Detox Your Sleep

Toxic Chemicals in Bedding, Safer Alternatives & Certified Products for Healthier Sleep

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Overview

We spend approximately eight hours a night sleeping—totaling almost one-third of our lives—spent in bed. Babies spend almost two thirds of their time sleeping.[1] As we sleep, our bodies heal, rest, and rejuvenate. However, our mattresses and bedding can contain chemicals known to cause negative health effects, potentially limiting the body's innate ability to preserve our health.

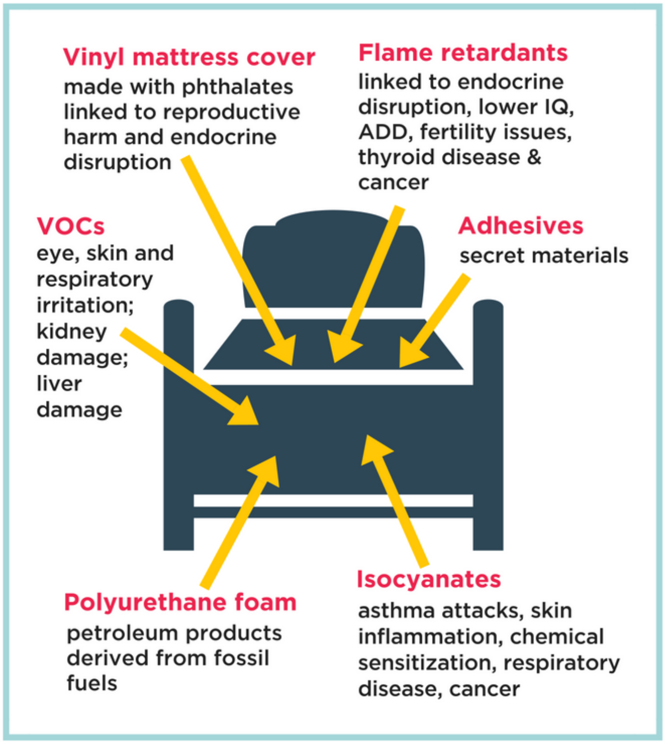
At Made Safe, we believe that products should be made from safe materials. Materials that, according to the best available science, are deemed safe to use—even while we sleep.

So let's start with the heart of our sleep: the mattress. Purchasing a mattress can offer a dizzying array of choices: pillow top, memory foam, spring coils, numbers for firmness. Most people simply go for comfort and cost. But there's more to mattresses: what actually makes up that foam, or that firmness, and everything else inside? And is it safe for our health?

On the whole, the mattress industry offers little transparency into the materials and processes used in manufacturing conventional mattresses. Mattresses do bear labels, but they often contain jargon and don't list every material and chemical used in the project. We believe that shoppers deserve to be informed and empowered to make decisions based on knowing what's inside the stuff we use.

This report offers the first-ever big-picture detail of what a mattress is actually made of. It reveals common toxic chemicals in the materials that make up bedding, including adult mattresses, crib mattresses, sheets, pillows, and more; it covers the impact of those chemicals to our health and ecosystems, as well as safer alternatives. The goal is to provide facts to help people make the best decisions about what kind of mattress is right for them and their families.

Finally, shoppers can make informed choices about what they sleep on.



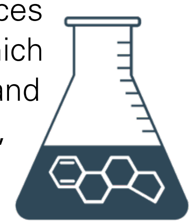
How Our Bodies Heal & Detox During Sleep

Our Brains

One study from the University of Rochester Medical Center conducted on mice suggests that the brain has a method for removing toxic waste that actually ramps up during sleep.[2] Essentially, they discovered that the space between brain cells expands by about 60 percent during sleep, which allows the glymphatic system (which acts much like the lymphatic system but is unique to the brain) to pump cerebral spinal fluid through the brain and flush the waste from the brain back into the body's circulatory system, where it reaches the liver and is eventually eliminated.[3] This research suggests that humans also have a "garbage removal system" in our brains that removes harmful waste products; this could potentially be the purpose of sleep.

Our Hormones

When we sleep, our hormone system is in an anabolic state which allows for energy conservation, repair, and growth processes.[4] The body produces human growth hormone, which promotes the maintenance and repair of muscles and bones, renewing tissues faster than while we're awake.[5,6]



Our Skin

The skin is made partially of collagen, a protein that is abundantly found in the human body, that gives our skin (and other connective tissues like bone and tendons) strength and structure. As we sleep, our body's immune function is restored, an effect which in turn can positively affect collagen production.[7] Sleep deprivation may also affect our skin's homeostasis, or balanced state, and may impair the skin's natural barrier, which protects us.[8] Sleep deprivation may even cause skin diseases and increase our chances of systemic bacterial infections.[9]

Sleep's abundant positive effects on the human body make the importance of a healthy sleep environment that much more imperative. By choosing healthier materials, we can lower our body's levels of toxic chemicals, potentially eliminating interference with healthy and restorative sleep.

What's Inside the Mattress: Polyurethane Foam

There are many kinds of mattresses. The most common types are made of memory foam (or viscoelastic foam), flexible polyurethane foam, coils, or combinations of these materials.

Flexible polyurethane foam and memory foam are both polyurethane foams, but each type contains different additives at varying amounts to achieve the desired density, firmness, and rate at which the foam returns to its original position.[10]

The polyurethane foam that makes up most mattresses is made by mixing polyols with water and isocyanates, the primary building blocks of foam.[11] The process also uses other chemical catalysts, surfactants, fillers, and flame retardant chemicals.[12] Some manufacturers add auxiliary blowing agents, which influence the foam's softness and density.[13] Most, if not all, of the ingredients used in making polyurethane foam are petroleum products, meaning they are derived from fossil fuels. All of these ingredients are mixed together in a mold and react quickly, rising like a loaf of bread.

Ingredients in polyurethane foam, which makes up most mattresses, are petroleum products derived from fossil fuels.

Flame Retardants

Flame retardants are a group of chemicals commonly added to polyurethane foam. Because polyurethane foam is made from materials derived from fossil fuels, and therefore highly combustible,[14] some industry officials assert that flame retardant chemicals lower the risk of flammability. However, these chemicals are of significant concern to our health, and might not actually give us more time to escape in a fire.[15, 16]

Some of these toxic flame retardants have been measured in the blood stream,[17] urine[18,19] and on people's hands[20] in biomonitoring studies, which measure the actual level of a substance within people's bodies.

