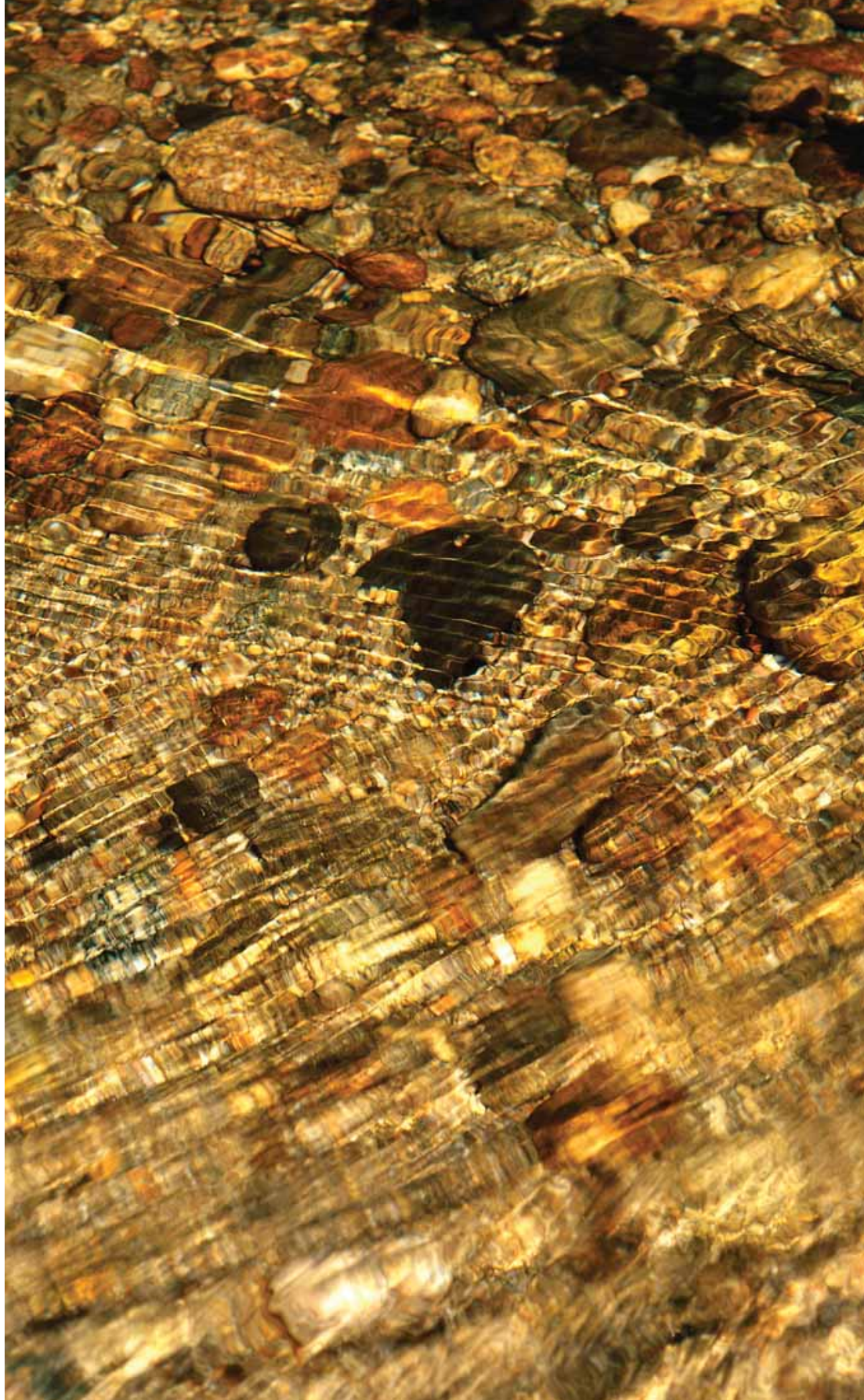


A close-up photograph of a green leaf, showing a detailed network of veins. The veins are a lighter shade of green, creating a complex, grid-like pattern against the darker green leaf surface. The lighting is even, highlighting the texture and structure of the leaf.

green.

