



## Suggested Environmental Considerations for Patient Beds, Mattresses, and Therapeutic Surfaces

Please consider the following environmental questions for the RFP/RFI for mattresses. These questions also apply to overlays, therapeutic surfaces, critical care beds, low beds, med/surg beds, and bariatric beds. Priority considerations are suggested based on the Healthier Hospitals program criteria for Healthier Interiors. Additional considerations are also provided. To limit the number of questions, attributes relevant to bed frames as electronic devices are limited.

For a link to the Healthier Hospitals Safer Chemicals challenge and Healthy Interiors goal, visit <http://healthierhospitals.org/hhi-challenges/safer-chemicals>.

#	Question	Preferred	Definition	Rationale	Other Information
<b>Priority Considerations</b>					
1	Is this product free of intentionally added polyvinyl chloride (PVC)? (Yes/No)  Exemption: Products made up of less than 1% of PVC by weight are exempt.	Yes	<p>Polyvinyl chloride (PVC) shall be defined as a plastic polymer used in a wide array of products. It is the third most widely produced plastic. Intentionally added means a substance is deliberately added in the production of the product.</p> <p>Suppliers can answer Yes to this question if they can provide upon request: a formal declaration stating that the product supplies does not contain polyvinyl chloride (beyond the exemption). The declaration must be written, signed and dated by the manufacturer on the manufacturer's letterhead; or they can provide lab testing data from an accredited lab verifying compliance; or complete information in the Health Product Declaration on product content related to this material, verifying compliance.</p>	Production and incineration of PVC releases dioxins and other harmful chemicals. Dioxins are widely distributed throughout the environment in low concentrations and are persistent, bioaccumulative and toxic (PBT). Dioxins are potent toxicants with many health impacts even at low exposure levels.	HH Safer Chemicals Challenge for Healthier Interiors

2	Is this product free of intentionally added perfluorinated compounds PFAS's)? (Yes/No)	Yes	<p>PFAS's are man-made chemicals composed of a strong carbon-fluorine chain. PFAS's are manufactured because of their specific physical and chemical properties. Their unique properties of repelling both water and oil has led to their use as coatings for carpet protection, textile protection, leather protection, and paper and board protection. This question pertains to any compounds below:</p> <p>Perfluoroalkyl substances; Polyfluoroalkyl substances; Fluoropolymers; Perfluoropolyethers and Side chain fluorinated polymers.</p> <p>Suppliers can answer Yes if they can provide upon request a formal declaration stating that the product supplied does not contain PFAS's as stain- or water-repellant treatments. The declaration must be written, signed and dated by the manufacturer on the manufacturer's letterhead; or they can provide lab testing data from an accredited lab verifying compliance; or complete information in the Health Product Declaration on product content related to these compounds, verifying compliance.</p>	<p>Research has revealed that some PFAS's have the potential to bioaccumulate (build up) in the blood and liver of living organisms. Furthermore, studies on toxicity have shown that two PFAS's, which are known contaminants of the global environment, namely perfluorooctane sulphonate (PFOS) and perfluorooctanoic acid (PFOA), exert many adverse effects on laboratory mammals and aquatic organisms. PFAS's are now ubiquitous global contaminants. These chemicals have been detected in indoor and outdoor air, in rivers, lakes and groundwater, in wastewater treatment effluent, in landfills and in the marine environment. PFAS's have also been found in the body tissues of many different living organisms throughout the world including humans.[i]</p>	HH Safer Chemicals Challenge for Healthier Interiors
3	Does this product contain less than 1000 ppm of all flame retardants by weight of homogenous material? (Yes/No)	Yes	<p>Flame retardants are intended to inhibit ignition and the spread of flames. Halogenated chemicals are chemicals that contain bromine, chlorine, fluorine or iodine bonded to a carbon atom. Homogeneous means uniform composition throughout, such as individual types of plastics or paper. Homogenous material, as defined by RoHS, is a unit that cannot be mechanically disjointed into single materials, or any material that is not mechanically divisible (disassembled, cut or ground) into separate material constituents. Mechanically disjointed means the materials can be, in principle, separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.<sup>[ii]</sup> Guidance for suppliers on testing is available.</p>	<p>Some flame retardants and/or their breakdown products tend to be persistent bioaccumulative and toxic (PBT) in the environment. They are widely found in the environment and in humans with Americans having some of the highest levels of them in their bodies. Some halogenated organic flame retardants are carcinogenic. These compounds are used in foams (for furniture and mattresses), textiles, paints and coatings, electronics, and plastics in health care. Alternatives exist that reduce the concern for environmental and human health effects. The European Union has a ban on some brominated flame retardants. In Europe, the Restriction of Hazardous Substances Directive (RoHS) restricts the use of PBDE's and PBB's in electronic equipment.</p>	HH Safer Chemicals Challenge for Healthier Interiors

