

Selecting Healthy Materials for Mayo Clinic



Perkins&Will

Introductions



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Mayo Clinic Rochester
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Agenda

- 1 — Chemicals of Concern & Healthy Materials
- 2 — Mayo Clinic Environmental Services Training Facility
- 3 — Results and Lessons Learned
- 4 — Questions

Learning Objectives

- Demonstrate knowledge of chemicals of concern and healthy interior finish materials
- Analyze materials to avoid chemicals of concern, while weighing material attributes against specific project needs
- Understand the process of material selection for Mayo Clinic's Environmental Services Training Facility project in addition to materials test results and lessons learned
- Understand the impact of test results on future design project decisions



**Perkins&Will Project: Rice Memorial Hospital
Rehabilitation Institute
Willmar, Minnesota**



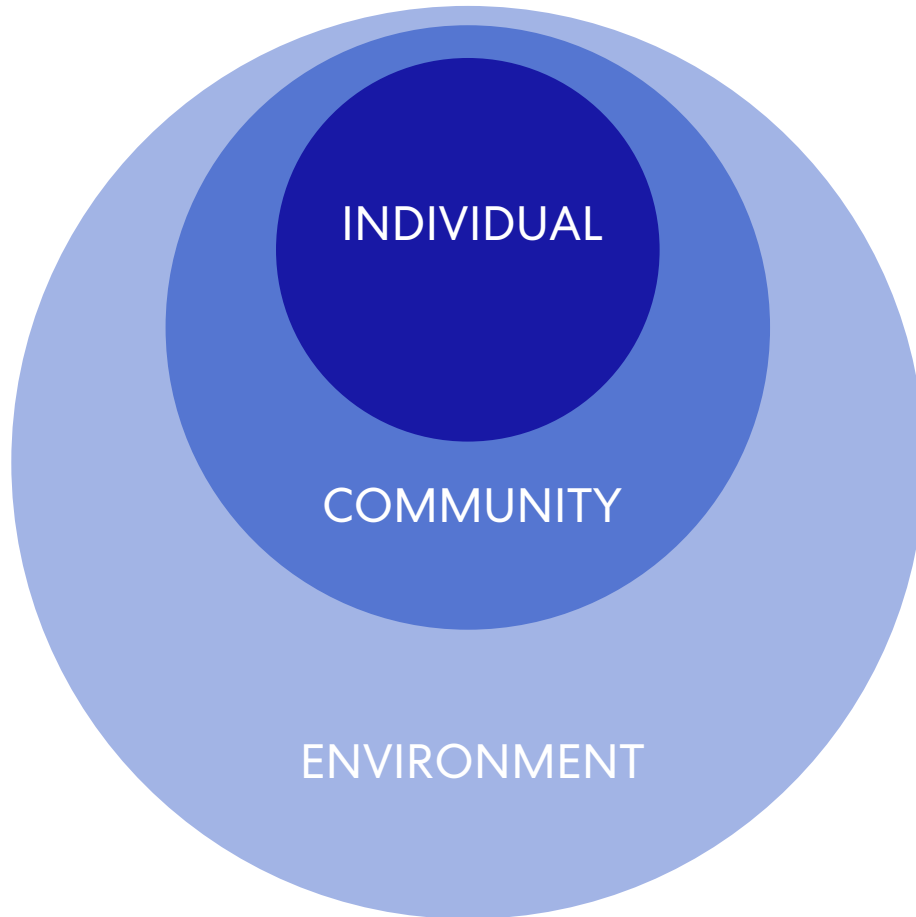
Mayo Clinic — Overview

A leading **Academic Medical Center** committed to the highest quality care for each patient every day.

- Medical Practice, Education and Research
- 34,000 employees
- 21,000,000 square feet



Healthy Materials — Why does it matter?



Primary Value:

Needs of the **patient** come first


Stewardship Value:

Sustain and reinvest in our mission and **extended communities** by wisely managing our human, **natural, and material resources**

The Challenge with Chemicals

Look out for these 5 potentially dangerous food chemicals when feeding your kids

Sonja Halber, USA TODAY Published 3:55 p.m. ET July 23, 2018 | Updated 12:30 p.m. ET July 26, 2018



The American Academy of Pediatrics issued a statement saying that a growing body of scientific evidence shows that children are being harmed by chemicals in food. (Photo: Getty Images)


The chemicals added to food and used in food packaging are potentially a major pediatricians' group says.

Chemicals used in packaging and in processed meats, among others, cause puberty issues and other health problems, the American Academy of Pediatrics says.