Several scientific studies have linked flame retardants to many health impacts including various effects of endocrine disruption,[21,22,23,24] lower IQ,[25,26] hyperactivity,[27] altered sexual development,[28,29] altered neurodevelopment,[30,31,32] other adverse pregnancy outcomes,[33] fertility issues,[34,35] thyroid dysfunction,[36] and cancer.[37,38] Some flame retardants can accumulate in the placenta, which could adversely impact a developing fetus.[39]

Mothers can transfer flame retardants to their babies through breast milk.[40] In fact, breast milk can be one of the largest sources of flame retardants in a human's lifetime.[41] Exposure to toxic substances during critical windows of development can have long-lasting impacts on children's systems. For example, one study that measured certain flame retardant metabolites, the products of metabolizing a substance in the body, in pregnant women found adverse impacts on intelligence and working memory in children when they were assessed at age seven.[42]

Household dust is another common route of exposure to flame retardant chemicals.[43,44,45] Because some flame retardants are not heavily bound to the products they're used in, flame retardants can migrate from a product, like a mattress, and land in

household dust.[46] From there, they're inhaled, consumed, and then stored in our bodies.[47] Flame retardant chemicals have been measured in dryer lint; this is likely from household dust accumulating in clothing[48] or children's pajamas.

Children are especially at risk for exposure to flame retardant chemicals through contact with household dust. Children play, nap, and sit on the floor, and also handle objects like toys that have touched the floor. Children often place their hands in their mouth; this is a common route of exposure to flame retardants.[49] Because their bodies are still developing, children are considered a population vulnerable to chemical exposure that can disrupt various systems.[50] This ongoing development makes children particularly susceptible to flame retardant chemicals.

Not only are some flame retardants harmful to human health, but they also impact animals and the environment. Flame retardants have been found in the tissues of polar bears,[51] sea otters,[52] killer whales,[53] and more. Because household dust accumulates in clothing, flame retardants have been measured in laundry wastewater effluent. This effluent water can eventually reach natural water sources where aquatic life lives. This is an issue because some flame retardants are known to be toxic to aquatic life.[54] Many flame retardants can be persistent (meaning they stick around) in the environment,[55,56,57,58] can bioaccumulate (accumulate in organisms' tissues),[59,60] and can biomagnify (accumulate progressively in organisms' tissues moving up the food chain).[61,62]

Flame retardants are linked to endocrine disruption, lower IQ, hyperactivity, altered sexual development, fertility issues, thyroid dysfunction, and cancer.

Polybrominated Diphenyl Ethers

Until 2004, Polybrominated diphenyl ethers (PBDEs) were the most commonly-used type of flame retardants,[63] but because of the link between PBDE exposure and hormone disruption,[64] PBDEs were voluntarily and permanently phased out by the sole manufacturer in the United States.[65,66] As a result of the ban, researchers found lower levels of PBDEs in people studied.[67,68]

Many older products containing PBDEs from pre-phase-out are still in use by the general public.[69] Regardless of the ban, PBDEs are still detected in the blood, albeit at much lower levels.[70] However, in pregnant women, these detected levels may impact thyroid function.[71]

The industry has replaced PBDEs with other flame retardants, but toxicological information on these alternatives—and even the identities of these alternative flame retardants—are not readily available.[72] Flame retardant formulations are often proprietary and considered trade secrets, which means that many major mattress companies will not reveal what flame retardant chemicals they use.[73] Only recently have researchers began identifying some of the compounds used within flame retardants.[74]

Organophosphorus and Halogenated Flame Retardants

Although many flame retardant formulations are proprietary, we do know that of the flame retardants currently in use, two types are of primary concern:[75]

- Organophosphorus flame retardants: those containing phosphorous bonded to carbon.[76]
- Halogenated flame retardants:[77] those containing carbon bonded to a halogen (chlorine, bromine, iodine, or fluorine).[78] This class includes flame retardants sometimes referred to as brominated, chlorinated, or organohalogen flame retardants (OFRs).[79] (PBDEs are also halogenated flame retardants.)[80]

Both categories are suspected to cause adverse effects on human health and environment.[81]

In July of 2015, a number of petitioners including medical, consumer, science, fire, and community organizations, submitted a petition to the U.S. Consumer Product Safety Commission (CPSC) to ban halogenated flame retardants (OFRs) in certain consumer products, including some childcare articles, upholstered furniture, mattresses, and mattress pads.[82]

Flame retardant formulations are often proprietary so companies can legally keep them secret.

In 2017, the Commission voted to grant the petition; however, it was granted as a non-binding recommendation, as opposed to a legal standard.[83,84,85] This means that although it's a recommendation, companies are not yet required to forego OFRs in mattresses and other consumer products, until the board can adequately assesses them.[86,87]

The CPSC is required to assess the health risks of OFRs before instituting a ban. The Commission is currently consulting the National Academy of Sciences on the best course of action to assess OFRs.[88] Until the assessment is complete, OFRs are allowed for use in consumer products.[89]

Firemaster 550

Firemaster 550, a common replacement for PBDEs,[90] is an organophosphorus and brominated flame retardant mixture.[91,92] The components of Firemaster 550 are commonly found in household dust,[93,94,95] and there are several associated and potential health effects associated with the chemicals.

Perinatal exposure to Firemaster 550 can cause endocrine disruption at levels much lower than previously reported,[96] including those reported by the manufacturer.[97] In animals, Firemaster 550 is a potential obesogen and contributor to metabolic syndrome,[98] may impact growth[99] and neurodevelopment,[100,101] and is associated with early onset puberty in the pups of female rats exposed to it.[102]

Firemaster 550 flame retardant is made up of several compounds:[103,104]

- TBB (2-ethylhexyl-2,3,4,5-tetrabromobenzoate): shown to accumulate in tissues of both the female rats and their pups.[105]
- TBPH ((2-ethylhexyl) tetrabromophthalate): linked to potential alterations in fetal testis development, thyroid dysfunction, liver dysfunction, and obesity.[106] TBPH is structurally similar to the phthalate DEHP, which is a male reproductive toxicant in rodents.[107]
- TPP (triphenyl phosphate): While there is little information about the toxicological potential of this individual component, Firemaster 550 as a whole may be an endocrine disruptor, obesogen, and developmental toxin.[108]
- ITPs (isopropylated triphenylphosphate isomers)[109]: linked to adverse health effects in zebra fish;[110] several ITPs are trade secrets.[111] Despite widespread exposure to these compounds in the U.S.,[112] there are large data gaps in research.[113] This has been acknowledged by the EPA who prioritized safety evaluations of ITPs in 2016.[114]

The chemicals of Firemaster 550 are commonly found in baby mattresses, even though they're potential obesogens and are associated with early onset puberty.

Despite their potential and associated health effects, the chemicals of Firemaster 550 were commonly detected in baby products purchased between 2000 and 2010.[115] However, if after proper assessment of OFRs, the CPSC recommendation is granted into a requirement, Firemaster 550 will be banned from use in select consumer products, including mattresses for adults and infants.

This legislation would be a step in the right direction, but might be too slow to catch up with a fast-moving flame retardant industry. There has been little research on identifying the flame retardants used in baby mattresses and products produced after 2011, and with new flame retardants continually hitting the market, it's impossible to know which flame retardants might be used in today's baby mattresses without laboratory research or industry disclosure.