4	Is this product free of intentionally added antimicrobials? (Yes/No)	Yes	<p>Antimicrobial products kill or slow the spread of microorganisms. Microorganisms include bacteria, viruses, protozoans, and fungi such as mold and mildew. The U.S. Environmental Protection Agency (EPA) regulates antimicrobial products as pesticides, and the U.S. Food and Drug Administration (FDA) regulates antimicrobial products as drugs/antiseptics. As pesticides, antimicrobials are used on objects such as countertops, toys, grocery carts, and hospital equipment. To meet Practice Greenhealth's Healthier Hospital (HH) Safer Chemicals challenge for healthy interiors, the following guidance is provided: triclosan and triclocarban are explicitly prohibited in the HH Safer Chemicals Challenge. No other added or built-in chemical antimicrobials are allowed unless they are registered with the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide (FIFRA) <u>and</u> have published data that show efficacy in a hospital/clinical setting measure by a reduction in healthcare-associated infections (HAIs) as part of the comprehensive infection control measures.</p>	<p>Few hospital mattresses may currently meet this criterion. However, a review of current scientific literature reveals no evidence that environmental surface finishes or fabrics containing antimicrobials assist in preventing infections.[iii]</p>	<p>HH Safer Chemicals Challenge for Healthier Interiors</p>
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5	Does this product meet the ANSI/BIFMA e3 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, for VOC emission limits using either the concentration modeling approach or the emissions factor approach using the applicable scenario? (Yes/No/NA)	Yes (except salvaged, refurbished furniture)/NA (outdoor furniture)	ANSI/BIFMA e3 Furniture Sustainability Standard is a voluntary standard setting measurable market-based definitions for sustainable furniture (ANSI/BIFMA e3 is a self-certified program). It is designed to allow multiple levels of achievement. For a link to certifiers and certified products, see <a href="http://levelcertified.org/thirdparty/">http://levelcertified.org/thirdparty/</a> . (Note: This link will not tell you who has achieved Sections 7.6.1 and 7.6.2. Suppliers could provide a test data to verify the ANSI/BIFMAe3 scorecard) Level is a third party certification for the ANSI/BIFMA e3 Standard. Suppliers can answer Yes to this question if they can provide upon request evidence of ANSI/BIFMA testing data (with the exception for salvaged or refurbished furniture) or a copy of ANSI/BIFMA e3 scorecard verifying compliance; or complete information in the Health Product Declaration on product content related to these chemicals, verifying compliance. This does not apply to outdoor furniture.	Furniture shall meet the maximum allowed concentration limits (in the appropriate section, 7.6.1, 7.6.2) when calculated using the standard classroom scenario defined in Tables 4-2 and 4-3 of CDPH/EHLB/Standard Method V1.1, 2010. Products emitting volatile organic compounds (VOCs) can irritate the respiratory tract and contribute to respiratory ailments such as asthma. Some chemicals, such as formaldehyde, can also react with other chemicals to form pollutants such as ground level ozone and smog. Formaldehyde is a common indoor air contaminant because of its use in furniture, cabinets, countertops, insulation, wallpaper, paints, and paneling. The International Agency for Research on Cancer (IARC) classified formaldehyde as a human carcinogen in 2006. More recently, the National Toxicology Program, an interagency program of the Department of Health and Human Services, named formaldehyde as a known human carcinogen in its 12th Report on Carcinogens (NTP 2011).	HHI Safer Chemicals Challenge - Guidelines for Furniture  LEED for Healthcare v2009 MR Credit 5: Furniture and Medical Furnishings, and  LEED v4, Building Design and Construction MR Credit, Furniture and Medical Furnishings (Healthcare)
6	Is this product not made with natural rubber latex? (Yes/No)	Yes	Latex is natural rubber latex that comes from a liquid found in tropical rubber trees.  Suppliers can answer Yes if this product is not made with natural rubber latex and they can provide upon request: a formal declaration stating the product supplied does not contain latex. The declaration must be written, signed, and dated by the manufacturer on the manufacturer's letterhead; or complete information in the Health Product Declaration on product content related to this material, verifying compliance.	Liquid latex is processed to make many medical and dental supplies, including gloves, blood pressure cuffs, urinary catheters, dental dams and material used to fill root canals, as well as tourniquets and equipment for resuscitation. The protein in rubber can cause an allergic reaction in some people. This reaction can range from sneezing to anaphylactic shock, which is a serious condition that requires immediate medical attention. Synthetic (non-rubber) latex materials are possible alternatives.	
<b>Additional Considerations</b>					