LONSEAL



Ice Cap, N°211

Sandalwood, N°212

Mica, N°219

Solar Flare, N°221

Mint, N°216

Left

Crafted from an average of up to fifty percent recycled vinyl and wood powder, LonEco outperforms other surfaces in tests for indoor air quality and low lifecycle cost – emitting ten times less volatile organic compounds than linoleum and half as much as rubber. With LonEco, vinyl is Greener than ever.

The Importance of Being Green


Are the products you specify for your building projects environmentally friendly?

If you're like a growing number of architects and designers, this is a critical concern. At Lonseal, we share your passion for better preserving our precious resources and natural environment.


Over the past few decades, the vinyl industry has made major strides in manufacturing Green products. Unfortunately, misconceptions and mistruths abound about vinyl being "bad for the environment."

In order to set the record straight and help Green architects make better-informed decisions, this booklet explains why vinyl can help you create buildings that are better for the indoor environment and for the planet as a whole.


We invite you to learn more about the reality of vinyl—and how Lonseal can be your partner in making the world a Greener place.




Golden Oak, N°82




Ebony, N°87



Amber, N°78



Indigo, N°86



Cherry, N°79

Left

*This enchanting, durable, subtly-embossed sheet magically evokes the open-grain of natural oak and the nuance of knot-free, quarter-sawn plank. With a dozen delightfully authentic color-patterns, there's no doubt that **Lonwood Dakota** is the soul of wood made wonderful.*

Vinyl: Myth vs. Reality

The charges against vinyl can be boiled down into three statements:

- 1 All **production** of vinyl is inherently bad for people and the environment.
- 2 Once **installed**, vinyl emits carcinogens and is therefore bad for the indoor environment.
- 3 After **disposal**, vinyl emits toxins and pollutes the environment.

These charges are a combination of gross exaggerations of scientifically proven facts and direct contradictions of empirical evidence. To understand why, consider the facts surrounding each accusation.

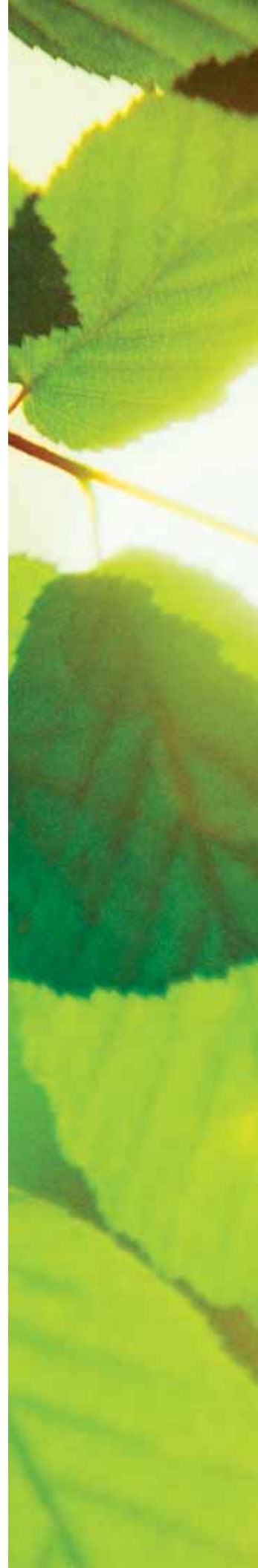
MYTH 1

All production of vinyl is inherently bad for people and the environment.

This myth rests on misconceptions about a carcinogenic gas called vinyl chloride monomer (VCM).

VCM is indeed a carcinogen and a byproduct of vinyl production. However, vinyl's critics go too far when asserting that harmful levels of this toxin are emitted into the environment by vinyl production.

Up until three decades ago, vinyl plant workers were exposed to harmful levels of VCM as it was released into the workplace. Why? At the time, VCM's carcinogenic effects (specifically angiosarcoma, a rare form of liver cancer) were not widely known.



