex offers several major advantages over other insulation materials in high performance applications.

Lowest Thermal Conductivity

Microporous ceramic powders and fibers work together to form a material with the lowest possible thermal conductivity, thermal diffusivity and heat storage. This enables FeatherFlex to provide the maximum thermal protection utilizing the lowest amount of weight and space.

Lightweight and Saves Space

Low core densities result in mass savings for weight sensitive applications commonly encountered in the Aerospace industry. In applications where space is a problem, low thermal conductivity means less material thickness is required to achieve the desired thermal energy flux reduction.

High Temperature Capability

FeatherFlex can be manufactured to meet high temperature requirements including intermittent exposure up to 2500°F.

Flexible

The quilted stitch pattern provides strength, yet allows the composite to remain flexible enough to insulate irregular shapes and service in the form of a thin film for long periods of time.

Easy Fabrication

Complex shapes can be easily made by cutting FeatherFlex with a sharp knife, bat or blade. Edges can be sealed by sewing closed with a step of similar fabric used on the composite.

FeatherFlex™ Materials Technical Data

Thermal Conductivity For Material in Btu-in/hr-ft2°F/Wm*K

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Core Density</th>
<th>1/2&quot; Core Density</th>
<th>3/4&quot; Core Density</th>
<th>1&quot; Core Density</th>
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FeatherFlex™ Systems offer a variety of solutions for the following types of applications:

- Thermal barrier systems
- Weapons atomic systems
- Toxic waste equipment
- Nuclear vitrification
- Explosive detection devices
- Aircraft filters and catalysts
- Hazardous waste disposal
- High performance Owens
- Aircraft tires
- Structural claddings
- Fire walls
- Nuclear power plants
- Fuel cells & inerts
- Chemical boilers
- Base air units
- Auxiliary power plants (APU)
- Turbine engines exhaust shafts
- Diesel engine exhausts

* All thermal conductivity values have been measured in accordance with ASTM Test Procedure C-127. When comparing similar data, it is advisable to check the validity of the thermal conductivity test. The results in this chart are based on the use of standard test techniques. Variations in any of these tests may cause data to be significantly different in the calculated data.

**Additional data, thicknesses and densities are available upon request. It is very common to have different sizes for specific programs that are produced currently.

Note: Additional information on FeatherFlex is available from ThermoDyne upon request. For questions regarding the performance and selection of any of these materials, please contact us at info@ThermoDyne.com or call 574.293.0047.