

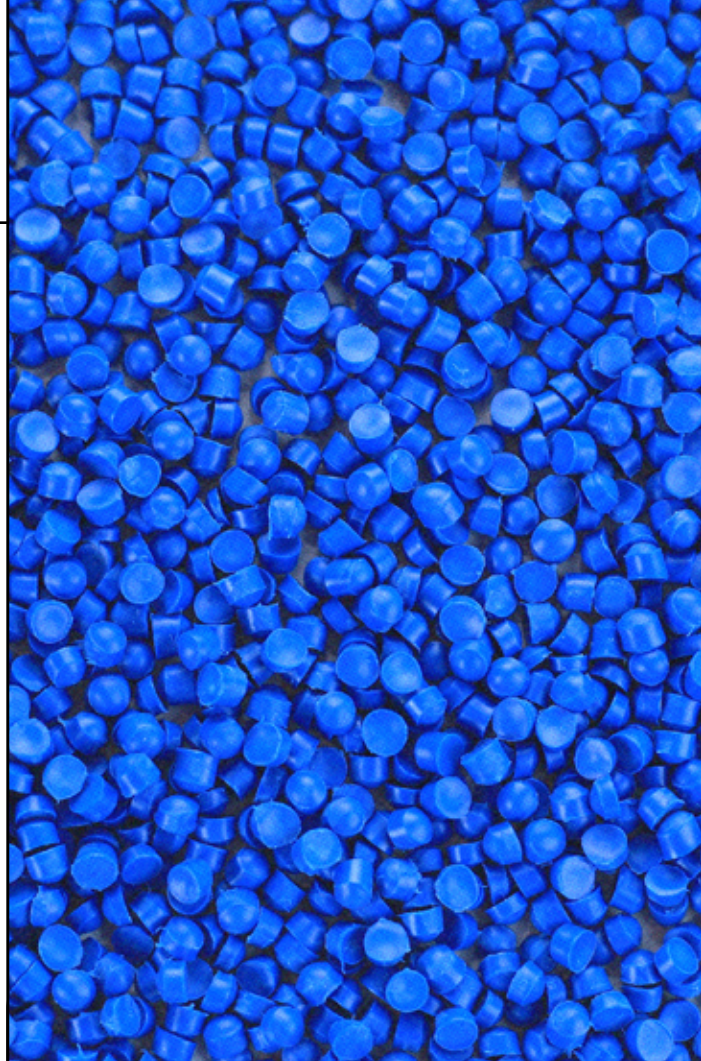
# Polyvinyl Chloride (PVC)

## Chemical and Environmental Justice Impacts in the PVC Life Cycle

Many AEC professionals may not be aware that the building products they specify can have environmental justice impacts.

Product manufacturing often involves the use and release of toxic chemicals throughout the supply chain, impacting human and environmental health and contributing to environmental injustice.

As built environment practitioners seek to reduce the environmental justice harms caused by their material selections, understanding the role that PVC plays can help raise awareness of potential impacts.



### WHAT IS ENVIRONMENTAL JUSTICE?

The Environmental Justice Health Alliance for Chemical Policy Reform (EJHA) defines environmental justice (EJ) as a set of principles and a grassroots-led movement that “arose in response to the disproportionate exposure of communities of color and low-income communities to harmful pollution, toxic sites and facilities, and other health and environmental hazards.”<sup>1</sup>

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Read more about the [Principles of Environmental Justice](#).

## This study explored the chemical and environmental justice impacts of PVC manufactured in the United States.

You may be familiar with polyvinyl chloride (PVC), also known as vinyl, through its use in PVC pipes and roofing membranes; vinyl siding, windows, and flooring (luxury vinyl tiles, vinyl composition tile, vinyl sheet, wood plastic composite, and stone plastic composite); coated wire shelving; and window blinds.<sup>2</sup> PVC is the most used plastic in the built environment.<sup>3</sup> When choosing products, it is important to consider how they contribute to environmental injustice through their life cycle and how a different material choice might reduce those impacts.

### Habitable assessed the chemical hazard and environmental justice impacts of PVC according to five criteria:

- 1 avoid hazardous chemicals
- 2 prevent accidents
- 3 prevent pollution and waste
- 4 abide by environmental regulations
- 5 prevent disproportionate and cumulative impacts.

Habitable's analysis included the 14 facilities that manufacture PVC in the United States.<sup>4,5</sup> This research was conducted in 2024.

Learn more about Habitable's research process in our [Chemical and Environmental Justice Impacts Methodology](#).