EPA CHART

Putting Risks in Perspective¹

One Chance In:	Risk of Harm From:
10	• STROKE • CAR ACCIDENT
100	• HOME ACCIDENT • FIRE
1,000	• POISONING
10,000	• LIGHTNING
100,000	
1,000,000	• VCM EXPOSURE

However, in 1975, the U.S. Occupational Safety and Health Administration (OSHA) introduced strict regulations concerning VCM emissions, limiting the maximum workplace exposure to an average of one part per million over an eight-hour shift. In response, vinyl factories overhauled their production systems to recycle VCM back into a closed loop.

The results of OSHA regulations and industry improvements have been impressive.

- There have been no documented cases of angiosarcoma among vinyl product factory workers who began working in these factories after the VCM-emissions-controls procedures were reformed.²
- No vinyl chloride monomer was detected when peer-reviewed air monitoring studies were conducted to measure the progress of vinyl factories' emissions controls.³
- The Environmental Protection Agency (EPA) reports that drastic cuts in VCM emissions in the United States have resulted in a lifetime distribution cancer risk to *less than one in a million persons*, per EPA risk characterizations.⁴

In sum, due to changes in vinyl production methods, VCM gas is no longer a significant danger to vinyl plant workers, the population at large or the environment.

Similar claims about the emission of harmful levels of dioxin during vinyl production are also outdated or unfounded. Since the EPA enacted its emissions controls and regulations in the 1970s, dioxin levels in the environment have "decreased significantly." Indeed, from 1987 to 1995, dioxin emissions dropped 80 percent.⁵ As a result of these improved emissions controls, household fireplaces account for more dioxin emissions in the U.S. than vinyl production.⁶

Elsewhere, Europe and Japan have also mandated strict emissions controls to protect the safety of vinyl plant workers and the environment.⁷

Reality: Under current emissions controls, vinyl production is *not* bad for the environment.

Right

Available in an exciting range of next-generation hues, the unparalleled, subtle, stippled mini-embossing of **Lonfloor Vista** brings an alluring new dimension to all kinds of smooth surfaces – offering so unique a design for your floors or wall-surfaces that you have to feel it and see it to believe it.

MYTH 2

Once installed, vinyl emits carcinogens and is therefore bad for the indoor environment.

Some vinyl critics claim that installed vinyl “contains” and emits VCM and other carcinogenic chemicals, particularly dioxin and phthalates. A careful review of the facts disproves both charges.

During vinyl production, VCM gas is *chemically transformed* into a solid with completely different chemical properties called polyvinyl chloride (PVC). Remarkably stable and non-carcinogenic,⁸ saying that PVC is dangerous because the carcinogen VCM was used to make it is like saying that water is dangerous because unstable hydrogen was part of its formation.

The second groundless claim is that once installed, vinyl gives off “carcinogenic” chemicals such as dioxin and phthalates.

In fact, PVC does not emit dioxin unless it is:

- burned at low temperatures (such as those found in a wildfire), or
- heated to near-combustion temperatures,⁹ an unlikely state for vinyl to reach in everyday use.

During a building fire, vinyl would indeed give off potentially-carcinogenic dioxin, posing a risk to firefighters and fire victims. However, it’s important to realize that *many, if not most, materials* used in buildings emit dioxin and other toxins under such conditions.

As for phthalates: Plasticizers that include phthalates are added to many forms of vinyl to increase pliability. Over long periods of time, these plasticizers do indeed migrate (or are emitted) out of the vinyl matrix. So, does this action represent a threat to humans?

One study, which exposed laboratory rats to plasticizers until they developed cancer, is often cited as proof that these plasticizers are harmful to humans as well. But in order to duplicate the carcinogenic effect in humans that the researchers produced in rats, a person would have to ingest 500 grams of plasticizer over 100 days¹⁰—an impossible feat under normal conditions with any room’s vinyl.