The group is calling for "urgently needed reforms" at the U.S. Food and Drug Administration. In a policy statement, the AAP, which represents 67,000 pediatricians, argued for more rigorous testing and regulation of food additives.

The chemicals that raised the most concern

- **Bisphenols**, such as BPA, which are used in the lining of metal cans, can act as an estrogen in the body. This can affect the onset of puberty, increase obesity and decrease fertility and impact the nervous system and immune system.
- **Phthalates**, which are found in plastics, can impact male genital development, cause obesity and heart disease.



Eliminating Toxics in Carpools Lessons for the Future of Recycling



An Optimizing Recycling Report by the Healthy Building Network
With Support from Changing Markets and the Global Alliance for Incinerator Alternatives

October 2017



CBS THIS MORNING Today's Rundown ~ Politics & Power

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Methylene Chloride

"...unreasonable risk."

DEADLY CHEMICAL CONCERNS
PROPOSED BAN ON HOLD DESPITE CHEMICAL'S LINK TO DOZENS OF DEATHS

CBS NEWS | March 29, 2018, 11:36 AM

Deaths linked to a common paint stripper chemical go back decades, so why isn't it banned?

Share / Tweet / Reddit / Flipboard / Email

A proposed federal ban on a potentially deadly chemical found in common paint strippers may be on hold indefinitely. The EPA says **methylene chloride poses an unreasonable risk** and the chemical has been implicated in dozens of deaths. The agency proposed a ban in January 2017, but postponed it late last year.

Chemicals of Concern & Healthy Materials



Perkins&Will Project:
Mayo Clinic Health System, Mankato Hospital
Mankato, Minnesota

THE SATURDAY EVENING POST

For the most beautiful floor in town, all you need is:

a brush...

adhesive...

J-M vinyl-asbestos floor tile...

a husband!

Using Johns-Manville TerraFlex Floor Tiles and our new colorless, brush-on adhesive, an average husband can do an average room for about \$37.50! And he'll give you a glamorous, up-to-date floor—in your choice of many styles and colors. Cleans with a swish of a damp cloth! Come in for samples. Look in the Yellow Pages under Building Materials or Flooring for your J-M JOHNS-MANVILLE DEALER

7-STAR VALUE PRODUCTS

This 50-ft. tape is a must for all do-it-yourselfers.

1950s

NEW VINYL FLOOR TILE

38 go-together colors—3 styles

Something new has been added to KenFlex floors...new coordinated colors with an easy-to-follow decorator-harmony chart now at your KenFlex Dealers. There's new excitement in *Carnival KenFlex*, now harmonized to blend with new shades in *Morbleized KenFlex*. New richness in the natural cork-look of *Corkstone KenFlex*, too. Blended of vinyl and sturdy asbestos fibers, this glowing, greaseproof floor is so easy to keep clean. Tile-deep colors can't wear off. Install it yourself from basement to attic and save...average 8'x10' room costs about \$21.50.

COME TO THE BIG KENFLEX NEW COLOR JUBILEE. Look for this Palette Sign in your Kenflex Dealer's Window. You'll find his name and address under FLOORS in your Classified Telephone Directory.

KENTILE • KENCORK • KENRUBBER • KENREE • KENFLOR • KENROYAL

KENFLEX
VINYL ASBESTOS TILE
by the makers of
KENTILE FLOORS
Kentile, Inc., 95 Second Avenue, Brooklyn 10, New York

1956

What is a Chemical of Concern?

- Chemicals of Concern:
 - Pollute the environment
 - They are bio-accumulating or “forever chemicals” in the environment and our bodies
 - Harmful to construction and factory workers
 - Harmful to building occupants
- Examples: Asbestos and Lead
- Manufacturer transparency vs chemical avoidance

Perkins&Will Project: Mayo Clinic Jacksonville Mangurian
Building
Jacksonville, Florida



What is a Chemical of Concern?



Chemicals of Concern — Where is the overlap?

Asbestos	Formaldehyde & Urea- Formaldehyde	Neoprene	VOCs	Mercury	Lead
Copper	Flame Retardants	Wood Treatment: Creosote	Styrene	Isocyanates	Maleic Anhydride
Fluorinated Stain Treatments (PFCs, PFOAs)	Methyl Methacrylate (MMA)	Antimicrobials	PVC (Vinyl)	Phthalates (DEHP) & Orthophthalates	Bisphenol A (BPA)
Alkylphenols	Polychlorinated Biphenyls (PCBs)	Chloro- fluorocarbons (CFCs)	Arsenic	Short Chain Chlorinated Paraffins (SCCPs)	Chlorinated Polyethylene (CPE)
Solvents (xylene, benzene, toluene)	Cadmium	Hexavalent Chromium (chromium VI)	Chloroprene	Wood Treatment: Pentachlorophenol	Polystyrene

