

CONFOR® Foams

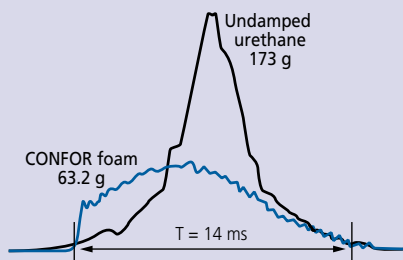
Expanding
Design
Options

- For comfort-management products



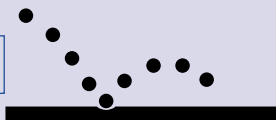
Damping makes the difference

It is the damping properties, engineered into CONFOR formulations, that give the materials their uncompromising comfort and protection capabilities. Damping makes the foams rate-sensitive—able to display different properties under different rates of strain. While CONFOR foams slowly deflect under sustained pressure, damping causes them to behave like stiffer foams when they receive an impact. The foams' ability to dissipate energy prevents them from bottoming out, or collapsing completely, and virtually no energy is returned to the impacting body.



A drop-shock test—a 16.9-pound weight is dropped from a height of 2 feet onto 1-inch-thick materials—demonstrates CONFOR foams' energy-absorption capabilities. Peak acceleration response registers 173g with an undamped urethane foam, but only 63.2 g with CONFOR foam.

Undamped urethane foam



CONFOR foam



The classic "golf ball drop" shows that an undamped urethane returns nearly all of the impact energy, while CONFOR foam absorbs it.



Shock-absorbing CONFOR foams are widely used in sports equipment and padding, to help prevent and protect injuries. Helmets and footwear also take advantage of the foams' self-adjusting fit, as do medical braces and splints.

As ergonomic materials, CONFOR foams provide comfort and support in numerous devices requiring comfort during long-term use, such as computer keyboard wrist rests and audio headsets.



Engineered for flexibility

Available in a broad range of stiffnesses and densities, CONFOR foams greatly simplify the design of products that must sustain weight and provide comfort. One self-adjusting formulation, incorporated into a seat or mattress, for instance, will provide equal cushioning and support for occupants of various weights. Energy-absorption capabilities will be equivalent as well.

Use of a CONFOR foams also can enable designers to achieve comfort goals with less cushioning material, reducing the design profile and perhaps project costs. For impact-resistance, CONFOR foam composites often present a less costly solution when compared to structural or mechanical alternatives.

With strategic use of CONFOR foams, design engineers can optimize their considerable benefits. In seating, for example, extra softness can be achieved by combining a relatively thin layer of CONFOR foam with another standard material. Or, instead of contouring the seat back for extra lumbar spine support, appropriately placed pieces of CONFOR foam often provide the optimal combination of performance and value.

For products designed to enhance physical comfort or provide protection from impact, CONFOR viscoelastic foams offer a unique combination of properties found in virtually no other single material. In many cases, this proprietary engineering foam allows designers to achieve a product's ergonomic or impact-absorption goals while actually simplifying its physical, mechanical or structural make-up.



In mattresses and pillows, CONFOR foams' temperature responsiveness and controlled recovery provide each user with customized support that readjusts with every movement.