Furthermore, two federal institutions have conducted their own studies on the carcinogenic risk of phthalates (plasticizers). The U.S. Consumer Product Safety Commission concluded that, *at most*, the risk to humans was “extremely low.”¹¹ The National Institute of Health also weighed in, concluding that the risk from phthalates was likewise insignificant.¹²

Reality: The use of vinyl in installations is *not* harmful to the indoor environment.



Both U.S. Consumer Products Commission and National Institute of Health studies show that vinyl's plasticizers do *not* pose significant health risks.

MYTH 3

After disposal, vinyl emits toxins and pollutes the environment.

The third myth starts with the assumption that when disposed vinyl enters the waste stream, it breaks down into toxic chemicals (e.g., dioxin) that can pollute the air and/or groundwater.

As noted earlier, PVC is very stable. It will emit dioxin only if, for instance, burned in a wildfire or heated to near-combustion temperatures. However, a waste facility with proper fire controls will preclude the former scenario, while a facility that professionally incinerates vinyl at high temperatures will prevent the latter one.¹³

This myth also purports that vinyl "decomposes" in the waste stream. For example, accusations were recently made that vinyl waste was leaching vinyl chloride into landfills. The California Integrated Waste Management Board found otherwise, pinpointing the probable cause of such chemicals in the ecosystem to be "microbial action on chlorinated solvents," such as those found in household cleaners.¹⁴

Interestingly, some waste management facilities even line their landfills *with vinyl* to prevent their refuse from contaminating the local ecosystem and groundwater.¹⁵

Reality: Under most normal circumstances, vinyl does *not* pollute the environment after disposal.

Arctic Haze, N°653

Snowfall, N°641

Timberland, N°652

Lavender Fields, N°655

Titanium, N°640

Some Green Virtues of Vinyl

A stark irony to the current castigation of vinyl is this: In many ways, vinyl is better for the environment than building products that are favorites of vinyl's critics.¹⁶ Take linoleum, for instance.

Linoleum flooring is widely thought to be “the” Green floor, a reputation refuted by a 1999 study titled, “Environmental and Economic Impact Analysis—Flooring Materials.” In this study, the U.S. Commerce Department tried to establish a yardstick to measure manufacturers’ Green product claims.

The Commerce Department defined six criteria for gauging a product’s overall eco-friendliness (see table below). During the study, the government conducted a lifecycle analysis (LCA) of the products, comparing the impact of the following for each product:

- manufacturing process
- transportation
- installation
- typical daily use
- disposal

The comparison between vinyl flooring and linoleum flooring was particularly enlightening. As the table below shows, vinyl was found to be Greener than linoleum on most of the environmental-impact measures. The findings of the Commerce Department study (and other studies, see endnotes Sources) should cause all those who are skeptical of the eco-friendliness of vinyl to reconsider their doubt.¹⁷

Consider also the innovations of some vinyl manufacturers, such as recycled content that meets current LEED standards, ultra-low volatile organic compounds (VOC) plasticizers, and “dry-erase” wear layers that can reduce the need for mopping and the dumping of chemical-laden run-off water into the waste stream.

Add it all up, and it’s clear that portrayals of vinyl as “non-Green” are both simplistic and inaccurate.



VINYL: GREENER THAN LINOLEUM¹⁸

Criteria	Impact of the product on ...	Findings	Details
Solid waste	the waste stream (i.e., how much trash resulted from it)	Better for the environment than linoleum	Vinyl lasts longer once installed (esp. higher-grade and sheet vinyl surfaces), resulting in less waste over time.
Indoor air quality	the indoor environment	Better for the environment than linoleum	Once installed, many types of vinyl flooring emit less volatile organic compounds (VOC) than linoleum.
Nutrification (or eutrophication)	the facilitation of unhealthy organisms	Less environmental impact than linoleum	As a polymer, vinyl does not facilitate bacterial and microbial overgrowth-pollution as much as natural-materials products such as linoleum.
Acidification	the genesis of acid rain	Less environmental impact than linoleum*	Some studies show that vinyl production contributes less to the creation of acid rain than linoleum production, while other studies show the inverse.
Global warming	the average ambient temperature of Earth	Less environmental impact than linoleum*	The impact of vinyl production on global warming is disputed, but some key studies show that the total impact of vinyl production on global warming is less than the total impact of linoleum production
Resource depletion	the consumption of natural resources, including fossil fuels	Linoleum: slightly better for the environment than vinyl	As a polymer, vinyl requires more fossil fuel consumption than linoleum (during its production).

