

TOXIC **AT ANY SPEED**

Chemicals in cars and
the need for safe alternatives

A REPORT BY THE ECOLOGY CENTER

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ECOLOGY CENTER

The Ecology Center is a nonprofit environmental advocacy organization that works for healthy communities, clean products and clean production. The Auto Project of the Ecology Center works to address toxic and health issues related to the production of automobiles and promotes cleaner vehicle technologies. The Ecology Center is based in Ann Arbor, Michigan.

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EXECUTIVE SUMMARY

WHEN MOST PEOPLE THINK about auto safety, seatbelts and air bags likely come to mind. But cars also pose hidden hazards that endanger drivers and passengers even before turning on the ignition. Chemicals used to make seat cushions, arm rests, floor coverings and plastic parts can break down into toxic dust that is inhaled, becoming a serious health risk.

According to the Environmental Protection Agency (EPA), indoor air pollution is one of the top five environmental risks to public health. Next to homes and offices, Americans spend the greatest amount of time in their cars—more than 100 minutes per day on average.

This study by the Ecology Center, *Toxic at Any Speed: Chemicals in Cars & the Need for Safe Alternatives*, found that concentrations of some toxic chemicals in automobile interiors were five to ten times higher than those found in homes and offices, thus making cars a significant contributor to overall indoor air pollution.

PBDEs and Phthalates

This report examines two classes of toxic compounds: polybrominated diphenyl ethers (PBDEs) and phthalic acid esters (phthalates). PBDEs, used as flame retardants, and phthalates, used to soften plastics, were chosen due to their toxicity and ubiquity in the environment.

PBDEs are used in car interior fabric backing, wire insulation, electronic enclosures, arm rests, floor coverings and other plastic parts. These chemicals are known to cause neuro-developmental damage, thyroid hormone disruption and possibly liver toxicity in test animals. Given the high levels of PBDEs in cars compared to homes or offices, exposure during a 90-minute drive is similar to the exposure from eight hours at work.

Phthalates, the second group of toxic compounds examined in this study, are predominantly used as plasticizers and are found in a large variety of polyvinyl chloride (PVC) products in vehicles including seat fabrics, body sealers, instrument panels, and interior trim. These chemicals have been linked to birth



defects, impaired learning, liver toxicity, premature births, and early puberty in laboratory animals, among other serious health problems.

This study found that not only are drivers and passengers exposed to these toxic chemicals through inhalation of air and dust, but that these chemicals in cars pose a particular threat; frequent exposure to the sun's heat and UV light increases their levels and may exacerbate their toxicity. Since automobiles have 360-degree windows, cars can heat up to 192°F; and UV exposure from parking in the sun creates a favorable environment for chemical breakdown.

Car Manufacturer Rankings

The Ecology Center collected windshield film and dust samples from randomly selected 2000 to 2005 model cars made by 11 leading auto manufacturers. Rankings of these companies by the concentration of PBDEs and phthalates found on windshield films are presented in Table ES1.

Table ES1: Ranking of Vehicles by Company (Windshield Film Concentrations)

Auto Company	Total PBDE, $\mu\text{g}/\text{m}^2$	Auto Company	Total Phthalates, $\mu\text{g}/\text{m}^2$
Hyundai	0.054	Volvo	3
Volvo	0.152	BMW	3
BMW	0.178	VW	4
Honda USA	0.193	General Motors	5
Ford	0.280	Toyota USA	6
General Motors	0.301	Honda USA	6
Toyota	0.323	Mercedes	6
Honda	0.351	Honda	7
VW	0.594	Subaru	7
Subaru	0.744	Chrysler	7
Toyota USA	0.936	Toyota	8
Chrysler	1.021	Ford	10
Mercedes	1.772	Hyundai	24

Alternatives

The presence of PBDEs and phthalates in automobile interiors, when coupled with the many other sources of exposure to these compounds in daily life, is both troubling and unnecessary, especially when alternatives exist and are already used by some automakers.

As seen in the above chart, Volvo was found to have the lowest level of phthalates and the second lowest level of PBDEs, making it the industry leader in terms of indoor air quality in cars. Volvo also proves the feasibility of replacing these harmful chemicals with safer alternatives. Volvo Group (the original parent company of Volvo), which produces trucks and buses, has prohibited the use of three types of phthalates and all types of PBDEs.¹

Other manufacturers claim they have eliminated PBDEs and phthalates from particular applications. For example, Ford reports that it has eliminated PBDEs from “interior components that customers may come into contact with.”² Honda also reports that it has eliminated most of its phthalate-containing PVC in its vehicles.³

Much of the motivation for these efforts is due to recent government initiatives in Europe and Japan. The European Union, for example, passed legislation in 2003

requiring the phase-out of PBDEs in electronic and electrical equipment. As a result, electronics manufacturers such as Apple, Dell, Hewlett-Packard, IBM, Panasonic and Sony have already eliminated PBDEs from their products. The European Union has also required phase-outs of phthalates in toys, childcare items, and cosmetics, resulting in similar elimination efforts in those industries. Other companies, like Volvo, have taken proactive action to get out ahead of future legislation.

In Japan, the Japanese Auto Manufacturers Association (JAMA) recently made headway toward improving air quality in cars when they announced a voluntary agreement of its members to reduce air concentrations of a number of volatile organic chemicals, including phthalates. These chemicals, also known as VOCs, are responsible for what is typically called “new car smell.”⁴ Several Japanese automakers have indicated efforts to reduce the use of these chemicals as a result of the initiative.⁵

In lieu of legislative action at the federal level, at least 9 U.S. states (California, Hawaii, Illinois, Maine, Maryland, Michigan, New York, Oregon and Washington) have passed laws banning two forms of PBDEs, penta and octa, which have been rapidly bioaccumulating in the environment. Additional legislation is being considered in at least six other states, as well as revisions of existing legislation that would extend PBDE phase-outs to all uses of deca, including automotive.





Recommendations

► FOR MANUFACTURERS

Manufacturers should reduce the health risk to vehicle occupants by phasing out PBDEs and phthalates in auto interior parts, setting specific timelines for its material and component suppliers. As an interim step, North American automakers should voluntarily comply with recent Japanese and European initiatives that limit hazardous air pollutant levels in auto interiors.

► FOR GOVERNMENT

Congress and individual states should encourage rapid action to gradually eliminate the use of PBDEs and phthalates by requiring phase out timelines and provid-

ing research and technical assistance to vehicle manufacturers for assessment and development of alternatives. Government purchasers should further require disclosure on the use of these substances in their purchasing specifications. Voluntary efforts should also be given public recognition.

► FOR VEHICLE OCCUPANTS

Fortunately, car owners can take some direct actions to minimize health risks from PBDEs and phthalates in car interiors. Some of these actions will also reduce the risks associated with other interior car pollutants. Drivers can reduce the rate of release and breakdown of these chemicals by using solar reflectors, ventilating car interiors, and avoiding parking in sunlight.