

ETRMA Position Paper on Tyre & Road Wear Particles (TRWP) Generation

Executive summary

The European Tyre and Rubber Manufacturers' Association is committed to **contributing to a healthy environment for Europe**. The tyre industry has been collaborating over the last ten years through various research projects to developing a better understanding of the fate and possible effects on air quality of particles generated during normal tyre use and wear.

However, today there are still **many uncertainties on the fate and transportation of tyre and road wear particles (TRWP)** and their impact on the environment. Therefore, **before discussing potential measures to reduce the generation of TRWP, their actual presence and effect in the environment needs to be ascertained**.

ETRMA calls for building a **solid scientific understanding** which **should be the basis of any decision making and regulatory action**. This is why, most recently, ETRMA launched a study to build the necessary knowledge about the distribution and retention of TRWP in freshwater up to the estuary. Results are expected early 2018.

However, the generation of TRWP is influenced by a variety of external factors; therefore **policies focusing only on tyre design will have marginal effects**. A balanced and holistic approach is needed when discussing potential mitigation options.

ETRMA therefore calls on the Commission **to launch a roundtable involving all relevant stakeholders** to review the state of knowledge, coordinate research, and come to a common understanding of if and how generation of TRWP can be effectively reduced.

1. Introduction

ETRMA, the European Tyre and Rubber Manufacturers' Association, is aware of the public debates on Air Quality and on Microplastics in oceans and is committed to contributing to a healthy environment for Europe. ETRMA strongly believes that a science-based policy making approach should guide the EU regulatory agenda. With this respect, the tyre industry has been contributing over the last ten years to developing a better understanding of the fate and possible effects of particles generated during normal tyre use and wear, through research projects performed under the umbrella of the World Business Council for Sustainable Development (WBCSD) Tyre Industry Project (TIP)¹.

2. Tyre and Road Wear Particles (TRWP)

Tyre wear particles are generated from the friction between the tyre and the road. This ensures a sufficient grip on the road and safety. The particles are therefore not simply rubber pieces from the tyre, but an **agglomeration of approximately equal mass fractions of material from the tyre and the road. They are therefore identified as Tyre and Road Wear Particles (TRWP).**

3. TRWP in the air

Ambient airborne particulate matter can include TRWP, especially in urban environments and locations near roadways.

To contribute to a science-based discussion, the tyre industry – at WBCSD TIP level – has conducted extensive research into the contribution of TRWP to airborne particles.

Through global sampling efforts² it has been demonstrated that TRWP represent less than 1% of the total PM10 fraction³ and about 0.3% of the total PM2.5 fraction in ambient air. Therefore, **TRWP do not significantly contribute to PM10 and PM2.5.**

The potential toxicity of TRWP was also investigated by conducting a subacute inhalation study in rats.⁴

Results demonstrated no adverse cardiopulmonary effects.

4. TRWP in the marine environment

The identification of particles sources is important to accurately assess the nature and quantities of microplastics entering the marine environment⁵. **Many uncertainties still exist in the identification of sources as well as pathways by which microplastics reach the marine environment.**

¹ Extensive literature on TRWP has been produced by the World Business Council for Sustainable Development (WBCSD) through the Tyre Industry Project (TIP) - <http://www.wbcd.org/Projects/Tire-Industry-Project/Resources/Tire-Road-Wear-Particles-Papers>

² Use of a Deuterated Internal Standard with Pyrolysis-GC/MS Dimeric Marker Analysis to Quantify Tire Tread Particles in the Environment Kenneth M. Unice et al., Int. J. Environ. Res. Public Health 2012, 9(11), 4033-4055 and Julie M. Panko <http://www.mdpi.com/1660-4601/9/11/4033>

³ Measurement of airborne concentrations of tire and road wear particles in urban and rural areas of France, Japan, and the United States, J. Panko et al. (2013).

⁴ Kreider ML et al., 2012, Evaluation of potential for toxicity from subacute inhalation of tire and road wear particles in rats, Inhal Toxicol. 2012 Nov;24(13):907-17

Recently published scientific literature demonstrates that the morphology and density of particles affect their fate and transport through the environment^{6,7}. Due to their high density, TRWP will deposit and be retained primarily on the road or near the road. As a portion of these particles may reach freshwater ecosystems through road run-off discharges, some studies assume that a significant proportion of TRWP are released into oceans. Such assumption clearly overlooks the issue of transport from the source to the ocean and disregards the retention of TRWP in soils and sediment. This constitutes an important methodological weakness.

