EverythingFeet, LLC

Innovative Foot Care Products Developed by Podiatrists

Supracor®

Technology Overview

Flexible Honeycomb Technology

Supracor's flexible honeycomb is an engineered material produced from a revolutionary technology of fusion-bonding. It is a derivative of the aerospace industry which relies heavily on the structural integrity and optimum strength to weight advantages of rigid honeycomb composites. However, unlike aerospace honeycomb, Supracor honeycomb is not bonded with adhesives. Instead, a proprietary, fusion-bonding technique is used to produce Supracor honeycomb from an extensive variety of thermoplastic materials. Because it is fabricated from thermoplastics and manufactured without adhesives, Supracor is the only aerospace-type honeycomb to have "memory," the ability to repeatedly return to its original shape. As a flexible and stable structure, Supracor honeycomb is setting new standards for shock absorption in a wide spectrum of applications—from impact-absorbing components in athletic shoes to bumpers on amusement park rides.

Physical Properties

Supracor honeycomb is fabricated from an extensive range of thermoplastic elastomers (TPE's). These materials combine the best properties of rubber and plastics for superior durability and performance. They are noted for their exceptional tensile, tear and compressive strength, resistance to puncture and their flexibility at low and high temperatures. Supracor's honeycomb Pad, an impact-absorbing hoof pad for horses incorporates the best properties of TPU in a highly engineered honeycomb matrix. It's able to withstand the impact of a galloping horse, which is roughly 5,500 - 6,000 pounds per square inch.

Sophisticated Architecture

Supracor honeycomb is a matrix of elongated hexagons forming a complex pattern of alternating single- and double-walled cells. Each cell has eight interior and exterior radii.

In bonded or sandwiched panel form, i.e., reinforced with facings, "I-beams" are formed at the point where the cell walls meet the facings. The I-beams reinforce the cell walls providing additional stability to the matrix, while encapsulated air pockets act as a cushion to further absorb energy.

Dynamic Mechanical Properties

Anisotropy: It is the sophisticated architecture of radiated double- and single-walled cells that makes Supracor honeycomb anisotropic—having three different degrees of resistance or "flex" in its length ("L" direction), width ("W" direction) and vertically against the surface ("T" direction). This enables it to absorb energy or impact from different angles and to perfectly contour to the anatomy. The anisotropic property of Supracor honeycomb makes it highly effective as a shock absorbing bumper on amusement park rides.

Shock Absorption: The widespread use of aerospace honeycomb in structures of commercial and military jet aircraft attests to its excellent shock-absorbing capabilities. Energy from impact is absorbed and dispersed evenly throughout the honeycomb matrix. Because the cells are interconnected, when one cell buckles from impact, the walls of the adjacent cells also buckle to absorb the force, similar to a ripple effect. Supracor Honeycomb absorbs shock in the same manner, but has increased load-bearing capability as a result of its elastomeric composition. These properties make it ideal for wheelchair cushions and Supracor honeycomb can be found in an innovative line of pressure-relief cushioning products called Stimulite®.

Optimum strength-to-weight: The alternating thick and thin cellular walls of Supracor honeycomb allow it to be both strong and lightweight. On the average, the matrix is 92% open space, based on cell diameter.

Engineering

The mechanical properties of Supracor Honeycomb are controlled by the following specifications: 1) physical properties of the thermoplastic; 2) cell diameter; 3) wall gauge (thickness of the cell wall); 4) core thickness; and 5) facings applied to the core. Altering one or more of these specifications will produce different performance characteristics. Supracor Honeycomb can be engineered to be a specific weight, absorb a specific load, rebound at a specified rate and possess the flexibility or stiffness required by the end application.