Chlorinated Tris

Chlorinated tris is an organophosphorus flame retardant that was used in children's pajamas until the 1970s when it was banned for associated adverse health effects.[116] However, despite the chemical's ban in pajamas, it is still used in mattresses today. Chlorinated tris, a known carcinogen,[117] is used in baby mattresses[118] and is often used as a replacement flame retardant for PBDEs. Forms of chlorinated tris include TDCPP, TCEP, TCPP, and TCPP.[119]

Other Flame Retardants

In addition to the flame retardants that have been identified as currently in use, companies are constantly discovering, synthesizing, and using new flame retardants. However, often the chemical structure and formulation is proprietary, leading to issues in transparency and difficultly obtaining toxicological data. Because flame retardants formulations can be considered trade secrets, many major mattress companies will not reveal which chemicals they use. Other flame retardants, some of which are organophosphorus or halogenated, that may be used in polyurethane foam include, but aren't limited to:

- Emerald Innovation NH-1
- Firemaster 600
- Firemaster BZ-54
- FR 513
- FR 1410
- Fyrol-2 / Fyrol-38
- Fyrol A300TB
- Fyrol A710
- Fyrol HF-4
- Fyrol HF-5
- Fyrol PCF / Fyrol PCF-LO
- Melamine
- Reofos NHP
- U_POFR
- V6

Data gaps from proprietary information are exacerbated by the fact that many flame retardant chemicals are used in combination.[120] Not only are the individual chemicals untested, the combinations are untested, resulting in even greater gaps in research on human and environmental health.

Flammability of Foam and Flame Retardants

Mattresses must meet certain flammability standards set by the U.S. federal government; these standards require both a smolder test and an open-flame test. A smolder test is meant to simulate a fire ignited by a cigarette,[121] whereas an open-flame test is meant to simulate a fire ignited by a flame,[122] like a candle. Crib mattress flammability is not regulated under specific federal regulation; the same standards as adult mattresses apply.[123]

The smolder test mandated by 16 C.F.R. § 1632 in 1973 requires mattresses and mattress pads to pass a smolder test. It requires that charring doesn't spread beyond two inches from where a faux cigarette is applied to the material.[124]

In 2007, 16 C.F.R. § 1633 was instituted as a complementary requirement to existing § 1632. The new standard requires mattresses, foundations, and mattress-foundation sets to undergo a 30-minute open-flame test,[125] in addition to the existing smolder test.

Because polyurethane foam is highly flammable, the addition of flame retardant chemicals is necessary to meet mattress flammability standards. Natural materials are generally less flammable than polyurethane foam, so they don't require extra flame retardants.

Open flame tests measure how much heat will be released when a material is ignited. This is called heat release rate. The higher a material's heat release rate, the higher that material's energy content, and propensity to self-propagate a fire.[126] Heat release also measures the size of a fire.[127]

A material's heat release rate also partially determines flashover.[128] Flashover is when a material ignites other materials within the space by the original fire's radiant heat.[129] After flashover occurs, it's essentially impossible to exit a room because it's entirely ignited.[130]

The goal of § 1633 is to delay flashover,[131] by capping a material's heat release rate[132] at both fifteen and thirty minutes.[133] Flashover is a concern because about two-thirds of fatalities from mattress fires are flashover fires that originate in the mattress.[134]

Because polyurethane foam is highly flammable[135,136] and has a high release rate, the addition of flame retardant chemicals is necessary to meet mattress flammability standards.[137] In a fire, polyurethane foam often liquefies, drips, and pools under the product. The pool ignites from the heat of the foam fire, which can cause the fire to grow.[138]

Natural fabrics have a lower heat release and are generally less flammable than polyurethane foam. In a study measuring the time to the point of flashover of foam-based furniture versus cotton batting and cotton fabric-based furniture, foam's flashover was at 4 minutes.[139] Cotton-based furniture's flashover was not until 34 minutes.[140] The application of fire retardants improved foam-based's flashover, but cotton's flashover was still approximately two times longer.[141] Natural fabrics do not often liquify and pool like polyurethane foam.

Are Flame Retardants Effective?

In addition to the potential adverse health and environmental effects of flame retardants, their efficacy is debated. Flame retardants may not be effective in preventing fire or in providing significantly more time for an exit in the event of a fire.[142] However, they're ubiquitous in foam-based products because foam is inherently very flammable.[143,144]

Two studies are often referred to regarding flame retardant efficacy. One is misrepresented.[145] The other's conclusions are extrapolated incorrectly.[146,147] Other studies are scarce.

In the first study, the researchers used amounts of flame retardant chemicals at much higher concentrations than would be used in normal products. [148] The study's author, fire engineer Vytenis Babrauskas, criticized the misuse of his research.[149] The second study's data was extrapolated incorrectly, resulting in the misuse of information.[150] This means that these often-cited studies are not reliable evidence of flame retardant efficacy.

In a fabric-covered foam product, once the underlying foam has ignited from the fabric, flame retardant chemicals are ineffective in mitigating the intensity of the spread of the fire.[151,152] In flammability testing, flame retardants applied directly to foam showed no significant difference in flammability safety from foam without flame retardants applied directly.[153]

Flame retardants may not be effective in preventing fire-related deaths, as some flame retardant formulations cause an increase in carbon monoxide, smoke, and soot.[154] Smoke inhalation alone and coupled with burns are the leading causes of death in fires.[155]

Finally, occupationally-related cancer in firemen has become a growing concern,[156,157,158,159] as firefighters experience cancer at elevated rates.[160] Cancer is now the leading cause of death in firefighters.[161] Some organizations and researchers attribute exposure to synthetic chemicals in fires as a potential association with occupationally-related cancer in firemen,[162,163] including flame retardant chemicals specifically.

Isocyanates

Isocyanates are a primary building block of foam[164]; when they're mixed with water and polyols, a group of surfactants, foam is formed. Toluene diisocyanate (TDI) is the most common isocyanate used in this process; methylene diphenyl diisocynate (MDI) is also used.[165] Both TDI and MDI are hydrocarbon compounds, and are made primarily from crude oil or natural gas.[166]

Exposure can cause asthma attacks, irritation to mucous membranes, skin inflammation, and chemical sensitization.[167] Isocyanates can also cause respiratory disease, even at low levels of exposure.[168] One isocyanate, TDI, is a known carcinogen.[169] Isocyanates are an occupational chemical of concern.[170]

According to the foam industry, mattresses are "cured" during manufacturing, and so isocyanates are "inert" and therefore unable to migrate or off-gas from the product, once the mattress is manufactured. However, such industry claims are often made with few supporting reference materials.[171]

More isocyanates are added than necessary for the chemical reaction that creates foam.[172] This means that not all of the isocyanates are used up in the reaction, and residual, unreacted isocyanates may be present in polyurethane foam.

