Tread lightly: Environmental implications of tire particles

By Kara Hunter

Tire particles are an inimitable threat to the environment. The regulation of tire particles is a rather bumpy road to traverse, especially when considering recent federal administrative changes.

Tire particles contribute to both microplastic and nanoplastic pollution. Since tire particles are derived from rubber mixed with a sophisticated blend of synthetic and natural materials, they are chemically unique. As tires shed, the materials which they are comprised of go on to pollute the environment in the form of particles and leachate. After tire particles are released into the air, they travel varying distances prior to their deposition.

Tire particles end up in wastewater, road/stormwater runoff and in oceans. The International Journal of Environmental Research and Public Health states that tire particles account for approximately five to ten percent of ocean plastic pollution. According to Science of the Total Environment, researchers estimate that the U.S. emits 1,524,740 metric tons of tire particles into the environment yearly.

Tire particles and the chemicals that they leach can be detrimental to aquatic life. According to a 2021 study in Science, 6PPD-quinone, the rubber-derived ozone transformation product of 6PPD, was discovered as a causative agent for urban runoff mortality syndrome in coho salmon. 6PPD is a chemical that prevents tires from degrading and helps them last.

On November 22, 2024, the EPA developed an agency-wide Action Plan to address 6PPD-quinone. The Action Plan coordinates activities across the EPA's programs to support progress towards Action Plan activities over the next four years.

Interestingly, tire pollution emitted per vehicle has increased in recent years as the production of electric vehicles has amplified. Since electric vehicles are much heavier than gas-powered or hybrid vehicles, electric vehicles contribute approximately 20 to 30 percent more tire pollution to the environment than gas-powered or hybrid vehicles of a comparable size. This begs the question as to whether the electric vehicle industry is in fact causing more harm than good for the environment.

The UN Economic Commission for Europe's World Forum for Harmonization of Vehicle Regulations developed a proposed methodology to measure emissions from tire abrasion. This data will be used to determine tire abrasion limits to be incorporated in UN Regulation No. 117 by September 2025 for tires fitted to passenger cars. Once the abrasion limits are in force, tire manufacturers must ensure that tires are below the set limits.

Further, the EU agreed to emission standards for cars and trucks, with a new regulation, Euro 7, set to be enforced in 2026. Euro 7 will regulate tire and brake particle emissions generated by the abrasion of brake pads and discs. Euro 7 rules are fuel and technology neutral, imposing the same limits regardless of whether the vehicle uses gasoline, diesel, electric drive trains, or alternative fuels. Euro 7 rules will set additional limits for particulate emissions generated by brakes and rules for microplastic production due to tire wear. The goal of the Euro 7 standards is to ensure cleaner vehicles, improve air quality, protect citizens' health, and protect the environment.

Starting in November 2026, European auto makers will be required to demonstrate that all new type-approved vehicles emit less than 7 mg of particulate matter per km from their brakes. By November 2027, this limit will also become mandatory for all newly registered vehicles. By 2035, this number will drop to less than 3 mg/km per vehicle. Electric vehicles must reach the 3 mg/km limit by November 2026.

Researchers and organizations have called for the regulation of tire particles in the U.S.; however, based upon recent reversals of EPA standards, it is likely that any regulation efforts pertaining to tire particles will be thwarted by the current administration.

For example, in March of 2025, lawmakers voted to reverse EPA standards set to reduce hazardous emissions from the rubber tire manufacturing process. Republicans argued that the rule increased compliance costs for the industry, resulting in higher prices for consumers. The EPA is currently reconsidering National Emission Standards for Hazardous Pollutants for various industries, including the rubber tire manufacturing industry. The Trump administration is also considering a two-year compliance exemption via Section 112(i)(4) of the Clean Air Act for affected facilities while the EPA goes through the rulemaking process. The CAA allows the President to exempt stationary sources of air pollution from compliance with any standard or limitation under Section 112 for up to two years if the technology to implement the standard is not available, and if it is in the national security interests of the country to do so. The EPA accepted Presidential Exemptions through March 31, 2025.

This is a vast departure from the Biden administration's finalized amendments to the NESHAP, which addressed unregulated emissions of hazardous air pollutants from the rubber processing subcategory and fulfilled the EPA's obligation to address all hazardous air pollutants from the rubber processing subcategory, as well as the EPA's obligation to address all

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hazardous air pollutants listed in the CAA. The action would have reduced emissions of total hydrocarbons and filterable particulate matter from the rubber tire manufacturing source category by approximately 171 tons per year.

Although regulation of tire particles is not expected to occur in the U.S. any time soon, changes are happening globally. It is likely that a future administration will follow through with the regulation of tire particles based on global trends. ■

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