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Chemicals of Concern — Repeat Offenders

	Formaldehyde & Urea- Formaldehyde		VOCs	Mercury	Lead
	Flame Retardants				
Fluorinated Stain Treatments (PFCs, PFOAs)		Antimicrobials	PVC (Vinyl)	Phthalates (DEHP) & Orthophthalates	
	Cadmium				

A photograph of a modern hospital room. In the foreground, a patient bed with a white and blue frame is partially visible. The bed has a white pillow and a light-colored blanket. To the right of the bed is a green sofa with two green pillows. A large window in the background shows a view of a green field and trees. The room has wood-paneled walls and a white ceiling with recessed lighting. A tray with a bowl and some items is on the bed. A vase with yellow flowers is on a small table next to the bed. The overall atmosphere is clean and bright.

Chemicals of Concern — Interior Finishes

VOCs & Formaldehyde

Wood composites, adhesives, coatings, flooring, ceiling tile

respiratory issues, nervous system impacts, cancer, sick building syndrome

Phthalates


Upholstery, flooring, wall coverings

reproductive and developmental toxicants

PVC (vinyl)

Upholstery, flooring, wall coverings

neurodevelopmental and reproductive issues, cancer, endocrine disruptor

A photograph of a modern hospital room. In the foreground, a patient bed with a white and blue frame is partially visible. The bed has a white pillow and a light-colored blanket. To the right of the bed, there is a small wooden nightstand with a vase of yellow flowers. The wall behind the bed is covered in light-colored wood paneling. A large window on the right side of the room offers a view of a green landscape. The room is well-lit, and the overall atmosphere is clean and professional.

Chemicals of Concern — Interior Finishes

Halogenated Flame Retardants

Upholstery, drapery fabrics, cushions

thyroid disruption, reproductive and neurodevelopmental problems, diabetes

Antimicrobials

Privacy curtains, upholstery, handrails

endocrine disrupter, reproductive effects, increased allergies

Heavy Metals

Found in upholstery dyes, furniture finishes

cancers, lung and kidney damage, bone density loss, neurodevelopmental problems, infertility

Perfluorochemicals (PFCs)

Stain treatments, upholsteries, curtains

liver function issues, reduced immune response, thyroid disease, and increased kidney and testicular cancer

Chemicals of Concern — Finding Healthy Materials & Strategies

Chemicals of Concern	
Contains Chemical of Concern:	Y / N
VOCs	
Urea Formaldehyde	
PVC	
Phthalates	
BPA	
PFC Stain Treatments	
Halogenated Flame Retardants	
Antimicrobials	
Heavy Metals (Lead, Mercury, Cadmium)	
Hexavalent Chrome (Chromium VI)	

Certifications & Documentation	
Product Has Certification / Documentation:	✓
Precautionary List Free	
Declare Red List Free	
Declare Red List Compliant	
Healthier Hospitals / Kaiser Approved	
FloorScore (VOCs)	
Carpet and Rug Institute Green Label Plus (VOCs)	
GreenGuard / SCS Indoor Advantage (VOCs)	
MTS SMaRT Product Certification	
Cradle-to-Cradle	
C2C Material Health Optimization Certificate	
FACTS* (Upholstery and Fabrics)	
HPD	
EPD	

Chemicals of Concern — Finding Healthy Materials

Declare.

Nylon Modular Carpet Tiles on EcoFlex NXT
Durkan

Final Assembly: Glasgow, VA, USA
Life Expectancy: 15 Years
End of Life Options: Take Back Program (Various Locations), Recyclable (100%)

Ingredients:

Coating: Coal Fly Ash, Sodium Lime Glass, Limestone, Calcium Oxide, Carbon Black-Amorphous, Ammonium Lauryl Sulfate, Sodium Polyacrylate; Yarn: Nylon 6, Nylon 6,6, Titanium Dioxide; Backing: Ethene-1-Octene Copolymer, Hydrocarbon Resin, Butadiene Acrylate Polymer, 2,5 Furandion Modified Ethylene/Hexane-1-Polymer; Scrim: Filament Glass Fibers, Modified Acrylic Copolymer; Topical: Sodium Polymethacrylate, Citric Acid, Fluoroacrylate Polymer; Dye: Red Colorant, Yellow Colorant, Black Colorant, Blue Colorant, Orange Colorant

Living Building Challenge Criteria:

DRK-1002	EXP: 11/01/2016
VOC Content: N/A	VOC Emissions: CDPH Compliant
Declaration Status	<input checked="" type="checkbox"/> LBC Red List Free
	<input type="checkbox"/> LBC Compliant
	<input type="checkbox"/> Declared

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Declare.

