1.A.3.b vi-vii - Road Transport: Automobile Tyre and Brake Wear and Road Abrasion

This overview chapter provides information on emissions from automobile tyre and brake wear & road abrasion are reported reported in NFR sub-categories 1.A.3.b vi and 1.A.3.b vii. These sub-categories are important sources for a) particle emissions and b) emissions of heavy metals, POPs etc. included in these particles.

NFR-Code	Name of Category
1.A.3.b vi	Automobile Tyre and Brake Wear
1.A.3.b vii	Automobile Road Abrasion

Methodology

Activity data

Specific mileage data for all different types of road vehicles are generated within TREMOD (Knörr et al., 2020a)¹⁾. The following table provides an overview of annual mileages.

Table 1: Mileage data for road vehicles 1990-2019, in 10^^6^^ kilometers

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
MILEAGE: COMBUSTION ENGINES														
Passenger Cars														
Light Duty Vehicles														
Heavy Duty Vehicles														
thereof: Lorries & Trucks														
thereof: Buses														
Two-wheelers														
Σ from fuel combustion														
MILEAGE: ELECTRIC ENGINES														
Passenger Cars														
Light Duty Vehicles														
Heavy Duty Vehicles														

& Trucks								
Two-wheelers Image: Constraint of the sector of the s	thereof: Lorries & Trucks							
Σ from electric energy Image: Sector of the sector of	thereof: Buses							
electric energy TOTAL MILEAGE: COMBUSTION + ELECTRIC ENGINES Passenger Cars Light Duty Vehicles Heavy Duty Vehicles thereof: Lorries & Trucks Trucks Image: Subses Multices Comparison MULEAGE: Comparison Cars Cars Light Duty Vehicles Heavy Duty Vehicles Multices Multices Vehicles Multices Multices Light Duty Vehicles Light Duty Vehicles Multices	Two-wheelers							
MILEAGE: COMBUSTION + ELECTRIC ENGINES I	Σ from electric energy							
CarsImage: Cars<	TOTAL MILEAGE: COMBUSTION + ELECTRIC ENGINES							
Vehicles Image: Constraint of the state of the sta	Passenger Cars							
Vehicles Image: Construction of the state of the s	Light Duty Vehicles							
& Trucks Image: Constraint of the sector	Heavy Duty Vehicles							
Two-wheelers	thereof: Lorries & Trucks							
	thereof: Buses							
Σ over-all	Two-wheelers							
	Σ over-all							

source: TREMOD 6.02²⁾

Discussion of emission trends

Please see sub-category chapters 1.A.3.b vi - Automobile Tyre and Brake Wear and 1.A.3.b vii - Automobile Road Abrasion .

Recalculations

Recalculations were carried out due to a fundamental revision of the TREMOD software.

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Passenger Cars													
Submission 2021													
Submission 2020													
absolute change													
relative change													
Light Duty Vehicles													
Submission 2021													
Submission 2020													
absolute change													

Table 2: Revised mileage data , in 10⁶ kilometers

relative change									
HDVs: Trucks									
Submission 2021									
Submission 2020									
absolute change									
relative change									
HDVs: Buses									
Submission 2021									
Submission 2020									
absolute change									
relative change									
Motorcycles & Mopeds									
Submission 2021									
Submission 2020									
absolute change									
relative change									
REVISED TOTAL MILEAGE									
Submission 2021									
Submission 2020									
absolute change									
relative change									
		2	2	2	2	2	-	-	

For changes in the **emission factors** applied, please refer to the sub-ordinate chapters on **tyre and brake wear** and **road abrasion**.



For more information on recalculated emission estimates for Base Year and 2018, please see the pollutant specific recalculation tables following chapter 8.1 - Recalculations.

Planned improvements

Besides the **routine revision of the TREMOD model**, no specific improvements are planned.

3) 4)

^{1), 2), 3)} Knörr et al. (2020a): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Fortschreibung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2035, sowie TREMOD, im Auftrag des Umweltbundesamtes, Heidelberg & Berlin, 2020.

⁴⁾ EMEP/EEA, 2019: EMEP/EEA air pollutant emission inventory guidebook – 2019