* Other key studies have contradicted this conclusion on acidification while supporting this evaluation in terms of eutrophication and global warming.¹⁹

Lonseal's vinyl was found to emit less VOCs than linoleum and rubber – averaging half the VOC emissions of rubber and one-tenth (or ten times lower) the VOC emissions of linoleum.

*Right
Lonfloor Nova's array of
luminous, metallic-flecked,
color-shifting pigments
creates an alluring surface
sheen. And its tough, 100-
micron-thick, factory-applied,
UV-cured urethane finish
cleans up with ease. (Silver
Award Winner—Best of
NeoCon 2004—Flooring)*

Lonseal's Green Innovations

While vinyl manufacturers have made great progress in recent years, Lonseal is never satisfied with the status quo. We are always striving to raise the Green bar with ever-more eco-friendly products. That's why we developed the revolutionary LonEco surface series.

The LonEco series averages 50% recycled materials content from post-industrial recycled vinyl and wood powder. This qualifies LonEco for credits under the US Green Building Council (USGBC) LEED Green Building Standards MR4.1 and MR4.2.

In independent small-chamber environmental testing designed specifically to emulate real-world conditions (expertly acknowledged as the only valid test of products' VOC impact)²¹, LonEco was found to produce:

- 1/10 the VOC emissions of linoleum
- 1/2 the VOC emissions of rubber²²

Studies have shown that creating better indoor air quality can improve productivity and save \$20-\$160 billion nationwide in costs related to respiratory disease, allergies/asthma and sick building syndrome.²³ The results prove that LonEco is better for indoor air quality than both linoleum and rubber.

We are also introducing a range of UV-cured, factory-applied, urethane-finish products. Due to their low-maintenance, dry-erase finishes, these products can reduce detergent-laden wastewater—yet another Lonseal benefit to the environment.

Finally, our new GreenAir formulation represents our boldest Green innovation ever. Incorporating a revolutionary plasticizer and pigmentation composition, our GreenAir product versions can reduce VOC emissions by an additional 80-90% above our already-low rate. Visit lonseal.com/press.html to learn more about the exciting GreenAir surfaces and other incredible Green innovations coming to market.



High Sun, N°700



Storm Cloud, N°702



Cactus Tree, N°703



Sand Swirl, N°705



Riverbed, N°704

Left

Featuring natural tones, LonEco Mesa's clean, matte finish creates a more comfortable, eco-friendly environment, while its slip-fighting embossing and superior indoor air quality (IAQ) can make interiors safer as well – stylishly enabling credits under the LEED Green Building System.

Know the Truth

The desire for a Greener environment is a worthy goal, and one that Lonseal shares.

In attempting to make their case, however, some anti-vinyl extremists have abandoned facts in favor of hyperbolic rhetoric. This strategy has muddled the vinyl debate, blurring the lines and distorting the truth for architects and designers looking to pursue the Greenest avenues possible.

At Lonseal, we want simply to present the facts about vinyl. Once the design community knows the truth about this venerable, high-performance building material, it can act accordingly.

The truth is this: Vinyl is not bad for the environment—not during its current modes of production, not during its typical use, not after its disposal. In fact, on the central criteria of solid waste generation and indoor air quality, vinyl is better for the environment over its lifecycle than alternatives such as linoleum.

Lonseal invites you to join us on the cutting edge of Green building design and material innovation. For more information on the real virtues of vinyl, please visit our Web site at lonseal.com/press.html. For Customer Service (including requests for product samples), please visit lonseal.com and click on Contact Us.

With the truth in hand, there is nothing we cannot accomplish together.



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