7	<p>Is this product certified by a third party to meet VOC emission limits using criteria based on the Standard Method for Testing and Evaluation of Volatile Organic Compound Emissions from Indoor Sources using Environmental Chambers, or CDPH/EHLB/Standard Method V1.1 (Feb 2010) (otherwise known as the California 01350 Standard)? (Yes/No/NA)</p> <p>(This is a STRONGER VOC question than Q #5 above)</p>	Yes	<p>Formaldehyde is a colorless, reactive, strong smelling gas at room temperature. It is one chemical in a large family of chemical compounds called volatile organic compounds (VOCs). These compounds vaporize or become a gas at room temperature. Formaldehyde is used to make many products including furnishings. Strict VOC and formaldehyde emission levels are addressed in the CA Section 01350 standard. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.</p> <p>Applicable certifications and levels include: GREENGUARD Gold, SCS Indoor Advantage (for BIFMA Credit 7.6.1) and SCS Indoor Advantage Gold (for BIFMA Credits 7.6.1 and 7.6.2), ANSI/BIFMA LEVEL Furniture Sustainability Standard at level 1,2 or 3, with at least one point score for Sections 7.6, Cradle to Cradle Gold or Platinum, or SMaRT Certified with at least one point score under Public Health and Environment (PHE) standards 3-2 and 3-3.</p>	<p>Formaldehyde exposure may potentially cause various adverse health effects such as eye, nose and throat irritation, coughing and allergic reactions. High levels of exposure are associated with cancer in humans and lab animals. Products emitting volatile organic compounds (VOCs) can irritate the respiratory tract and contribute to respiratory ailments such as asthma. Some chemicals, such as formaldehyde, can also react with other chemicals to form pollutants such as ground level ozone and smog. Formaldehyde is a common indoor air contaminant because of its use in furniture, cabinets, countertops, insulation, wallpaper, paints, and paneling. The International Agency for Research on Cancer (IARC) classified formaldehyde as a human carcinogen in 2006. More recently, the National Toxicology Program, an interagency program of the Department of Health and Human Services, named formaldehyde as a known human carcinogen in its 12th Report on Carcinogens (NTP 2011).</p> <p>For a link to certifiers and certified products, see ANSI/BIFMA e3, <a href="http://levelcertified.org/thirdparty/">http://levelcertified.org/thirdparty/</a> (Note: This link will not tell you who has achieved Sections 7.6.1 and 7.6.2. Suppliers could provide a copy of the ANSI/BIFMAe3 scorecard as verification with at least one point for 7.6). GREENGUARD Gold, <a href="http://productguide.ulenvironment.com/SearchResults.aspx?CertificationID=2">http://productguide.ulenvironment.com/SearchResults.aspx?CertificationID=2</a>. SCS Indoor Advantage Gold,</p>	
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8	<p>Are the components of this product free of metals, including lead, cadmium, mercury, and antimony at less than 100ppm and hexavalent chromium less than 1000ppm? (Yes/No)</p>	Yes	<p>While not widely agreed upon definition, metals are any relatively dense metal and some metals are potentially toxic.</p>	<p>Some metals are persistent bioaccumulative and toxic. Metals may enter the human body through food, water, air, or absorption through the skin when they come in contact with humans in agriculture and in manufacturing, pharmaceutical, industrial, or residential settings. They may build up in biological systems and become a significant health hazard. The European Union's Restriction of Hazardous Substances Directive restricts mercury and cadmium at no more than 100ppm, and hexavalent chromium and lead at 1000ppm. Cadmium is extremely toxic [iv]; hexavalent chromium is carcinogenic. Exposure to mercury results in permanent nervous system and kidney damage. Lead accounts for most of the cases of pediatric heavy metal poisoning (Roberts 1999)<sup>[v]</sup>.</p>	
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9	<p>Are all product components free of intentionally added phthalates (which means less than 1000 ppm) including: DEHP, BBP, DnHP, DIDP, DBP, DINP, DIBP, DPENP, DCHP, and DHEXP? (Yes/No) Prefer Yes If no, please specify the phthalate(s).</p>	Yes	<p>Phthalates are esters of phthalic acid mainly used as plasticizers (substances added to plastics to increase their flexibility, transparency, durability, and longevity). They are used primarily to soften polyvinyl chloride (PVC). The scientific literature provides strong evidence on the potential harm for the ten phthalates covered in this question: Phthalates include Di-2-ethyl hexyl phthalate (DEHP) CAS 117-81-7, Benzylbutylphthalate (BBP) CAS 85-68-7, Di-n-hexyl phthalate (DnHP) CAS 84-75-3, Di-isodecyl phthalate (DIDP) CAS 68515-49-1 or 26761-40-0, Dibutyl phthalate (DBP) CAS 84-74-2, Diisononyl phthalate (DINP) CAS 28553-12-0 and 68515-48-0, Diisobutyl phthalate (DIBP) CAS 84-69-5, as well as Di n-pentyl phthalate (DPENP) CAS 131-18-0, Dicyclohexyl (DCHP) CAS 84-61-7 and Di-n-hexyl phthalate (DHEXP) CAS 84-75-3 (above 1000ppm). People can be exposed through the use of products containing these chemicals. Suppliers may answer yes to this question if they have a formal declaration stating that the products supplied do not contain intentionally added phthalates (including those listed) above the stated threshold. Declarations must be written, signed, and dated on the manufacturer's letterhead by the manufacturer, Or, suppliers may answer yes to this question if they have test results for the components showing the listed phthalates are not present in any component above 1000ppm.