



naturepedic®
organic mattresses

Taking a Precautionary Approach to Chemicals in Products

BY CLEAN PRODUCTION ACTION

In 2005, in anticipation of his first grandchild, Barry Cik went shopping for a crib mattress. An environmental engineer specializing in chemistry, Cik was dismayed to find that most bedding manufacturers used harmful chemicals and materials in both the manufacturing process and final product. “I knew all about vinyl/PVC, polyurethane foam, and the various chemicals contained in them, and there was no way I was going to put my grandchild to sleep within a few inches of these chemicals.” Available organic crib mattresses were not waterproof and so also unacceptable: “... if the mattress were to get wet, it would grow mold and fungus without any effective way to clean it.”

Mission Driven

Working with his two sons, Cik founded Naturepedic to develop a non-toxic, organic, waterproof crib mattress. They set a goal of creating a crib mattress that was functionally equivalent or superior to existing mattresses using the safest materials possible. Reaching this goal required the Ciks to redesign every major element of conventional crib mattresses. Specifically, the Ciks established three design requirements:

- **Meet flammability requirements without the use of chemical flame retardants:** All mattresses in the United States are required to meet federal flammability standards. Most mattress manufacturers use chemical flame retardants to meet these standards. While chemical flame retardants vary in toxicity, many of those most commonly used are known to be hazardous.
- **Avoid the use of polyurethane foam:** Polyurethane foam has been widely



used by mattress manufacturers since the 1960s. Highly flammable, polyurethane foam may contain toxic chemicals including volatile organic compounds and toxic flame retardants.

- **Waterproof without the use of vinyl or perfluorinated chemicals:** The manufacture of vinyl produces toxic pollutants, exposing workers and neighboring communities to high hazard chemicals. The use of vinyl in mattress covers also requires the use of chemical softeners to make the vinyl pliant. The softeners are themselves hazardous and leach out of the vinyl over time, exposing those in close contact.

Perfluorinated chemicals are used in a wide variety of applications (clothing, food packaging, carpeting, etc.) to repel water and grease. As a group, perfluorinated chemicals vary in structure, but they are all either persistent in the

environment or degrade into persistent compounds. Large data gaps exist on the hazard of specific structures, though some are well-established to be highly toxic.

Benign by Design

The Ciks spent a year developing and testing materials for a new crib mattress. To evaluate chemical hazard, they used the GreenScreen for Safer Chemicals, an assessment tool that examines 18 endpoints and assigns an overall hazard score. To evaluate plastics, they used the Plastics Scorecard, which scores polymers on their progress to safer chemicals in the core steps of polymer manufacturing and plastic products on their chemical footprint. Fundamental to the Ciks' approach was the Precautionary Principle; if evidence existed indicating a chemical or material was unsafe, they would avoid using it, even if that evidence was not conclusive.

Innovation and Solutions

As a result of their research and testing, the Ciks were able to develop a crib mattress that met their requirements. Their first crib mattress used organic cotton fill with metal coils for support, covered with woven organic cotton, and coated by waterproof polyethylene that met US FDA's food contact standards. The Ciks opened a manufacturing facility in Ohio, employing local Amish craftsmen, and began production.

To address the needs of growing children, they developed a larger, waterproof children's model using the same materials. To make a lighter weight crib mattress, they developed one from polyethylene foam with the same cover material.

From crib and children's mattresses, Naturepedic expanded to adult mattresses. Here, the goal was to develop a mattress without polyurethane foam that met flame retardant standards, but without the use of flame retardant chemicals at any level. After a period of engineering research, the company accomplished its goal with a mattress using a combination of organic latex foam, organic cotton fill, metal coils, organic wool batting, and plant-based PLA batting. The combination of components can be customized by the consumer.

Beyond the design of products manufactured at its own facility, Naturepedic also looks upstream at the manufacturing processes and materials used through its supply chain. Fabrics used by Naturepedic are certified to the Global Organic Textile Standard, which further eliminates the use of toxic dyes and processing chemicals. For example, fabrics have never been treated with chlorine bleach, common in conventional cotton processing. Naturepedic and its products also meet the OCS 100 Organic Content Standard, which ensures the proper tracking of organic content from its source to the final product.



Growing Market

Naturepedic has found that the most important common factors among its customers are education and awareness of potential chemical hazard. While their mattresses are more expensive than conventional ones, Naturepedic's customers cut across socio-economic lines. Online grassroots efforts have been critical to their success. Around the same time the Ciks were bringing their crib mattress to market, online communities of parents, led by "mommy bloggers," mothers writing online columns on children's issues, became concerned about bisphenol-A (BPA), a toxic chemical used as a softener in vinyl. This initial concern led to broader interest in risks posed by chemicals in children's products, creating a strong, vocal market for Naturepedic's products. As the consumer base informed about chemical risk has grown, so has Naturepedic's market.

Commitment to Continuous Improvement

The design and portfolio of Naturepedic's products continues to evolve as the company's engineers search for and test better materials and construction. For example, the company has begun sourcing polyethylene made from non-GMO sugarcane, shifting from a reliance on petrochemicals to a renewable resource. It continues to look for ways to make even safer and healthier non-toxic mattresses using only highly vetted materials. The engineers at the manufacturing facility in Ohio are "constantly tinkering," according to one employee, working to rethink, refine, and improve the design of the company's mattresses and bedding to more closely align with its goals of using the safest materials possible.