Adding excess isocyanates during manufacture could cause the slow release of isocyanates, resulting in the "exposure of the general population to low levels" of those chemicals from finished polyurethane products like foam bedding in which traces of unreacted TDI remain.[173]

Studies support this, showing that there are residual amounts of unreacted isocyanates like TDI and MDI in polyurethane products.[174,175] One study found free unreacted isocyanates in samples up to 31 years old.[176] Another found unreacted isocyanates in 13 polyurethane foam samples, likely at greater levels in newer mattresses than in older, used mattresses.[177]

Even though isocyanates can be present in polyurethane foam, the industry maintains that this exposure is harmless. One study conducted primarily by industry scientists concluded that there is no risk of harmful health effects resulting from sleeping on polyurethane mattresses. [178] But according to OEHHA, "chronic exposure to TDI may occur via inhalation and dermal contact with polyurethane products"[179] and this "chronic exposure to relatively low levels of TDI may result in allergic sensitization."[180]

While research is inconclusive as to whether isocyanates pose a high risk to consumers of polyurethane foam products, it remains a high risk to the workers who make our mattresses,[181] and could pose unforeseen health threats to consumers.

Isocyanates are linked to asthma attacks, irritation to mucous membranes, skin inflammation, chemical sensitization, respiratory disease, and cancer.

Volatile Organic Compounds

Researchers have identified multiple volatile organic chemicals (VOCs) that are capable of emitting from mattresses and mattress covers. VOCs are organic chemicals that can easily become a gas; these gases are usually invisible to the eye and are very common in indoor environments like homes, offices, schools and childcare facilities.[182] Many VOCs are known to be harmful to human health.[183]

Polyurethane foam is a source of VOC emissions in the home, but it also has the capability to absorb VOCs from the surrounding environment.[184] For example, because some paints are high in VOCs, painting a room can result in high levels of VOCs in indoor air; polyurethane foam can absorb the VOCs off-gassing from the paint.[185] This absorption can then be reversed. When VOC concentrations in the room decrease, VOCs can desorb from the polyurethane foam back into the indoor air.[186] This means that polyurethane foam plays a role in the quality of our indoor air.[187]

Multiple VOC emissions have been identified in mattresses, including a chemical manufactured with phosgene, a poisonous gas originally used as a chemical weapon in WWI that was responsible for the majority of deaths.

Because polyurethane foam can absorb VOCs from the surrounding environment, researchers have noted that some VOCs that have been detected off-gassing from foam samples can be either from the polyurethane foam itself or those that have been absorbed from the surrounding environment.[188]

One study found that mattress barriers (like some baby mattress covers) can act as somewhat of a barrier from VOC mattress emissions. However, adult mattresses don't usually have waterproof covers like baby mattress, which means that adults could be more readily exposed to VOCs emitted from polyurethane foam.[189]

Multiple VOC emissions have been identified in mattresses. One study identified the VOCs 1,2-dichlorobenze and 1,4 dichlorobenzene emissions from polyurethane foam samples.[190] Both of these chemicals are used in the manufacture of isocyanates during the phosgenation process, in which an amine is treated with phosgene,[191] a poisonous gas originally used as a chemical weapon of war in WWI that was responsible for the majority of deaths.[192] Phosgene is used widely in chemical manufacturing today.[193]

1-2 chloro-2-propanol, 2-chloro-1-propanol and 1,2-dichloropropane also can off-gas from mattress samples.[194] In animal studies, both short-term and long-term exposure at low levels of 1,2-dichloropropane caused damage to the liver, kidneys and the respiratory system.[195] In humans, it can cause eye, skin and respiratory irritation; kidney damage; and liver damage.[196]

Phenol, which can be used in the manufacturing process of foam,[197] has been identified in mattress emissions.[198,199] Other identified compounds include: 2-ethyl-hexanoic acid, which can be used in manufacturing;[200] D-limonene, which can be used as a solvent, wetting agent or fragrance in manufacturing[201]; and linalool, a fragrance ingredient.[202]

In one study, researchers found acetaldehyde and formaldehyde emitted at higher rates than other VOCs.[203] However, because of its small sample size, further research is necessary to determine if these are common emissions in many polyurethane mattresses.

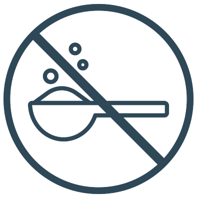
Other Additives

There are other common additives in polyurethane foam:

- Urethane grade methylene chloride: can cause skin and eye irritation and is readily absorbed through the lungs.[204,205]
- Acetone: skin and eye irritant;[206] linked to respiratory tract irritation, dizziness and weakness in workers.[207, 208]
- Liquid carbon dioxide: can pose a risk of frostbite in an occupational setting if not handled properly.[209, 210] This additive is gaining popularity in the industry.[211]

There is limited available research on these chemicals' potential to off-gas from mattresses or if coming into direct contact with a mattress manufactured using these chemicals poses health risks.

- Phthalates: Some additives—including dyes, fillers, and stabilizers—are phthalates, a class of plasticizers, and phthalate alternatives.[212] Like VOCs, phthalates can be absorbed, stored, and desorbed by foam.[213] More on the health effects of these chemicals can be found in the section entitled, "What's Inside the Mattress: Waterproof Baby Mattresses."



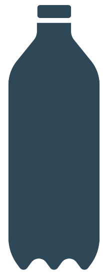
Polyester

Polyester is often used as ticking, which is the top-most finely woven protective layer of the mattress. It is also sometimes used to wrap metal coils. The most common fiber used to make polyester fabric is poly(ethylene terephthalate) or PET.[214] This is the same material used for soda bottles.[215]

In the polyester production process, antimony trioxide is commonly used as a catalyst.[216,217] Antimony trioxide is classified as possibly carcinogenic,[218] and some forms are potentially endocrine disrupting chemicals.[219]

Researchers have found antimony at detectable levels in polyester textiles.[220,221,222] The residue could be from petroleum, from which polyester is derived,[223] but more likely is from the catalysts used during manufacturing, an overwhelming majority of which use antimony.[224,225]

Researchers have found that even at low temperatures, antimony can migrate from the fabric to saliva[226] and sweat.[227,228] One study concluded that exposure to antimony through polyester could result in potential health impacts for groups who wear polyester textiles often and for prolonged periods of time.[229] Given that we sleep for approximately eight hours every night, it *may* be possible that this is prolonged and frequent enough exposure to experience associated health impacts from antimony exposure. However, there is no research on this subject.



In addition to antimony, a number of researchers have confirmed that estrogenic compounds are capable of migrating from PET water bottles into its contents.[230,231,232] However, there is no research on the capability of endocrine disrupting compounds' capability to migrate from polyester PET fabrics to the user's skin.

Making polyester is an energy-intensive process, often using far more energy than manufacturing other textiles like conventional and organic hemp and cotton.[233] In the production process, emissions can severely contaminate water sources with a number of pollutants like dissolved particulate matter, ammonia, and acids.[234] Antimony trioxide can also leach out into wastewater, contaminating surrounding waters,[235] potentially causing toxic impacts to aquatic life.[236]

Because we don't yet understand how polyester might be impacting humans in the sleep environment and environmental impacts are already documented, Made Safe encourages exercising the precautionary principle and choosing safer fabrics like organically grown and safely produced wool and cotton.