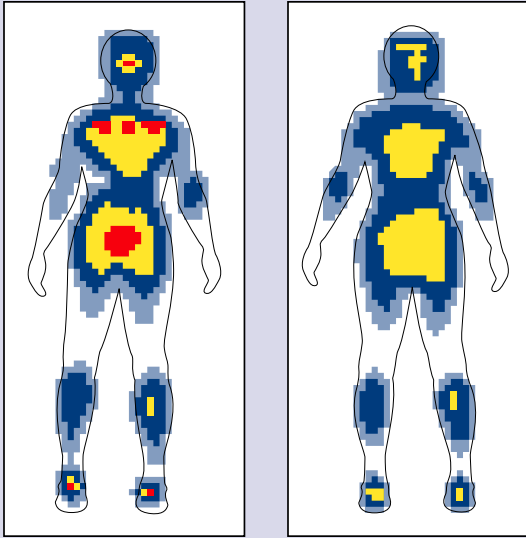
Self-adjusting comfort

As low-rebound, temperature-responsive materials, CONFOR foams are formulated to duplicate the "feel" of a very soft or very thick cushioning foam yet offer the support and protection of a stiffer or thicker material. Under sustained pressure and exposure to body warmth, CONFOR foams soften and "flow," conforming to the body. With the release or shifting of weight, however, the foams constantly and gradually readjust. This behavior starkly contrasts the constant return force of commodity-grade high-resilience foams when they are compressed.



Hospital bedding, wheelchair cushions, and exam and operating table pads take advantage of CONFOR foams' self-adjusting behavior. Under the brand name CONFOR®-Med, the foams have been clinically proven to help prevent the development or advancement of decubitus ulcers in high-risk patients.

Measuring comfort



These pressure maps present a two-dimensional color display of the distribution of weight of a recumbent person on a traditional mattress (left) and on a CONFOR foam mattress (right). Areas of light pressure register as shades of pale blue, spots of moderate pressure show as dark blue and areas of greatest force appear as yellow and red. The maps show that the CONFOR foam distributes the pressure more evenly.

With the advent of computer based pressure-mapping technology, designers today can minimize the subjective evaluation of cushioning materials. Pressure-mapping provides quantitative data about the interaction between a weight and its support surface and thus allows product designers to more accurately characterize cushioning materials and their ability to distribute surface loads.

Using pressure mapping, E-A-R applications engineers can quantify the various forces between a mattress and its occupant, for example, identify the areas of greatest pressure and help to optimize the design and the materials employed. Because padding, mattresses or chairs that initially feel comfortable may cause discomfort over time, pressure mapping significantly reduces the number of cycles a design must go through to arrive at an optimal solution.

Applying new technology

Traditional seat design uses a balance of physical design, mechanical configuration and cushioning foam to achieve the desired level of comfort. When designers enhance one component, however, they often must make sacrifices elsewhere in the design—a choice between stiffness and thickness of foam, for example.

CONFOR foams can significantly reduce the need for design trade-offs. They afford greater flexibility in seating and cushion applications, primarily because of their damping properties.

With a CONFOR foam, for instance, reducing a cushion's thickness doesn't necessarily mean increasing its tendency to bottom out. Or, switching to a stiffer formulation doesn't necessarily mean sacrificing long-term comfort. Moreover, E-A-R can customize various properties in the foams, such as speed of rebound and stiffness, to meet specific design parameters.



Because they self-adjust and provide balanced, even support, CONFOR foams do not contribute to the fatigue and discomfort associated with traditional high-resilience seating foams in long-term seating applications, such as for military pilots, wheelchair patients and mass transit passengers. Moreover, because of their shock-absorption properties, CONFOR foams also are being employed in general aviation passenger seats as a way to meet new crash-load standards. The foams dissipate impact energy, instead of hitting bottom and returning the energy to the impacting body.

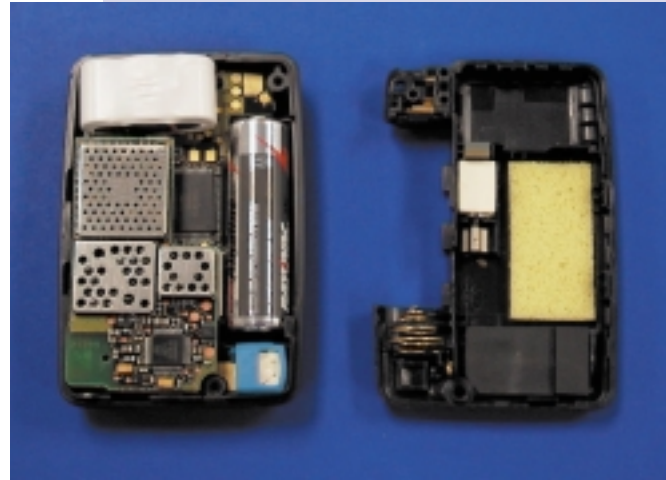
Shock protection

CONFOR foams' development is linked to NASA's Space Shuttle program and the search for an ultra-comfortable, long-term seating material. Because of the materials' damping properties and shock-absorption capabilities, the Air Force over the years has repeatedly evaluated—and specified—the foams as padding for ejection seats, subjecting them to high G forces on a vertical deceleration tower.

