



Tyre abrasion

- > Tyre abrasion is the largest source of plastics in the environment according to current information.
- > Tyre abrasion particles are mainly found in soil and watercourses, but also in the air.
- > Proving the presence of these small plastic particles is a demanding task for metrology.

Tyre abrasion is the largest source of plastics in the environment

According to a model calculation¹, some 10,600 tonnes of tyre abrasion particles are released in Switzerland every year, around 8,100 tonnes of which actually enter the environment. A proportion of tyre abrasion particles can be removed by street cleaning and runoff water treatment.

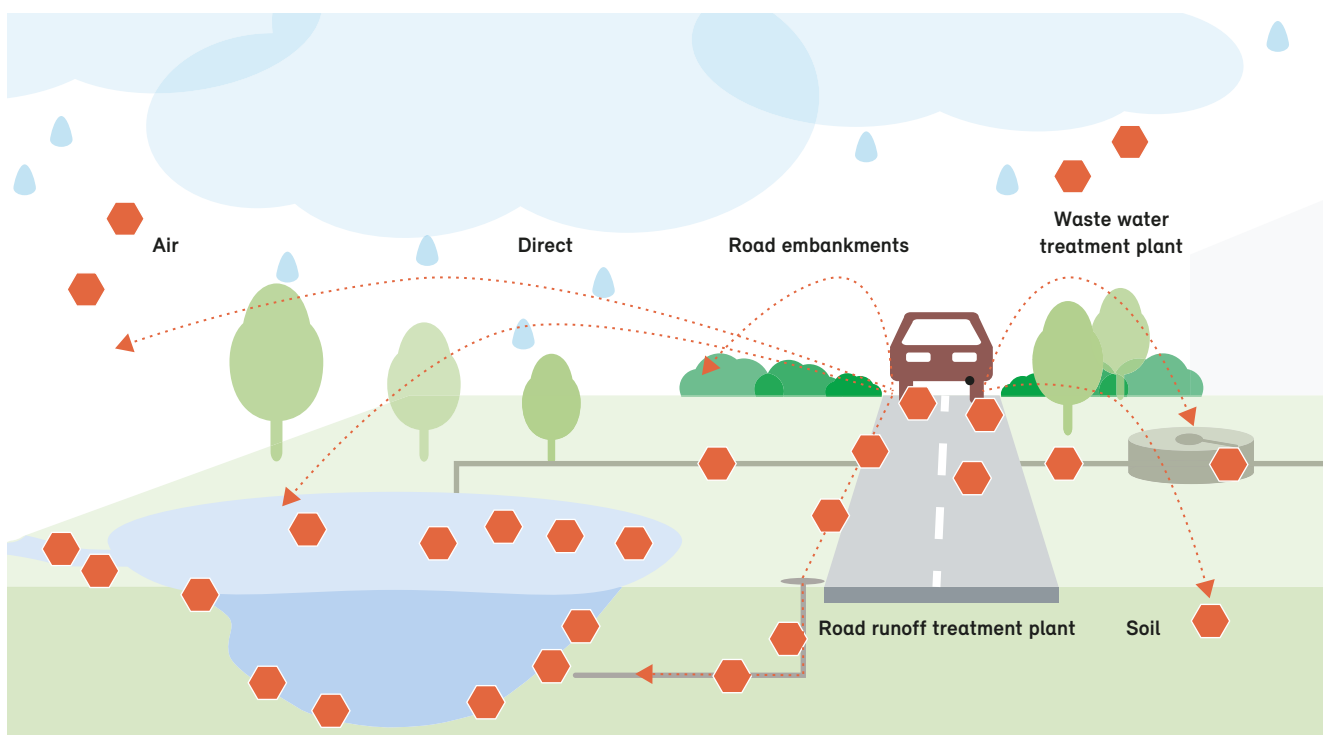
Tyre abrasion particles consist primarily of a mixture of synthetic and natural rubber, soot as a filler and other materials (e.g. metals and softeners). Rubber components in car tyres are also plastics. The particles are typ-

ically between 2.5 and 40 micrometres in size. Proving the presence of such very small plastic particles is, however, a demanding task for metrology.

Tyre abrasion particles are spread in rainwater and through the air

Tyre abrasion occurs on the roadways. Larger tyre abrasion particles remain on the roadways or are washed away with rainwater. Swiss water protection policy stipulates that road runoff on sections with a daily traffic level of over 15,000 vehicles must be treated. For roads connected to the combined sewer system or to road run-

Important sources of plastics from road traffic



off treatment plants, tyre abrasion particles can be removed to a large extent. This is generally the case for heavily used roads, although there is often no room for treatment plants in urban areas. For other roadways, tyre abrasion particles often enter watercourses with the road runoff or are deposited on road embankments (see *"Rivers and lakes"* factsheet). Tyre abrasion particles can also become airborne as a result of traffic. The particles are deposited on road embankments or are carried over considerable distances by the wind.

Most tyre abrasion ends up in the soil

According to a current model calculation¹, of the total actually entering the environment, just under three quarters (6,000 tonnes) of tyre abrasion particles end up in road embankments (the 5 metres on each side of the roadway), around 5% or 300 tonnes in other soils and 20% or 1,800 tonnes in surface waters. The 5 metres of soil bordering the roadways is therefore particularly heavily polluted (see *"Soil"* factsheet). A small proportion of the microplastics also remains airborne as particulate

matter (see *"Air"* factsheet). The percentage of tyre and brake abrasion particles in the respirable particulate matters PM10 and PM2.5 is in the low single digit range.

Behaviour and impact on the environment and health

The largest proportion of tyre abrasion particles consists of rubber and carbon black. According to estimates, since such plastics barely degrade, they remain in the environment for periods between several decades to centuries.

Particulate matter pollution from PM10 and PM2.5 had been in decline in Switzerland for years, and is only close to the limits at urban sites subject to heavy traffic. However, research is needed into the possible negative effects of tyre abrasion in the environment and on the health of living organisms (see *"Humans and animals"* factsheet).

Possible measures

- **Use low-abrasion brake pads, tyres and road markings.**
- **Lightweight cars**, correct tyre pressure, narrow tyres, regenerative braking.
- **Drive smoothly** (avoiding stop-and-go) and drive at lower speeds.
- **Street cleaning**, including waste water treatment.
- **Treatment of contaminated road runoff.**

¹ Press release Empa, 14.11.2019: Model calculation of tyre abrasion in Switzerland

Further information

- FOEN information for specialists on fine particles
- FOEN information for specialists on transport policy and spatial planning (in German, French and Italian)
- FOEN information for specialists on waste water treatment (in German, French and Italian)