Polyester, often used as ticking, is made of the same chemicals used for soda bottles – chemicals which are linked to cancer and hormone disruption.

Adhesives

The research on adhesives used in mattress construction is limited. Adhesive formulations are often proprietary and industry information contains few details about what actually goes into mattress glue. Because this information is unavailable, it is difficult to determine what adhesive ingredients people might be exposed to from bedding, and what health effects might result. What we do know about adhesives is summarized in this section.

After 1,1,1-trichloroethane (TCA), the primary adhesive solvent used by the polyurethane industry, was banned in the 1990s because it depletes the ozone layer, methylene chloride and n-propyl bromide (nPB) took TCA's place.[237] Methylene chloride is a suspected carcinogen,[238] and is implicated in the deaths of dozens of furniture workers.[239]

As methylene chloride was phased out, nPB became a preferred choice for many foam manufacturers,[240] though it is unclear to what extent this dangerous adhesive is used in polyurethane foam mattresses specifically.[241]

nPB causes irritation of mucous membranes like the eyes and respiratory tract.[242] The chemical can cause neurological effects like dizziness, confusion, and headaches.[243] The National Toxicology Program found clear evidence of carcinogenicity in female rats and male mice due to exposure to nPB.[244] The body can absorb nPB via contact with the skin and by inhalation.[245]

Despite being an occupational hazard, there is no current standard set by OSHA for nPB exposure.[246]

Other current mattress adhesives are often liquids composed of adhesive solids suspended in a solvent or in water.[247] Hot melt and water-based adhesives are two of the most popular forms of adhesives currently used in the mattress industry.[248] Hot melt adhesives are composed entirely of solids that are heated to high temperatures, and then applied to the foam. As the solids cool, the surfaces adhere.[249] As of 2000, the industry favored hot melt adhesives.[250] However, hot melts do not often work well with viscoelastic foams like memory foam.[251]

Water-based adhesives are somewhat misleading, as the term simply denotes that the base of the adhesive is water. In these adhesives, water is used instead of solvents, which are traditionally used as adhesive bases, but solvents can be undesirable because they can volatilize easily, dispersing gaseous molecules, potentially contaminating the workplace and exposing workers.

Just because the adhesive is water-based does not mean it is safe. The suspended adhesive itself can be made up of a number of chemicals or formulations, most of which are proprietary, which makes it impossible to know what kind of adhesive compounds we are exposed to through foam mattresses.

In addition to hot melts and water-based adhesives, some companies may use acetone adhesives.[252] Several other chemicals have been reported to be used in mattress adhesives including acrylate resins, chloroform, carbon tetrachloride, cyanide, dioxins, furans, polyvinyl acetate, and more. Formaldehyde, a carcinogen,[253,254] has also been reported as a mattress adhesive.[255] However, there is no information available regarding to what extent any of these compounds are currently used in the mattress industry.

What's Inside the Mattress: Waterproof Baby Mattresses

Babies spend more of their lives asleep than adults. This means their sleep environments are particularly important factors in babies' exposure to gaseous indoor air pollutants, both in the short-term and in the long-term.[256] Babies also inhale more air than adults relative to body mass,[257] making them more vulnerable to gaseous chemicals.

Because the developing systems of infants are vulnerable to chemical exposure,[258,259,260] Made Safe believes that a healthy sleep environment is crucial for our babies. This section unpacks what's inside waterproof baby mattresses made from vinyl in order to help you make the safest mattress choice for your baby.

In addition to the chemicals overviewed in the previous section – flame retardants, isocyanates, and others – waterproof baby mattresses have other specific concerns, including phthalates and additional VOCs.

To make them waterproof and antibacterial, baby mattresses often have a soft vinyl cover, or a cover is purchased to add to a mattress.[261] Vinyl is the same material as PVC; these terms are used interchangeably.

Normally, vinyl is a hard plastic, so in order to make it soft, manufacturers add plasticizers, which are a group of chemical compounds designed to make plastic softer and more flexible. Phthalates, a group of chemicals, are some of the most commonly used plasticizing chemicals.[262,263]

Waterproof vinyl can off-gas plasticizing phthalates and harmful VOCs. Off-gassing is a process in which invisible gasses are released from a source. Sometimes you can smell them; often you can't. These chemicals are released directly into the baby's sleep environment.

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Waterproof vinyl can off-gas plasticizing phthalates and harmful VOCs directly into the baby's sleep environment.

VOCs

In addition to the previous points on VOCs, a number have been detected off-gassing from polyurethane foam and vinyl mattress covers.

Specific to children, exposure to VOCs has been linked to the development or worsening of asthma in some kids,[264, 265] poor respiratory health in infants,[266] and increased risk of pulmonary infections.[267]

One study found evidence that crib mattress covers may act as a barrier to some volatile organic compounds (VOCs) originating in the soft foam layer underneath.[268] However, when the cover cracks, this offers a more direct escape route for VOCs originating in the polyurethane foam. In addition, VOCs don't just come from polyurethane foam; mattress covers are a significant source of VOCs. In fact, despite their ability to block some VOCs, mattress covers may be more of a significant source of VOCs than the mattress itself.[269]

Mice exposed to waterproof vinyl crib mattress covers experienced acute respiratory tract toxicity.[270] These effects were worsened when exposed a second time.[271]

Researchers found that some mattress covers emitted toluene, xylenes, trichloroethylene, isopropylbenzene, ethyl benzene, and phenol.[272] Other VOCs detected from crib mattresses in studies in which both the cover and polyurethane foam were tested include: phenol, 2-ethyl-haxanoic acid, 3-methyl-1-heptanol, D-limonene, neodecanoic acid and linalool.[273]

For more information on chemicals that have the ability to off-gas from polyurethane foam, see the "Volatile Organic Compounds" section earlier in this report.

