

Optimizing the Indoor Health of Multifamily Properties through Energy Efficiency

When it comes to making energy efficient upgrades within multifamily properties, lower energy use is not the only advantage. Energy efficient improvements can help lower costs, support the environment, and when you select healthy building materials, you can also provide a healthier indoor environment for owners and residents.

Healthy Building Tips for Insulation and Air Sealing

Evaluating insulation and air sealing materials is a great place to start, especially considering both are critical to maintaining comfort and efficiency all year long. Here are some tips to help ensure both health and efficiency.



Insulation

Recommendation: fiber glass and cellulose insulation

Commonly used fiber glass and cellulose insulations are some of the highest ranked from a health perspective and have the lowest installed cost for any given R-value. For applications with few space restrictions, the same insulative performance can be achieved with these healthier materials, and the cost savings per R-value on the insulation may allow for separate air-sealing measures, if needed.[†]

Avoid: products with formaldehyde-based binders

Formaldehyde is a carcinogen and respiratory hazard, even at low levels.[†]

Ranking of Building Insulation Materials			
Health-Based Ranking Information			
Rank (Green is best; red is worst)	Insulation Type	Common Chemical Content of Highest Concern and Associated Health Hazards*	Relative Installed Cost per R-value ²³
RECOMMENDED MATERIALS	Expanded Cork Board		\$\$\$\$
	Loose-Fill Fiber Glass		\$
	Dense-Pack Fiber Glass		\$\$-\$
	Spray-Applied Fiber Glass		\$\$-\$
	Fiber Glass Batts/Blankets (Kraft-Faced and Unfaced)		\$
	Fiber Glass Batts/Blankets (PSK-Faced (polypropylene-scrim-kraft) or FSK-Faced (foil-scrim-kraft), Basement Wall Insulation)		\$\$-\$
	Cellulose/Cotton Batts and Blankets (Unfaced)		\$\$-\$\$\$
	Loose-Fill Cellulose		\$
	Dense-Pack Cellulose		\$\$-\$
	Wet-Blown Cellulose		\$\$-\$
	Mineral Wool Batts	Formaldehyde-based binder (can release formaldehyde which has cancer and respiratory hazards)	\$
	Mineral Wool Boards	Formaldehyde-based binder (can release formaldehyde which has cancer and respiratory hazards)	\$\$-\$\$\$
	Polyisocyanurate (Polyiso)	Halogenated flame retardant (Tris(1-chloro-2-propyl) phosphate (TCPP)): developmental, reproductive, potential carcinogen**	\$\$-\$\$\$
	Expanded Polystyrene (EPS)	Halogenated flame retardant (HBCD): PBT, developmental	\$\$\$
	Extruded Polystyrene (XPS)	Halogenated flame retardant (HBCD): PBT, developmental	\$\$\$
	Spray Foam Insulation (SPF)	Organotin catalyst (Dibutyltin dilaurate): PBT, reproductive Halogenated flame retardant (TCPP): developmental, reproductive, potential carcinogen** Isocyanates (Methylene diphenyl diisocyanate (MDI), Polymeric MDI (PMDI)): respiratory	Closed cell: \$\$\$ Open cell: \$\$-\$\$\$

* Chemicals of highest concern found to be common based on the Common Product research. These include persistent, bioaccumulative toxicants (PBTs), halogenated flame retardants, isocyanates, formaldehyde-based binders, and phthalates. Only chemicals of concern that are intentional content in the products are listed in this table. For more complete information on all chemicals of concern, see the individual product type information in Part III of the Materials Encyclopedia and the Common Product profiles in Partas.

** While there is currently limited data regarding the carcinogenicity of TCPP, chemicals of similar structure have been identified as carcinogens, suggesting a potential cancer concern for TCPP as well.²⁴

²³ Estimate of relative installed cost per square foot, per R-value. Based on information compiled from various sources. Scale of project, location, and other factors may affect relative costs. Relative costs are not comparable across the different tables in this report.

[†] Making Affordable Multifamily Housing More Energy Efficient: A Guide to Healthier Upgrade Materials, 2018, Energy Efficiency for All, Chapter 3



Air sealing

Recommendation: caulk-type sealants to spray foam sealants

Spray foam sealants have the lowest relative cost to seal a given space because of their low density, but they contain many chemicals of high concern.[†]

Avoid: phthalate plasticizers

In some categories of sealants, phthalate plasticizers are still used. Make sure the sealants you use are free of these hazardous chemicals.

Multipurpose Sealants Ranking			
Health-Based Ranking Information			
Rank (Green is best; red is worst)	Sealant Type	Common Chemical Content of Highest Concern and Associated Health Hazards*	Relative Material Cost**\$6
	Noncombustible Sodium Silicate Caulk		\$\$\$
RECOMMENDED MATERIALS	Expanding Polyurethane Foam Sealant Tape	Nonylphenol ethoxylate (NPE): contains and breaks down into nonylphenols which have PBT, reproductive, and developmental hazards	-\$-\$\$\$**
	Acrylic Latex Sealant		\$\$
	Siliconized Acrylic Sealant		\$\$
	Intumescent Acrylic Firestop Sealant		\$\$\$\$
	One-Component Silicone Sealant	Volatile methylated siloxane (Octamethylcyclotetrasiloxane (D4)): PBT 10,10'-Bis(phenoxyarsinylo)oxide: PBT, cancer	\$\$\$
	Modified Polymer Sealant (STPE Sealant)	Organotin catalyst (Di-n-butyltinbis (acetylacetonate)): PBT, developmental Phthalate (Diisodecyl phthalate (DIDP)): developmental	\$\$\$
	One-Part Polyurethane Spray Foam Sealant	Halogenated flame retardant (TCPP): developmental, reproductive, potential carcinogen** Halogenated flame retardant (Medium chain chlorinated paraffins — in Fireblock version): developmental Isocyanate (PMDI): respiratory	\$
	One-Component Polyurethane Sealant	Organotin catalyst (Dibutyltin dilaurate): PBT, developmental Phthalate (DIDP): developmental, respiratory Isocyanate (Toluene diisocyanate (TDI)): respiratory	\$\$\$

*Chemicals of highest concern found to be commonly used based on the Common Product research. These include persistent, bioaccumulative toxicants (PBTs), halogenated flame retardants, isocyanates, formaldehyde-based binders, and phthalates. Only chemicals of concern that are intentional content in the products are listed in this table. For more complete information on all chemicals of concern, see the individual product type information in Part IV of the Materials Encyclopedia and the Common Product profiles in Pharos.

** While there is currently limited data regarding the carcinogenicity of TCPP, chemicals of similar structure have been identified as carcinogens, suggesting a potential cancer concern for TCPP as well.^{††}

† Estimate of relative material cost per linear foot sealed at a set width and depth. Based on information compiled from various sources. Scale of project, location, and other factors may affect relative costs. Relative costs are not comparable across the different tables in this report.

†† There can be a wide variation in cost for expanding polyurethane foam sealant tape. Interior-only sealant tapes are usually cheaper than dual-purpose interior and exterior tapes. The tape expands to fill the gap that is present, so for smaller gaps, the cost per volume filled will be greater than for larger gaps.

† Making Affordable Multifamily Housing More Energy Efficient: A Guide to Healthier Upgrade Materials, 2018, Energy Efficiency for All, Chapter 3

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