EcoWorx Carpet Tile
Shaw Industries Group, Inc.

Final Assembly: Cartersville, Georgia, USA
Life Expectancy: 15 Years
End of Life Options: Take Back Program (Globally), Recyclable (100%)

Ingredients:

Fiber: Nylon 6 Polymer, Nylon 6,6 Polymer, Polyethylene Terephthalate, Titanium Dioxide, Colorants*; Backing: Coal Fly Ash, Ethene-1-Octene Copolymer, Calcium Carbonate, Vinyl Acetate/Ethylene Copolymer, Hydrocarbon Resin, Glass, Polyethylene Terephthalate, Aluminum Trihydrate, Ethylene/Hexane-1 Copolymer, Backing Additives*, Binder*, Tridecyl Alcohol Ethoxylate, Poly Vinyl Alcohol, Magnesium Carbonate, Carbon Black, Sodium Carbonate, Phosphoric Acid Neutralized, 4,4'-Thiobis(2-Tert-Butyl-5-Methylphenol), Lubricant*, Dodecylguanidine HCL, 1,4-Bis(2-Ethylhexyl) Sodium Sulfosuccinate, Dehydroisoascorbic Acid, Ammonium Lauryl Sulfate, Poly(Oxy-1,2-Ethanediy) Alpha-(Nonylphenyl)-Omega-Hydroxy-Branched-Phosphates; Topical: Polymeric Acid*, Fluoropolymer Dispersion*, Anionic Surfactant*, Aromatic Condensation Polymer*

*LBC Temp Exception I10-E4 Proprietary Ingredients <1%

Living Building Challenge Criteria:

SHW-1002	EXP: 08/01/2016
VOC Content: N/A	VOC Emissions: CDPH Compliant
Declaration Status	<input type="checkbox"/> LBC Red List Free
	<input checked="" type="checkbox"/> LBC Compliant
	<input type="checkbox"/> Declared

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Mayo Clinic Environmental Services Training Facility



Environmental Services Training Facility — Strategy

- Evolves over time – new finishes can be tested
- Connecting silos between ES and Facilities
- Life Cycle Cost analysis and data collection
- Durability with cleaning chemicals
- Human health impacts



Environmental Services Training Facility

- 3 Mock Patient Rooms with fully functional toilet rooms
- 1 Mock Exam Room
- Mock Porter Room
- Open office area
- Classroom for training and education
- Products installed for testing:
 - 6 wall finishes
 - 9 flooring products
 - 6 upholsteries
 - 5 ceiling tiles









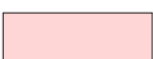



Environmental Services Training Facility



Environmental Services Training Facility



Environmental Services Training Facility

RESILIENT TILE		PHthalate-free LUXURY VINYL TILE
		LINOLEUM TILE
		PVC-free BIO-BASED TILE
RESILIENT SHEET		PVC-free SHEET
		PHthalate-free VINYL SHEET
		RUBBER SHEET, 2MM
		LINOLEUM SHEET
CARPET		PVC-free CARPET TILE
		RED LIST FREE CARPET TILE
		CERAMIC TILE



Environmental Services Training Facility

Resilient Flooring

- Rubber Sheet, 2mm
- Linoleum Sheet and Tile
- PVC-Free Polyester-based
- PVC-Free Bio-based tile

Phthalate-Free Vinyl Flooring

- Sheet and Tile

Carpet Tile

- PVC-Free Carpet Tile
- Red List Free Carpet Tile

Wall Base

- Rubber and Vinyl

PVC-Free Type II Wall Covering

- Thermoplastic Olefin (TPO)

Phthalate-Free Type II Vinyl Wall Covering

PVC-Free Upholstery

- Polyester fabric with fluorine-free stain treatment
- Polyurethane
- EPU polyurethane
- Silicone
- Polyurethane Silicone Hybrid

Phthalate-Free Vinyl Upholstery

Wall Protection

- Bio-based
- Polyester-based

Roller Shade Fabric

- Thermoplastic Olefin (TPO)
- Recycled Polyester
- PVC coated Polyester

Environmental Services Training Facility



Resilient Flooring

- Rubber Sheet, 2mm – Dull from mopping vs buffing
- Linoleum Sheet - Holding up well, but furniture movement scratched
- PVC-Free Polyester-based – Holding up best so far
- PVC-Free Bio-based tile – Product requires waxing