Phthalates

Plasticizing phthalates, which are semi-volatile organic compounds (SVOCs), also have the capability to off-gas from polyurethane foam and vinyl mattress covers. Mattress covers may be a more significant source of SVOCs like phthalates than foam.[274] Because phthalates are not tightly bound within the vinyl, they can migrate out of the product into the sleep environment.[275,276] Phthalates are "ubiquitous and among the most abundant SVOCs in indoor environments," as a result of off-gassing from consumer products.[277]

In 2009, because of their documented negative health impacts and widespread use, some phthalates were banned for use in "childcare articles,"[278] which include products that are intended to facilitate sleep or feeding in infants.[279] The banned phthalates include: bis(2-ethylhexyl) phthalate (DEHP), dibutyl phthalate (DBP), and butylbenzyl phthalate (BBP) in quantities greater than 0.1 percent.[280] Five more phthalates were banned in 2017 for use in childcare articles and toys (DINP, DIBP, DPENP, DHEXP, DCHP).[281]

Because of the phthalate ban, alternative plasticizers, which include new phthalates and plasticizers of other chemical groups, are being researched and developed.[282] These include: di(2-ethylhexyl) adipate (DEHA), di(2-ethylhexyl) terephthalate (DEHT),[283] and diisononyl cyclohexane-1,2-dicarboxylate (DINCH).[284,285] These new plasticizers do not have sufficient toxicological data.[286,287] However, "given that these alternatives have properties that are similar to those of phthalates, similar levels of emissions and environmental fates may be expected."[288]

Researchers found that 17 of 20 crib mattress covers tested for plasticizers contained at least one plasticizer greater than 0.1 percent.[289] In new mattress covers tested, DINCH was the most commonly detected plasticizer; in used mattress covers, the most commonly detected was DINP.[290] Overall, the most commonly detected plasticizer was DINP,[291] one of the phthalates currently banned on an interim basis for products that can be placed in an infant's mouth.[292]

In approximately one-fourth of the covers, DEHP and DINP were both detected.[293] DEHA was also detected, but always with another plasticizer. This suggests that plasticizer combinations could be in use in mattress covers.[294]

In the study, mattress covers manufactured after the U.S. Consumer Product Safety Commission's ban of select phthalates most commonly contained DINCH and iso-DEHP.[295] This suggests that these two plasticizers are being used as alternatives to the banned phthalates. Two of the mattresses containing DEHP, one of the phthalates banned for use at concentrations greater than 0.1 percent, exceeded the standard, despite being manufactured after the ban was established.[296]

Plasticizers emit from soft vinyl at a slow rate.[297] This means that "it is likely that crib mattresses are a constant plasticizer source in the infant sleep microenvironment."[298] Researchers point out the gravity of this: cribs often last somewhere around ten years, are passed through families and friends, and are donated or purchased second-hand.[299] Unlike many VOCs, the gases of which decrease as a product ages, SVOCs from phthalates do not appear to readily decrease over time.[300,301] In fact, mattress covers might "behave as permanent sources of phthalates and other SVOC additives during the lifetime of the covers."[302]

Mattress temperature also influences phthalate emissions from mattress covers.[303] Some phthalates more readily off-gas as temperature increases.[304] For example, DEHA emissions increased

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significantly as temperature increased, which can be caused by a sleeping infant's body heat transferring to the mattress. According to researchers, this "suggests that, due to their close contact with the mattress, infants are likely to be exposed to higher phthalate concentrations than other occupants of the room."[305] However, it is important to note that this study was conducted in a research laboratory and real sleep environments are complicated by other environmental factors that influence phthalate emissions.[306]

However, despite these complications, the researchers noted that "Considering that infants inhale nearly an order of magnitude more air per body mass than adults, their inhalation dose of phthalates that originate from their mattress covers can be significant."[307,308] This means that while researchers do not yet totally know the extent to which phthalates may impact infants in real sleep environments, there is reason to suspect that phthalates pose a potential problem to infant health.

SVOCs like plasticizers can also adsorb to bed sheets.[309] With temperature increases from a sleeping infant, the plasticizers can be released where they can come in direct contact with the baby.[310] Because some plasticizers can be dermally absorbed, a sleeping baby may absorb the chemicals through the skin.[311] Inhalation is also a significant source of exposure to phthalates.[312]

Many adverse health impacts are associated with some phthalates. Many phthalates have endocrine disrupting capabilities, which means they can mimic our hormones, and thereby may impact any function meditated by hormones. Because our hormones work in such tiny amounts, some endocrine disruptors can impact our bodies at levels of parts per billion.

A 2012 report by the World Health Organization and the United Nations Environment Programs documents evidence of phthalate endocrine disruptors and their effects in humans and animals. These effects in males include: decreased testis weight, reduced anogenital distance,[313] reduced accessory sex organ weights, modifications in sex organs and cells, reduced fertility, and more.[314] In females, endocrine disrupting effects include: uterine abnormalities, reduced fertility, and problems with thyroid function.[315] These effects are observed from one or more of the phthalates DEHP, BBP, DINP and DBP.[316] As mentioned earlier in the report, all of these phthalates have been documented in crib mattresses.

Flame Retardants

Vinyl may also contain flame retardant chemicals. For example, TPBH, an analogue of phthalate DEHP which is a reproductive toxicant,[317] is used in PVC.[318] For more information on flame retardants that are used specifically in polyurethane foam, see the section entitled, "Flame Retardants" earlier in this report.

Safer Mattress Materials

The good news is that there are many studies that show that reducing exposure to products with toxic chemicals reduces the levels of those chemicals in the body,[319,320] weighting the scales for better health—and the same goes for bedding.

Choosing mattresses and bedding made with more basic materials that are manufactured without highly intensive chemical processes often means reducing exposure to known harmful chemicals when sleeping, and avoiding the potential off-gassing of harmful chemicals over the long term.

Cotton

Organic cotton is a non-toxic alternative to foam. It provides cushion and softness to mattresses without all the dangerous chemical inputs. Cotton can be used as batting to replace foam in the bulk of a mattress, as batting in a pillowtop, as the mattress cover, to wrap coils, and more.

Cotton, a natural material, is also inherently much less flammable than foam, which is made from petrochemicals. This means that when properly used in conjunction with other naturally flame-retardant materials, mattresses made with cotton can meet federal flammability standards without the addition of flame retardant chemicals.

When properly used in conjunction with other naturally flame-retardant materials, mattresses made with cotton can meet federal flammability standards without the addition of toxic flame retardant chemicals.

While cotton is a great choice in lieu of foam, it must be grown organically to ensure its safety. Conventional cotton can use heavy doses of pesticides.[321,322,323,324] Growing cotton can also be water-intensive process, requiring 20,000 liters of water to produce one kilogram of cotton,[325] which is the equivalent of one outfit.[326] Cotton is also one of the world's most common GMO crops. In the United States, the majority of cotton is GMO.[327]

Instead of conventional cotton, opting for organic cotton means choosing a material that is non-GMO and grown without synthetic pesticides. When from an organic and sustainable source, cotton is a non-toxic bedding material that is naturally flame resistant.

Wool

Wool can be used in many different parts of mattresses. Some mattresses are made of 100 percent wool – inside and out. Other mattresses have pillow tops filled with wool, coils wrapped with wool textiles, supportive wool filling in the bulk of the mattresses, as part of the mattress cover, and more.

Wool is naturally flame resistant.[328] When used properly, wool can provide fire resistance that meets federal flammability standards.

Polyurethane mattresses tend to harbor heat, creating a hotter sleep environment. Wool, on the other hand, helps naturally regulate your body temperature, in both warmer and cooler months, by effectively circulating air within the material. The material also wicks away moisture from the body, another characteristic that keeps the body cool and comfortable.