### Key Findings:

- PVC is derived from fossil fuels and requires the use of many hazardous chemicals in its manufacturing process.
- Hazardous chemical incidents—such as fires, spills, and other nonroutine releases throughout the supply chain—have injured workers and resulted in shelter-in-place orders in nearby communities.
- PVC production facilities generate hundreds of millions of pounds of related hazardous chemical waste, including releases to the air and water, each year.
- Facilities that make PVC have a history of noncompliance with U.S. Environmental Protection Agency (EPA) regulations, with a third of the facilities in significant violation for all of the previous 12 quarters.
- The combined communities surrounding PVC manufacturing have a higher percentage of children, people of color, and limited English-speaking households than the U.S. overall.

CRITERIA FOR CHEMICAL AND ENVIRONMENTAL JUSTICE IMPACTS	FINDINGS ON POLYVINYL CHLORIDE (PVC)
<p><b>Avoid hazardous chemicals</b></p>	<p>Inputs are primarily fossil fuel-based.</p> <p>About two-thirds of chemicals used as inputs for PVC production (4 chemicals) are hazardous to human health.</p> <p>About 80% (5 chemicals) are highly reactive or flammable.</p> <p>All of the chemical inputs used for PVC production (6 chemicals) are volatile.</p> <p>We identified 9 hazardous by-products, including dioxins, PCBs, and chemicals that contribute to global warming and ozone depletion (carbon tetrachloride and CFC-11).</p> <p>PVC is an occupational asthmagen through exposure to thermal degradation products and unheated PVC dust.</p>
<p><b>Prevent accidents</b></p>	<p>Incidents at facilities throughout the PVC manufacturing supply chain have injured workers and resulted in shelter-in-place orders for nearby communities.</p>
<p><b>Prevent pollution and waste</b></p>	<p>Facilities manufacturing PVC in the United States report that they:</p> <ul style="list-style-type: none"> <li>• generate about 400 million pounds of hazardous PVC-related chemical waste on average each year (combined);</li> <li>• release an average of over 1.6 million pounds of hazardous PVC-related chemicals into the air and water each year (combined).</li> </ul> <p>Some of this waste and these releases may be tied to other processes at these facilities. Some facilities do not perform all steps of PVC production on site. Releases of related process chemicals at other facilities in the supply chain are not included in this study.</p>
<p><b>Abide by environmental regulations</b></p>	<p>57% of PVC facilities had significant violations of EPA regulations within the previous 12 quarters.</p> <p>36% of facilities had significant violations in every quarter.</p>
<p><b>Prevent disproportionate and cumulative impacts</b></p>	<p>Compared with the United States overall, the combined communities surrounding PVC manufacturing facilities have a:</p> <ul style="list-style-type: none"> <li>• higher percentage of people of color (70% near PVC facilities versus 40% in the U.S. overall);</li> <li>• lower percentage of low-income households (21% versus 30%);</li> <li>• higher percentage of limited English-speaking households (6% versus 5%);</li> <li>• higher percentage of children than the nation overall (26% versus 22%).</li> </ul> <p>We further found cumulative impacts:</p> <ul style="list-style-type: none"> <li>• Three different communities each face compounded health impacts from pairs of PVC facilities operating close to one another.</li> <li>• One city with a PVC manufacturing facility contains no other industrial sites that release and/or manage hazardous chemicals; whereas, other cities contain many other industrial sites—up to 60 in one instance.</li> <li>• Three cities that we researched contain more than 20 other industrial sites.</li> <li>• In 2022, each individual city experienced collective releases of hazardous chemicals ranging from 21,000 pounds in one location to 16 million pounds in another.</li> </ul>

## Research Details

EPA reports violations quarterly. Compliance data for PVC facilities is from July 2024.

TRI analysis was based on data through the 2022 reporting year. Average annual releases and waste represent the most recent five years for which data was available at the time of the research (2018–2022).

Habitable used EJScreen version 2.3, including U.S. Census Bureau American Community Survey data for 2018–2022.

Sources specific to PVC are included to the right and in the accompanying spreadsheet. See Habitable's Chemical and Environmental Justice Impacts Methodology for other sources used in our analysis.

## Sources

- 1 EJHA. What Is Environmental Justice?. Environmental Justice For All. <https://ej4all.org/about/environmental-justice> (accessed 2025-01-17).
- 2 Habitable. Pharos Common Products, 2025. <https://pharos.habitablefuture.org/common-products>.
- 3 Geyer, R.; Jambeck, J. R.; Law, K. L. Production, Use, and Fate of All Plastics Ever Made. *Sci. Adv.* 2017, 3 (7). <https://doi.org/DOI: 10.1126/sciadv.1700782>.
- 4 Environmental Integrity Project. Plastics Plants Inventory. <https://environmentalintegrity.org/plastics-plant-inventory/> (accessed 2024-06-24).
- 5 Material Research L3C. Material Research World Atlas. <https://experience.arcgis.com/experience/3ff82579637f4c7a96bd62d039ac3e00/page/About/> (accessed 2024-06-24).