</p>	<p>Five phthalates prioritized here (DEHP, BBP, DnHP, DIDP, and DBP) are listed as reproductive toxicants under California's Prop 65. Eight phthalates, including DEHP, BBP, DIDP, and DBP, are part of an EPA phthalates chemical action plan to reduce exposures because of their toxicity and evidence of pervasive human and environmental exposure. DEHP, BBP, DIDP, DBP, and DINP are part of the database of chemicals to be avoided by International Electrotechnical Commission's IEC 62474, Material Declaration for Products for products used by the Electrotechnical Industry. The National Research Council has noted the importance of looking at cumulative exposure from multiple phthalates. The RoHS directive will ban four phthalates in electrical equipment from 22 July 2019. The banned phthalates are: DEHP, DBP, DiBP, and BBP. In 2002, the FDA issued a Public Health Notification for some PVC devices containing DEHP because of potential health risks. Based on animal studies, DEHP has the potential to cause reproductive and developmental effects, endocrine disruption and testes toxicity and liver cancer. Medical treatments with high exposures to DEHP are: exchange transfusion in neonates, ECMO in neonates, TPN in neonates, multiple procedures in sick neonates, hemodialysis in peripubertal males or pregnant and lactating women, and enteral nutrition in neonates and adults. The Consumer Product Safety Commission restricts the use of DIDP in toys that may go in children's mouths.</p>	
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#	Is this product free of intentionally added Bisphenol A (BPA) or BPA derived plastics (such as polycarbonate plastic and resins)? (Yes/No)	Yes	Bis(4-hydroxyphenyl)propane, or Bisphenol A (BPA), is an organic compound used to make polycarbonate plastic, epoxy resins and for other applications. Polycarbonate plastic is derived from BPA. Resin derived from BPA is used to line metal food containers and in thermal paper for impact printing purposes. Intentionally added means a substance is deliberately added in the production of the product.	People can be exposed through the use of products containing these chemicals. BPA is one of the highest volume chemicals produced worldwide. Laboratory studies have shown widespread health effects, at least in part through endocrine disruption mechanisms. The National Toxicology Program has some concern for the effects on the brain, behavior, and prostate gland in fetuses, infants, and children at current human exposures to Bisphenol A.	
#	Is there a take-back program for this product for recycling? (Yes/No) If yes, please specify recycler. (Note: If yes, supplier should regularly report pounds of mattresses recycled)	Yes, specify recycler	Take Back Programs are generally supplier funded or provided to enable users to return products for responsible recycling at the end of their use. For example, many manufacturers fund a Battery Take Back Program for recycling of batteries.	Mattresses at the end of their life may impact hospitals in waste disposal fees. Hospitals may prefer vendors who take back products for recycling to help support their waste reduction efforts.	
	Is this product free of chemicals (carcinogens and reproductive toxicants) listed by the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)? (Yes/No)	Yes	California's Prop 65, The Safe Drinking Water and Toxic Enforcement Act, enacted in 1986, requires the Governor to publish a list of chemicals known to the state to cause cancer or reproductive harm. This is determined through a lead agency that has formally identified the chemical according to protocols in the legislation. Prop 65 applies to suppliers who sell products in the state. Suppliers must answer NO to the question if the product contains any chemicals listed in the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Prop 65).	The California Proposition 65 list is an authoritative government list of carcinogens and reproductive toxicants that health care facilities may wish to avoid. [28] All suppliers who do business in California must comply with this law. As such, they are aware of the list of chemicals. Since this list is updated at least once a year, suppliers must provide up-to-date information for procurement contracts.	