Since the majority of TRWP is likely to be present in soil and sediment, TRWP ecotoxicity testing has been conducted by the tyre industry on aquatic organisms in freshwater sediments.^{8,9} Results of those studies indicate **no acute aquatic toxicity of TRWP and low risk of toxicity to aquatic organisms.**

ETRMA is convinced that a solid scientific understanding should be the basis of any decision making and regulatory action. Therefore, before discussing potential measures to reduce the generation of tyre and road wear particles, the actual presence and effect of TRWP in the marine environment needs to be ascertained.

5. ETRMA study on Microplastics

In March 2017, ETRMA proactively launched a study based on a watershed approach, coupling hydrological with fate and transportation models, to build knowledge about TRWP and microplastics. The study intends to assess the quantity of TRWP generated, its distribution in water and soil, and the retention of those particles in the aquatic environment. Results will be available early 2018.

6. Mitigation options and tyre safety performances

The *raison d'être* of a tyre is to guarantee optimal safety performance during the running and braking of a vehicle on all road and weather conditions. As tyre performances are the result of complex balancing technologies, we request policy makers to pay very careful attention when proposing measures that could affect this equilibrium with severe consequences on other EU policies (i.e. Road Safety, Climate Change, etc).

Therefore, any proposed mitigation measure addressing tyre design needs to be accompanied by a thorough assessment of the impact of such measure on all tyre performances (regulated and non-regulated), especially safety performances such as wet and dry grip and traction under winter and snow conditions as well as rolling resistance.

⁵ GESAMP Reports & Studies No. 93 – Microplastics in the Ocean

http://www.gesamp.org/data/gesamp/files/file_element/0c50c023936f7ffd16506be330b43c56/rs93e.pdf

⁶ Nizzetto, L., Bussi, G., Futter, M.N., Butterfield, D. and Whitehead, P.G., 2016. A theoretical assessment of microplastic transport in river catchments and their retention by soils and river sediments. *Environmental Science: Processes & Impacts*, 18(8), pp.1050-1059

⁷ Besseling, E., Quik, J.T., Sun, M. and Koelmans, A.A., 2017. Fate of nano- and microplastic in freshwater systems: A modeling study. *Environmental Pollution*, 220, pp.540-548

⁸ Marwood C., B.L. McAtee, M.L. Kreider, R.S. Ogle, B.L. Finley, L.I. Sweet, and J.M. Panko. 2011. Acute aquatic toxicity of tire and road wear particles to alga, daphnid and fish. *Ecotoxicol.* 20(8):2079-89 -<http://www.ncbi.nlm.nih.gov/pubmed/21789673>

⁹ Panko, J.M., M.L. Kreider, B.L. McAtee, and C. Marwood. 2012. Chronic toxicity of tire and road wear particles to water and sediment - dwelling organisms. *Ecotoxicology*. 2011 Nov; 20(8):2079-89. doi: 10.1007/s10646-011-0750x <http://www.ncbi.nlm.nih.gov/pubmed/23001428>

7. Dialogue with EU policy makers

The European tyre industry is committed to engage in a constructive dialogue with EU policy makers to identify how tyre and road wear particles reach the environmental compartments, as well as to consider proportionate and effective mitigation measures to reduce the particle emissions.

Policies focusing only on tyre design will have marginal effects, considering the importance of external counter effects. **It is industry knowledge that driving behaviour, speed, road surface etc. have cumulatively ten times bigger influence on tyre (and road) abrasion than tyre design.**

Therefore, **a combination of mitigation options, starting with the ones having the highest impact on TRWP generation, needs to be considered.**

A few, not exhaustive, examples of these measures:

1. Education on driving behavior (part of driving license)
2. Adjustment of road surface parameters
3. Adjustment of traffic regulation (preceded by analysis of traffic conditions causing increased TRWP generation)
4. Adjustment of vehicle characteristics
5. Vehicle maintenance (control of toe and camber angles)
6. Road maintenance
7. Tyre maintenance (inflation pressure)
8. Enlarging the scope of TPMS requirement

8. Conclusion

In the spirit of continuously supporting a robust scientific understanding of underlying factors behind the generation of microplastics by road transport, **ETRMA suggests the creation of a discussion table at European Commission level.** This format would allow for tyre manufacturers together with other concerned stakeholders - road builders, road planners, maintenance operators, OEMs (Original Equipment Manufacturers) etc. - to bring expertise and data in order to align and coordinate research and policy initiatives.