Phthalate-Free Vinyl Flooring

- Sheet and Tile

Carpet Tile

- PVC-Free Carpet Tile
- Red List Free Carpet Tile



Wall Base

- Rubber and Vinyl – both showing wear

PVC-Free Type II Wall Covering

- Thermoplastic Olefin (TPO)

Phthalate-Free Type II Vinyl Wall Covering

Environmental Services Training Facility

Mayo Clinic
Environmental Services Training Space

Flooring: SV1 Forbo Eternal



Spec Info	Manufacturer: Forbo Product Name/Number: Eternal Color: Color-Washed Beech 11442 Size: 79" wide, 2 mm thick
Location	Porter
Installation Date	Fall 2019
Notes	This is a standard finish already used in Mayo facilities. It was selected as a control flooring to compare the performance of other flooring installations.

Material Health Data:

Chemicals of Concern	
Contains Chemical of Concern:	Y / N
VOC	N
Urea Formaldehyde	N
PVC	Y
Phthalates	N
BPA	
PFC Stain Treatments	N
Halogenated Flame Retardants	N
Antimicrobials	N
Hexavalent Chrome (Chromium VI)	N
Heavy Metals (Lead, Mercury, Cadmium)	N

Blank = Precautionary Element Content Not Verified
-- = Not Applicable to Material Type

Certifications & Documentation	
Product Has Certification / Documentation:	Y / N
Precautionary List Free	Y
Declare Red List Free	
Declare Red List Compliant	
Healthier Hospitals / Kaiser Approved	
FloorScore (VOCs)	
Carpet and Rug Institute Green Label Plus (VOCs)	--
GreenGuard / SCS Indoor Advantage (VOCs)	
MTS SMaRT Product Certification	
Cradle-to-Cradle	
C2C Material Health Optimization Certificate	
FACTS* (Upholstery and Fabrics)	--
HPD	Y
EPD	Y

Mayo Clinic
Environmental Services Training Space

Flooring: SF1 Upofloor Zero



Spec Info	Manufacturer: Upofloor Product Name/Number: 5723 Color: Morocco Size: 4'-9" wide, 2 mm thick
Location	Patient Rm 1-420D
Installation Date	Fall 2019
Notes	This homogenous flooring was selected for testing because of its non-toxic properties. Installed with an integral cove base

Material Health Data:

Chemicals of Concern	
Contains Chemical of Concern:	Y / N
VOCs	N
Urea Formaldehyde	N
PVC	N
Phthalates	N
BPA	N
PFC Stain Treatments	N
Halogenated Flame Retardants	N
Antimicrobials	N
Heavy Metals (Lead, Mercury, Cadmium)	N
Hexavalent Chrome (Chromium VI)	N

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Precautionary List Free	Y
Declare Red List Free	Y
Declare Red List Compliant	
Healthier Hospitals / Kaiser Approved	
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Carpet and Rug Institute Green Label Plus (VOCs)	--
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MTS SMaRT Product Certification	
Cradle-to-Cradle	
C2C Material Health Optimization Certificate	
FACTS* (Upholstery and Fabrics)	--
HPD	Y
EPD	Y

Environmental Services Training Facility - Matterport



Conclusion

**Perkins&Will Project: Mayo Clinic Rochester
Jacobson Building OR Fit Out
Rochester, Minnesota**

Learning Objectives

- Demonstrate knowledge of **chemicals of concern** and healthy interior finish materials
- **Analyze materials** to avoid chemicals of concern, while weighing material attributes against specific project needs
- Understand **the process of material selection** for Mayo Clinic's Environmental Services Training Facility project in addition to materials test results and lessons learned
- Understand the **impact of test results** on future design project decisions



Perkins&Will Project: Mayo Clinic Health System, Mankato Hospital
Mankato, Minnesota



Resources

Perkins & Will Precautionary List: <https://transparency.perkinswill.com/>

International Living Future Institute Red List: <https://living-future.org/red-list/>

AIA Healthier Materials Protocol: <https://www.aia.org/resources/198731-healthier-materials-protocol>

Center for Environmental Health: <https://www.ceh.org/>

Green Science Policy Institute Six Classes: <https://www.sixclasses.org/>

Practice Greenhealth Healthy Interiors: <https://practicegreenhealth.org/topics/safer-chemicals/healthy-interiors>

Mindful Materials: <http://www.mindfulmaterials.com/>

Healthy Building Network: <https://healthybuilding.net/>

Questions

**Perkins&Will Project: Mayo Clinic Jacksonville; Mangurian Building
Jacksonville, Florida**

Thank you!



Perkins&Will