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## **SLEEP COOL, SLEEP COILS**

*Forecasts call for a long, hot summer for visco-foam and air mattress sleepers*

**CARTHAGE, Mo.**, (June 26, 2008)- Since the introduction of visco memory foam and air chamber mattresses into the bedding market, consumers and mattress producers alike have engaged in an ongoing debate: Which surface truly provides a superior and healthy night's sleep?

"In our consumer research studies, we consistently hear that visco-foam mattresses are uncomfortable because they 'sleep hot,'" said Mark Quinn, group executive vice president of sales and marketing for the bedding division of Leggett & Platt, the nation's largest producer of bedding components.

As summer temperatures and raw material prices continue to climb, the debate heats up. Which mattress will help sleepers stay cool this summer?

### ***Putting the Debate to Bed: Innersprings Sleep Cooler***

Recent research from [Kansas State University's Institute for Environmental Research](#) shows that innerspring mattresses provide and maintain a cooler and more comfortable sleep environment than visco-foam or air chamber mattresses. In fact, innerspring mattresses dissipate heat approximately 28 percent\* better than non-innerspring sleep surfaces.

To identify which sleep surfaces sleep coolest, university lab technicians measured the evaporative heat loss properties of visco-foam, air chamber and multiple innerspring mattresses using a thermal manikin designed to simulate the body weight and temperature of an average person.

"The laws of physics tell us that evaporative heat loss is a long-term cooling phenomenon in which the body is cooled through evaporation of water," explained Caleb D. Browning, Ph. D., senior research engineer/physicist for Leggett & Platt's IDEA (Innovation, Design, Engineering, and Acceleration) Center.

By tracking resistance to evaporative heat loss from the thermal manikin to each of the three sleep surfaces (measured in Watts per square Meter or  $W/m^2$ ), university researchers found that the innerspring mattresses averaged only  $110.79 W/m^2$  of resistance, while the visco-foam and air mattresses measured  $151.45 W/m^2$  and  $160.48 W/m^2$  of resistance to evaporative heat loss, respectively.

"In our analysis of this testing data, we found that innerspring mattresses encourage evaporative heat dissipation nearly one-third better than visco-foam or air chamber sleep surfaces, therefore offering the coolest sleeping environment of the three," said Browning.

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### **Cool Surface Technology**

In addition to their superior rate of evaporative heat dissipation, innerspring mattresses sleep cooler than visco-foam or air core mattresses because their surfaces cool at an accelerated rate. Thermal imaging studies conducted at Leggett & Platt's industry testing facilities\*\* showed that the surfaces of innerspring mattresses have an initial cooling rate that is approximately 40 percent greater than the foam or air core mattresses.

As illustrated in the attached graph (data from Leggett's testing), innerspring mattresses actively dispel surface heat as soon as a sleeper rolls off the mattress. In fact, testing showed the initial cooling rate for the innerspring mattress was 0.91 degrees per second, while both visco-foam and air core mattresses showed an initial cooling rate of only 0.55 degrees per second.

### **Active Air Exchange: The Construction of Cool**

Why do visco-foam and air chamber mattresses come up short in resistance to heat transfer testing? "There are several reasons why innerspring mattresses offer superior evaporative and surface cooling qualities," says Browning. "You have to consider the construction and active air exchange."

The laws of physics state that air movement across or within a substance will evaporate moisture. As a substance increases in density, it becomes less breathable and allows for proportionally less air exchange. Applied to mattress physics, the less dense a mattress's construction, the more active air flow and evaporative properties it allows.

Innerspring mattresses rely on the advanced engineering of Active Support Technology™ to provide comfort and support, unlike visco-foam beds that rely entirely of foams and fibers that can decrease healthy air flow.

And while air-chamber mattresses depend on the flow of air to achieve personal sleep customization, the air is trapped in chambers and is not allowed to flow freely and provide the air exchange necessary to promote evaporative cooling.

### **Stay Cool, Stay Asleep**

Why is sleeping cool important for healthy sleep? Sleep experts widely agree that body temperature affects the circadian rhythm of sleep and that optimal sleep occurs when body temperature is at its lowest level of the day.

[The Netherlands Institute for Neuroscience](#) in Amsterdam reports that sleep regulation has an evolutionary sensitivity not only to light-dark cycles, but also to warm-cold cycles. Sleep coincides with low rather than high core temperature and causes decrease of core body temperature. Simply put, whenever your body temperature begins to fall, you will feel tired, lethargic, and drowsy. Whenever your body temperature rises, you will feel more energetic, alert and be able to focus better.

A report titled [Help Me Get Some Sleep](#) from the Oregon Health and Science University (OHSU) recommends that people avoid exercise for three to six hours before sleep because exercise raises body temperature for several hours after completion. The elevation of body temperature makes sleep difficult since the deepest sleep occurs when the body's temperature is at its lowest level of the day.

[The Division of Sleep Medicine at Harvard Medical School](#) also reports that body temperature falls to its lowest point during the all-important REM (rapid eye movement) sleep phase, and that REM propensity increases when body temperature is at its lowest point in the evening.

“Anecdotally, we have always known that innerspring mattresses are the superior sleep surface for healthy sleep, and frequently overhear consumers’ complaints that visco-foam and air chamber mattresses sleep too hot,” said Quinn. “These test results only confirm what we’ve all known for years: innerspring mattresses provide and maintain a cooler and more comfortable sleep environment than non-innerspring surfaces.”

*\*Indicates plus or minus two percentage points for margin of error*

*\*\*To ensure test objectivity, scientists at Leggett asked a human subject to rest on each sleep surface for one hour in room with a maintained temperature of 68 degrees Fahrenheit. After one hour, the subject rolled out of bed and testers immediately begin capturing thermal images and temperatures changes on a 15 second interval.*