



PRESS RELEASE

GROUP

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Tire Technology Expo 2024:

MICHELIN innovates to push forward knowledge on tire and road wear particles

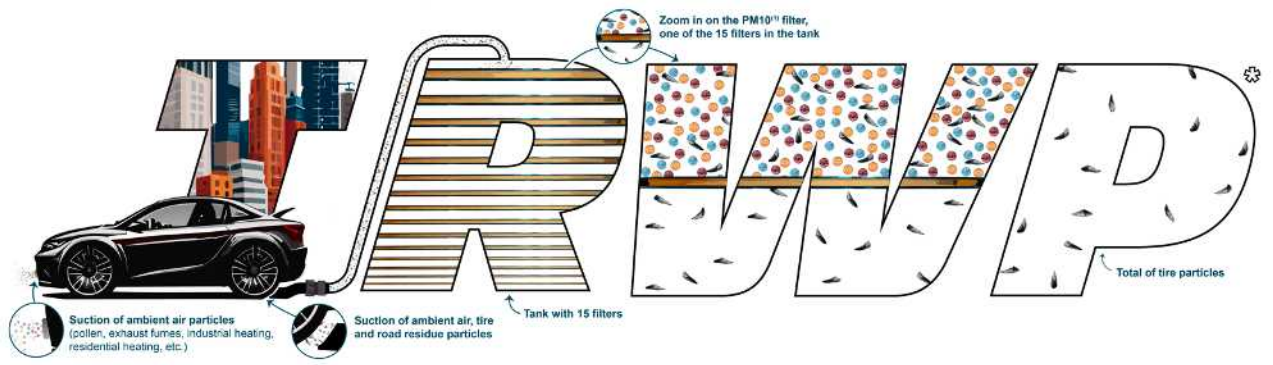
- **A new step forward with the development of a system for analyzing small particles and presentation of the first research results to the scientific community and industry.**
- **Improving knowledge of tire and road wear particles to improve action: a complementary approach to the Euro7 standard.**
- **For the last 20 years, Michelin has been committed to reducing tire abrasion and to research on wear particles.**

A new step forward and presentation of the first research results to the scientific community and industry.

With a wish to reduce tire abrasion and deepen knowledge in this field, Michelin has developed a system for analyzing small, emitted particles, "SAMPLE". This captures, sorts, counts and characterizes particles close up to tires with unequalled precision and reproducibility. This analysis system, presented at Tire Technology, opens the way to tires with wear particles totally bio-assimilable by nature.

There are questions being raised about tire and road wear particles. This is why it is essential to use reliable, reproducible and standardized measurements and will be a fundamental step in better understanding the environmental impact of these wear particles to innovate and devise new solutions.

MICHELIN ANALYSIS SYSTEM FOR LIGHT PARTICLES EMITTED



SUCTION

Two suction systems are installed on the vehicle: one at the front of the vehicle to capture all particles present in the ambient air (pollen, exhaust fumes, industrial heating, residential heating, etc...) and one at the rear of the vehicle to capture tire and road particles as well as particles present in the ambient air.

FILTRATION

During the filtration stage, all the particles taken in (tire, road and ambient air) are filtered according to their size (filtration of particles from 10 micrometers to 6 nanometers). Each particle is retained by the filter corresponding to its size for analysis in the next stage.

SEPARATION

For each of the 15 filters in the tank, the tire particles are identified among all particles (tire, road and ambient air) by a pyrolysis system. This step isolates the tire particles.

SAMPLING

During the sampling phase, we can quantify the proportion, by size, of light particles emitted by the tire (less than 10 micrometers). We obtain less than 1% PM10⁽¹⁾ and less than 0,6% PM2.5⁽¹⁾.

⁽¹⁾Tire and Road Wear Particles are generated by friction between the tire and the road surface, known as abrasion phenomenon.
⁽²⁾Particulate matter (PM) includes microscopic matter suspended in air or water. PM10 refers to particles smaller than 10 micrometers in diameter, PM2.5 to those smaller than 2.5 micrometers.