#	Is this product free of intentionally added nanomaterials? (Yes/No)	Yes	Engineered nanomaterials are materials designed at the molecular (nanometer) level to take advantage of their small size and novel properties which are generally not seen in their conventional, bulk counterparts. Nanomaterials have extremely small size as their defining characteristic, although there is as yet no agreed national or international definition for nanomaterials[vi]	A recent report found EPA does not currently have sufficient information or processes to effectively manage the human health and environmental risks of nanomaterials. <sup>[vii]</sup> With some 600 commercial products reportedly on the market now [viii] and more under development, nanomaterials are entering municipal wastewater treatment plants. That realization has heightened concerns about the effects of these materials on treatment plants and the potential for release of free nanoscale materials into the environment. No comprehensive studies on the problem have yet been published. <sup>[ix]</sup>	
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[i] Allsopp, M., Santillo, D., Walters, A. & Johnston, P., *Perfluorinated Compounds: An Emerging Concern*, University of Exeter, April 2005, p5.

[ii] *RoHS Producer Support Booklet*, National Measurement Office, 2010, pg 6, <http://www.bis.gov.uk/assets/bispartners/nmo/docs/rohs/support-literature/producer-sup>

[iii] Thomas Cooper from Erica Stewart, *memo on Kaiser Permanente's Antimicrobial Position*, December 1, 2006, Kaiser Permanente, from Kaiser Permanente.

[iv] OSHA, <http://www.osha.gov/SLTC/metalsheavy/index.html>

[v] <http://www.lef.org/protocols/prtcl-156.shtml#comm>

[vi] EPA: Information for Health Care Providers, <http://www.epa.gov/hg/healthcare.htm#facilities>, viewed August 30, 2011

[vii] "*Nanomaterials*," NICNAS Information Sheet, Australian Government, September 2006, [http://www.nicnas.gov.au/publications/information\\_sheets/general\\_informatic](http://www.nicnas.gov.au/publications/information_sheets/general_informatic)

[viii] *EPA Needs to Manage Nanomaterial Risks More Effectively*, U.S. EPA Office of Inspector General, Report No.12 P-0162, December 29, 2011, p.3.

[ix] Sellers, K., Bergeson, L., *Nanomaterials Down the Drain: Perception versus Reality*, poster by Arcadis and Bergeson & Campbell, P.C..