Physical-protection applications, such as athletic padding or racecar head rests, also depend on CONFOR foams' ability to absorb and dissipate shock energy internally, without hitting bottom, recoiling and amplifying the impact. The same performance properties add ruggedness and durability to hand-held electronics, such as cellular phones, pagers and palm-top computers.

When small electronic devices, densely packed with components, are bumped or dropped, circuit boards can collide, antennas and speakers can crash into the shell, and fragile display screens can flex and crack. Even as very thin pads, however, CONFOR foams protect components by virtually eliminating the destructive shock energy, absorbing it internally and not returning any of the force to the impacting component. A special electronic-grade formulation—CONFOR® CF-45E foam—*exhibits no silicone off-gassing and can help prevent damage to disk drives and other delicate parts during assembly and clean-room operations.*

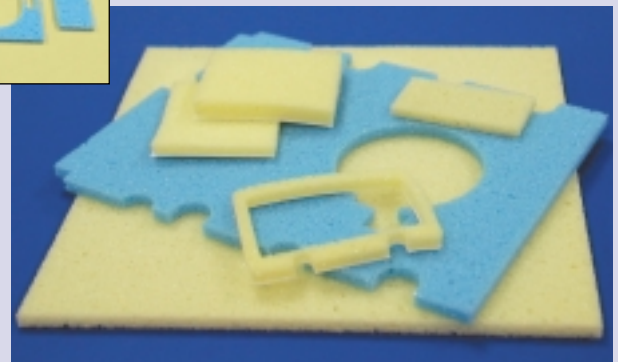
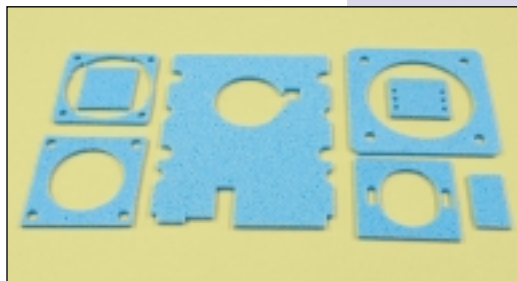
Because they are semi-open celled urethanes, CONFOR foams also provide a measure of acoustical insulation. Used as speaker and microphone seals, the foams help reduce audio distortion and background noise.



A wafer of energy-absorbing CONFOR foam—approximately 1/8-inch thick—lines the posterior section of a pager's shell, to protect the antenna. Prior to treatment, even a moderate shock event could cause the antenna to shatter.

Developed especially for electronics applications, one formulation of CONFOR foam (left) emits no silicone into clean rooms or sensitive devices.

Thin sheets of CONFOR foams (below) can be layered with pressure-sensitive adhesive and die-cut or kiss-cut into shock pads and shock-absorbing gaskets that help to ruggedize portable electronic devices.



It's easy to get more information

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To obtain more information about CONFOR ergonomic foams,
please contact us and request any of the following:

- Product Bulletin PB-102—CONFOR NT
- Material Summary Sheet 9—CONFOR Foams
- White Paper—Seating Design
- Application Report AR-109—Helicopter Seats
- Application Report AR-112—Ninja Turtle Helmets
- Application Report AR-114—Ergonomic Chair
- dBRIEFS newsletter—Winter 1994—Olympic Bobsled
- dBRIEFS newsletter—Winter/Spring 1995—Seating
- E-A-R Product Guide



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