Tire wear particles are on average the size of a human hair (100 µm) and form a complex mixture composed of equal parts of a combination of tire rubber (50%), minerals and other components of the road (50%).

The Michelin study has quantified the number of these particles that contribute to atmospheric pollution, i.e. PM10 et PM2.5(1) also known as fine particles. Until today, these figures had never been verified by such precise experimental measurements. The initial results show that among the particles emitted by tires, on average 1.3% are PM10 and 0.16 % of PM2.5 are liable to be found in suspension in the air⁽²⁾.

This precise quantification is important both for Michelin to increase understanding of the links between the tire, the road and the driving style and also for the official bodies in charge of estimating city pollution. These data are essential to the design of their simulation models for measuring air quality.

In December 2022 and in March 2023, this study was the subject of two scientific articles <https://www.researchgate.net/profile/Frederic-Biesse>.

Finally, Michelin has made available this system for analyzing emitted light particles to the tire industry and to ETRMA (European Tyre & Rubber Manufacturers' Association). The ETRMA will furthermore conduct a campaign of measurements on a larger scale with the aid of an independent third party. It will be launched during 2024 for a duration of around 18 months.



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Michelin's approach is complementary to the Euro7 standard

The Euro7 standard that has just been adopted by the European Commission will shortly set down the regulatory tire abrasion thresholds in order to reduce the quantities of particles emitted in Europe. This regulation has its own test method for quantifying all the wear particles from tire and the road, in terms of grams per km per ton carried. It enables overall emissions to be measured on a very large scale for all the tires on the market. Those not meeting the standard will no longer be marketable.

Michelin, a long-standing advocate of this regulation, is engaged in a complementary approach, furthering its understanding of this issue.

For the last 20 years, Michelin has been committed to reducing tire abrasion and to research on wear particles.

Since 2005, numerous research and development facilities have been committed to a better understanding and reduction of wear particles emissions [if it is what you mean by phenomenon]. To achieve this, Michelin relies both on its knowledge of materials and on a design strategy historically oriented to optimize the use of materials. This policy secured a 5% reduction in wear emissions of Michelin tires between 2015 and 2020 which has since continued.

At the end of 2023, the Group announced the creation of a common laboratory with the CNRS and the University of Clermont Auvergne: "BioDLab". Its mission is to understand the biodegradation of wear particles, for then to develop tools for finding new concrete solutions to make them bio-assimilable by the environment.

The Clermont manufacturer is moreover internationally recognized as a leader in the field of particle emission longevity. A position confirmed by a test carried out by ADAC², the German automobile association (Study published in March 2022) on a hundred or so tires.

Through these actions, Michelin wants to better understand the phenomenon of tire wear particles and their degradation process. There are multiple objectives: reduce their emissions, provide scientific responses, and develop concrete technical solutions.

(1) Suspended PM (particulate matter) includes microscopic material in suspension in air or water. Particles in suspension in the air are called aerosols. PM10 includes particles with a diameter of less than 10 µm, PM2.5 those less than 2.5 µm.

(2) See the study: [TO31940 eng. alte Version \(adac.de\)](https://www.adac.de/medien/2022/03/03/03-2022-TO31940-eng-alte-Version)



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Photos available on:

<https://contentcenter.michelin.com:443/portal/shared-board/b13fbd9d-18a3-4169-a527-f4f36fbaaef8>

About Michelin

Michelin's ambition is to sustainably improve its customers' mobility. The leader in the mobility sector, Michelin designs, manufactures, and distributes the tires best suited to their requirements and uses as well as services and solutions to improve transport efficacy.

Michelin also puts forward offers that allow its customers to enjoy unique moments when traveling. Michelin also develops high-technology equipment intended for multiple fields. Based in Clermont-Ferrand, Michelin is present in 175 countries, employs 132,200 people and operates 67 tire factories that, together, produced approximately 167 million tires in 2022. (www.michelin.com).

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