

# COMFORTEMP®

## The Ultimate Degree of Comfort™

- COMFORTEMP® products contain millions of microspheres which are preset to a selected temperature appropriate for this product.
- When the body temperature exceeds the preset temperature, the microspheres absorb the excess heat creating a cooling sensation. (Fig. 1)
- When the body temperature drops below the preset temperature, the microspheres release stored heat to keep the body warm at cooler temperatures. (Fig. 2)
- Your body heat and the ambient temperature continually recharge and recycle the microspheres to help keep you balanced and comfortable.

COMFORTEMP stay cooler when it's hot and warmer when it's cold.

## THERMASORB® A Sphere of Influence With Limitless Opportunities.

Few products are poised to dramatically impact and influence everyday life. THERMASORB®, the inventive thermal additive offered by Frisby Technologies is such a product. This breakthrough thermal additive provides unique, value-added performance properties when added to virtually any material. THERMASORB enables exciting new opportunities in a variety of product applications for both consumer and industrial markets.

## EXPAND YOUR SPHERE OF KNOWLEDGE

THERMASORB is a family of next-generation thermal management additives available exclusively from Frisby Technologies. THERMASORB looks like a fine, free-flowing powder but actually consists of millions of tiny durable shell. The diameter of the microcapsules can range from one to several hundred microns, but are typically produced between 15 and 50 microns. Frisby's THERMASORB capsules are designed and produced to maximize the amount of core material inside its durable, impermeable plastic shell. THERMASORB is a versatile powder that can be readily added to a variety of host materials. Currently, it's used in the production of Frisby's COMFORTEMP® brand of dynamic climate control foams, fabrics, gels, rubbers and leathers.

Other host materials that are improved by the addition of THERMASORB include:

Coolants – Heat Skins – Heat Shields – Composites – Paints – Coatings – Potting Compounds  
Epoxies – Thermal Capacitors – Adhesives – Gels

## A WIDE DEGREE OF OPTIONS:

THERMASORB was successfully developed over a span of more than a decade at a total investment exceeding \$8 million. Much of the development funds were from U.S. Government Military Research Agencies including NASA and USAF.

Today, Frisby Technologies offers THERMASORB for immediate incorporation into a wide array of materials and products in order to enhance thermal performance properties.

THERMASORB additives absorb heat when the encapsulated core material changes from a solid to a liquid at a predetermined transition temperature, conversely, the core will release heat when the material changes from a liquid to solid state. Because the liquefying and solidification process takes place within an impermeable capsule shell wall, THERMASORB remains a lightweight, free-flowing powder regardless of the state of the inside material. Therefore, THERMASORB additives can be easily mixed into various host matrices, always yielding maximum thermal performance with minimum production impact.

## THE EXPANDING SPHERE OF INFLUENCE:

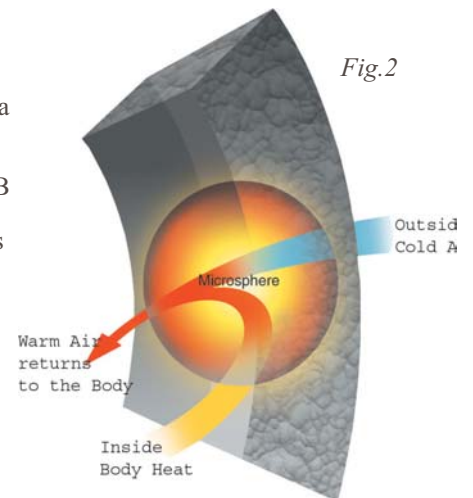
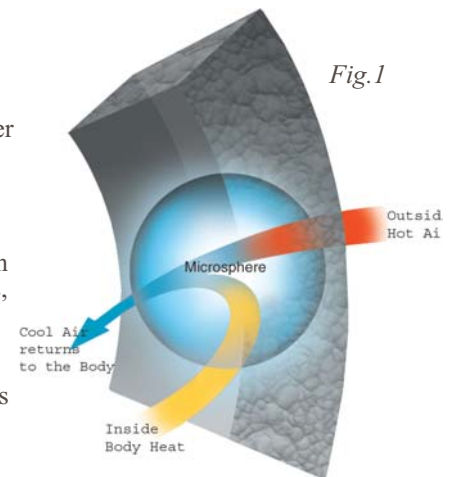
Frisby and its partners are continuously identifying new applications for THERMASORB in the following targeted industries:

Aerospace – Automotive – Computer – Electronics – Footwear – Medical – Packaging  
Sporting Goods – Technical Outerwear

## TECHNICAL DATA – THERMASORB® ADDITIVE

It is possible to produce different THERMASORB additives that will absorb and release heat at very low temperatures, as low as -30°F, at very high temperatures, up to 300° F, and virtually all temperatures in between. The table below lists the various THERMASORB products commercially available from Frisby along with the transition temperature for each type.

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NAME	Peak Transition Temp (°F)	Peak Transition Temp (°C)	Latent Heat Capacity (Btu/lb)	Latent Heat Capacity (J/g)	Capsule Diameter (Microns)	Density (lb/ft)	Density (g/cc)
THERMASORB® 43	43	6	70.1	163	15-50	54.3	0.87
THERMASORB® 65	65	18	74.4	173	15-50	54.9	0.88
THERMASORB® 83	83	28	80.0	186	15-50	54.9	0.88
THERMASORB® 95	95	35	77.4	180	15-50	56.2	0.90
THERMASORB® 122	122	50	68.8	160	15-50	56.2	0.90
THERMASORB® 175	175	79	86.0	200	15-50	58.0	0.93