Wool should be processed with non-toxic inputs like surfactant washes and treatments. Wool should also be sourced responsibly; as is true with any industry that handles live animals, animal welfare can be a concern. When purchasing a mattress, ask the mattress company about animal welfare standards.

Latex

Latex is used as many different components of mattresses. The material can make up the entirety or bulk of the mattress, serve as a top layer on coil mattresses, comprise a middle layer between coils and cotton or wool topper, or be added in small amounts to foam. Because of its utility, latex is an excellent substitution for foam.

There are three types of latex used in mattresses: natural, synthetic, and natural/synthetic blends. Natural latex is a milky fluid found in a wide range of plants. Latex also forms the basis of natural rubber.[329] Natural latex is tapped from trees, a process similar to collecting maple syrup.

Synthetic latex is made from refined oil, coal or other hydrocarbons.[330] More specifically, synthetic latex is most often styrene-butadiene rubber (SBR).[331]

In this process, butadiene and styrene are mixed together with other ingredients, which can include d-isopropyl benzene hydroperoxide, ferrous sulfate,[332] and others.[333,334] Butadiene is an occupational chemical of concern, and can cause mucous membrane irritation at low doses, and central nervous system depression at high doses.[335]

Blends are composed of both natural latex and synthetic SBR latex.

Despite being labeled as "natural," some natural latex mattresses can still contain chemicals of concern. This is because latex must be preserved before it undergoes processing, which is required to achieve a desired shape. Preservation occurs at multiple points in the process. The preservative can be dictated by the type of processing used. Multiple chemicals are known to be used as preservatives:[336]

- Ammonia
- Ammonium borate
- Ethylene diamine tetraacetic acid (EDTA)
- Formaldehyde
- Sodium pentachlorophenate
- Patented preservatives with undisclosed formulations

There are two types of processes used to create latex mattresses: Dunlop and Talalay. Dunlop is a simpler process that essentially involves the latex being whipped, poured into a mold, baked, washed, and then dried.[337] Talalay is a more involved process. The latex is poured into a mold, a vacuum is formed to distribute the latex, it's frozen, heated, washed, and then dried for curing.[338]

While mattresses using both methods can be touted as "natural" and "green," other additives can be used in the process like gelling agents, emulsifiers, and ingredients to add structure. Nanoparticle silver can also be incorporated into natural latex – and potentially synthetic latex – to add antimicrobial properties.[339] Nanoparticle silver is toxic to some wildlife,[340] and may be harmful to people, but the full-scale of its effects are unknown.[341]

As "natural" latex can contain synthetic additives, it's important to know exactly what went into the process of creating a mattress. When naturally sourced without any harmful additives, latex is an excellent alternative to foam.

While latex is excellent for its utility, it can be highly allergenic, and approximately 1 to 6 percent of the general of the population[342,343] and 8 to 12 percent of healthcare workers[344] are allergic the material. Latex allergy can produce itching, sneezing, and coughing.[345] In serious cases, the allergy can cause anaphylaxis,[346] a severe reaction that can be life-threatening.

Adults usually know if they're allergic and can avoid buying a mattress containing the material. However, with babies, it may not be known if they are allergic. As such, best practices are to avoid baby mattresses containing latex.

Coils

In 2010, a guest blog post in Scientific American overviewed the results of one study, stating that the researchers found that coils in mattresses may amplify electromagnetic waves (EMF) from FM and TV broadcasting towers, which may be associated with cancer.[347] Health bloggers raised a red flag. However, the blog reported the findings incorrectly.[348,349]

The study actually found that metal-containing mattresses attenuate – or reduce – electromagnetic waves immediately above the surface of the mattress.[350] This means, according to the study, metal-containing beds may reduce EMF exposure on the side of the body closest to the mattress, but not the other side, which could be unprotected from EMF.[351] However, the researchers' claims are unsupported by other studies; no other research exists on coils and cancer risk. Some citizen-scientists and mattress companies have measured EMF near mattresses but have usually found generally acceptable levels.[352,353]

The researchers point to mattresses and box springs containing "helically wound springs," which are coils bound and connected with a long spiral wire.[354] The hypothesis is that coils made in this fashion are connected, and therefore waves can be transferred.[355] But there is no substantive science supporting this claim and not all mattress coils are made in this fashion.

There are four common types of mattress coils: continuous, offset, Bonnell and pocket.[356,357] Continuous, which are formed with a single piece of wire; offset, which are hinged together with helical wires; and Bonnell, which are the most common and are connected with helical lacing that binds the rows and borders the entire unit, are all "connected" types. Pocket coils – also called wrapped coils, encased coils and pocketed springs—function independently of one another because they are individually-enclosed. These coils are wrapped in fabric, often cotton, wool, polypropylene or polyester. Pocket coils are not connected by metal.

Contemporary foundations (formerly called box springs) are typically made without metal springs.

In addition to inaccurately portrayed findings of this topic's primary study, there is not enough science to state that coil mattresses have the capacity to interfere with electromagnetic fields.

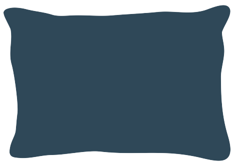
Adhesives

The safest way to adhere mattress components is to forego chemical adhesives altogether. Instead, some companies elect to sew (even by hand) mattress components together.[358] Choosing a sewn mattress ensures that you are not exposed to any chemical adhesives. Also see Adhesives section.

Linens

Pillows

Pillows made with polyurethane foam do not require added flame retardant chemicals under federal flammability laws. However, that does not mean flame retardants are not used in the manufacture of pillows, as some companies may want to decrease their liability because polyurethane foam is highly flammable.



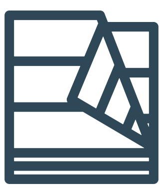
Foam pillows are made from the same materials as polyurethane mattresses, meaning that they may pose similar risk of toxicity. For more on foam, see the section entitled, "What's Inside the Mattress: Polyurethane Foam."

Other synthetic pillows can also be made with flame retardant chemicals, phthalates or alternative plasticizers. As these off-gas from polyurethane crib mattresses, it can be reasonably assumed that these products might carry the same risks, though this is unstudied. Studies suggest a possible connection between childhood allergies or adult rhinitis and synthetic pillows.[359,360]

Sheets

Sheets, especially cotton, that are labeled "wrinkle-free," "no wrinkle," "no iron," and other terms can contain a formaldehyde finish.[361] Levels of up to 2,000 parts per million or two parts per thousand of formaldehyde have been detected in textiles.[362] Formaldehyde is capable of off-gassing under certain conditions, like high temperatures and humidity.[363] In textiles, it has been reported as associated with allergic contact dermatitis.[364] The United States has no regulations on formaldehyde in textiles.[365]

Polyester, acrylic, and nylon are petroleum products. All three are essentially types of plastic and often require additives to manufacture, process, soften, and condition the materials. Some of these additives have been associated with harm to human health.[366,367,368] For more on polyester, see the section entitled "Polyester."



