

When the rubber meets the road, where does it go?

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<http://tinyurl.com/klmlbat>

All over the place, bud--including maybe in your lungs. For a long time conventional wisdom had it that tire particles were too coarse to do much harm and simply wound up as one more component of urban grit. Now we know better. Asthma and latex allergies have been on the rise in recent years, and some think tire dust is why.

Tires are a mix of materials, mostly synthetic and natural rubbers but also including carbon black, oil, sulfur, steel, and chemicals added as antioxidants, strengtheners, and fillers. They also contain varying amounts of potentially hazardous metals such as zinc, nickel, chromium, cadmium, and copper. As you drive, and especially as you corner and brake, your tires continually abrade against the road surface, and to some extent wear away just due to flexing as they roll along. This tire wear takes the form of rubber left on the road, heavy particles that quickly settle on the road and shoulder, and lighter particles that become airborne.

The rubber in car tires is typically about 40 percent natural--i.e., made from latex; there's even more latex rubber in truck tires. Putting a fine dust of latex into the air is a serious concern to those with latex allergies. Somewhere from 1 to 6 percent of the U.S. population has some sensitivity to latex, which can take the form of rashes, inflammation, asthma, and worse. (Health care workers who are constantly exposed to latex in the form of gloves and such have a higher rate of sensitivity, sometimes estimated at 15 percent or more.) While those values sound low and one can take steps to avoid latex exposure, if you live in an area with a lot of road traffic, airborne latex can make your life pretty miserable.

Those who aren't latex-sensitive don't get a break. Fine rubber particles, whether latex or synthetic, can lodge in your lungs and even enter your bloodstream. The Environmental Protection Agency has a whole category designated for such problematic particles: PM_{2.5}, or particulate matter less than 2.5 microns in size. Excessive exposure can lead to reduced lung capacity, bronchitis, asthma, accelerated heart disease, and death. One study claims that nearly 60 percent of airborne tire particles are small enough to be easily inhaled. I've heard tell that radial tires produce a finer dust that's more hazardous than what's produced by older-style bias-ply

tires; while that's plausible given tire construction differences, it's difficult to know for sure.

Tire dust that doesn't make it into the air can be problematic as well. Originally deposited on the pavement, it gets washed by rain into lakes and streams. Environmental scientist Alison Draper has shown that chemicals leaching out of tire dust can kill water organisms such as algae, plants, minnows, and snails. An Italian study found that the organic components of tire debris were toxic to frog embryos and to cultured human lung and liver cells.

How much rubber gets worn off of tires? Estimates vary widely--much depends on driving habits, vehicle weight, the type of road surface, and the type of tire. In the U.S., the amount is estimated to be on the order of 650,000 tons per year. A British study finds that about 10 to 20 percent of a tire's total weight is worn off during its lifetime, which works out to about 58,000 tons a year in the UK alone. Of that, the fraction consisting of those potentially toxic metals I mentioned is surprisingly high--36 tons of cadmium, more than 1,000 tons of copper, and nearly 3,300 tons of zinc. Pollution studies in the Los Angeles basin in the 1980s concluded that more than five tons of breathable tire dust were released into the atmosphere there each day, and there's no reason to think that figure's gone down since.

So just because tire dust isn't accumulating in huge black drifts along the roadside doesn't mean we can ignore it. What to do? One critical factor that determines how much rubber is lost from tires is inflation. Properly inflated tires create less rolling resistance than underinflated ones, build up less heat, flex less as they roll down the road, and release less latex into the environment. They also last longer and give you better gas mileage. So check your tire pressure next chance you get--not only will you be doing right by the environment, you might save a couple bucks.

— Cecil Adams