While some evidence indicates that some pesticides can be washed out of cotton,[369,370,371] because the crop is so heavily sprayed with pesticides,[372,373,374,375] it is best to choose organic cotton, as this protects field workers and prevents pesticide run-off, which is common.[376]

Mattress Pads & Comforters

Mattress pads and comforters are often made of polyester, acrylic and nylon. For more information on these textiles, see the section above, "Sheets."

Some waterproof mattress pads can be made of vinyl, which can contain endocrine-disrupting phthalates. For more information on vinyl, see "What's Inside the Mattress: Waterproof Baby Mattresses."

Antibacterial and Antimicrobial Linens

Many antibacterial and antimicrobial compounds can be added to bedding, including sheets, mattress pads, and mattress toppers.[377] These compounds include silver nanoparticles, triclosan, triclocarban, and many proprietary formulas under trade names.

Triclosan, which can be found in antimicrobial bedding,[378] is a known endocrine-disrupting chemical.[379,380,381,382,383,384,385] The chemical is also toxic to the aquatic environment.[386,387] The FDA banned triclosan in hand soaps effective in 2017,[388] but the chemical is still allowed for use in other products, including bedding.

Under trade names like Microban®, Biofresh ®, Ultra-Fresh, Sure Check and more, chemicals intended to kill germs can be added to bedding; some of these cannot be washed out.[389] Some trade name formulations may contain triclocarban, an endocrine-disrupting chemical[390,391,392,393] that is toxic to aquatic life;[394] triclocarban, like triclosan, was banned by the FDA in hand soaps.[395] Because many antimicrobial and antibacterial treatments are considered proprietary, scientists cannot know what chemical ingredients these products contain, making it impossible to determine possible health risks.

Silver nanoparticles can be embedded in bedding and mattresses.[396] Nanoparticle silver is toxic to some wildlife, and is suspected to be harmful to people, but the full-scale of its effects are unknown.[397] Because of the lack of research on the long-term health effects of nanoparticles, Made Safe and other organizations[398] recommend a precautionary approach with nanoparticle technology. It is best to avoid nanoparticles until extensive testing can be conducted.

In order to avoid harmful silver nanoparticles, endocrine disrupting triclosan, and undisclosed antimicrobial compounds, avoid bedding labeled as "antibacterial" and "antimicrobial."

Stain Repellants

Stain repellants can be made of poly and perfluoralkyl substances (PFAS), which include thousands of unique chemicals including PFOA, PFOS, PFHxS and PFHxA.[399]

Many PFAS are persistent in the environment, [400,401] meaning they stick around, and some bioaccumulate,[402] meaning they build up in the tissue of humans and animals. PFAS have a number of toxic effects,[403] including endocrine disrupting capabilities, [404] cancer,[405] immunotoxicity,[406] and developmental and reproductive toxicity.[407,408,409]

To forego PFAS, skip linens labeled as "stain repellant."

Spotting Safer Bedding

Avoid linens labeled with these terms, as they indicate the fabric may be treated with a harmful chemical:

- Antibacterial
- Antimicrobial
- Easy care
- No iron
- No ironing needed
- No wrinkle
- Shrink resistant
- Soft finish
- Stain Repellant
- Stain Resistant
- Wrinkle-free

MADE SAFE Certified Products

MADE SAFE is the only certification examining all materials in bedding from a human health and ecosystem perspective. Our 360-approach screens for known behavioral toxins, carcinogens, developmental toxins, endocrine disruptors, fire retardants, heavy metals, neurotoxins, high risk pesticides, reproductive toxins, toxic solvents and harmful VOCs used in products. We then we go above and beyond known toxic chemicals to work with chemists to evaluate each material that it doesn't bioaccumulate (build up in our bodies), persist (stick around in water, sediment or soil), contribute to air pollution, or cause harm to aquatic life or wildlife.

In short, the MADE SAFE seal on a mattress or bedding means that it's made without materials known to harm human health or ecosystems. The products listed below meet the highest standard of human health and ecosystem safety according to the best available science:

MADE WITH SAFE INGREDIENTS

MADE SAFE SCREENS ✓ INGREDIENTS FOR KNOWN:

- ✓ BEHAVIORAL TOXINS
- ✓ CARCINOGENS
- ✓ DEVELOPMENTAL TOXINS
- ✓ ENDOCRINE DISRUPTORS
- ✓ FIRE RETARDANTS
- ✓ HEAVY METALS
- ✓ NEUROTOXINS
- ✓ HIGH RISK PESTICIDES
- ✓ REPRODUCTIVE TOXINS
- ✓ TOXIC SOLVENTS
- ✓ HARMFUL VOCs

MADE SAFE®

It is imperative to follow manufacturer guidelines for use of certified products.

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Certified Bedding

For full product listings, please visit www.madesafe.org/certified-products/bedding

BEDDING - BABY & CHILD

Coyuchi

Happsy

Lullaby Earth

Naturepedic

BEDDING - KIDS & TEENS

Coyuchi

Happsy

Naturepedic

BEDDING - ADULT

Coyuchi

Happsy

Naturepedic

Naturepedic for Bed, Bath & Beyond

Certified Mattresses

MATTRESSES - BABY & CHILD

ED Ellen DeGeneres Crafted by Lullaby Earth

Happsy

Lullaby Earth

Lullaby Earth for buybuy BABY

Lullaby Earth for Pottery Barn

Lullaby Earth for Rosie Pope

Naturepedic

Naturepedic for buybuy BABY

Naturepedic for Pottery Barn

Naturepedic for Rosie Pope

MATTRESSES - KIDS & TEENS

Happsy

Naturepedic

MATTRESSES - ADULT

Happsy

Naturepedic

Certified Bed Foundations & Frames

FOUNDATIONS & FRAMES - KIDS & TEENS

Happsy

Naturepedic

FOUNDATIONS & FRAMES - ADULTS

Happsy

Naturepedic

Join Us in Creating
A MADE SAFE Future

We believe in a world where *every* product on shelves is made with safe ingredients, period. That's what we're working toward, and if you want to join us, there are some easy ways to make a big difference.

- **Choose MADE SAFE certified products!** When you support companies making safe products without toxic chemicals, you're using your economic power to help shift our entire marketplace to safe ingredients. See the full list here.
- **If you don't see a brand listed above**, reach out and ask them to become MADE SAFE certified.
- **Donate to our work.** We're a non-profit, and every dollar goes to screening products, closing data gaps on ingredients, and providing people with the information they need to choose safe products without toxic chemicals. Give here.
- **Join our community.** Stay up to date on new certified products and new science on ingredients in the things use every day. We can't emphasize enough that every choice you make to avoid toxic chemicals influences your health and your family's health for the better.
    - Follow us on Facebook, Twitter, and Instagram
    - Sign up for our monthly newsletter
    - Watch Amy Ziff's TEDx talk about living in a toxic age and be part of the product revolution

It's as simple as this:

The things we use on a daily basis should not lead to disease.

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