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Low particle Emissions and IOw Noise Tyres



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2.List of abbreviations and acronyms

Abbreviation	Definition
3PMSF	Three Peak Mountain SnowFlake
ACEA	European Automobile Manufacturers' Association
ADAC	Allgemeiner Deutscher Automobil-Club
BEV	Battery Electric Vehicle
CSR	Constant Speed Run
EEA	European Environment Agency
END	Environmental Noise Directive
EPREL	European Product Registry for Energy Labelling
ETRMA	European Tyre & Rubber Manufacturers Association
ETRTO	European tyre & rubber manufacturers association
FCEV	Fuel Cell Electric Vehicle
GRBP	Groupe Rapporteur Bruit et Pneumatiques
HDV	Heavy Duty Vehicle
HEV	Hybrid Electric Vehicle
ICE	Internal Combustion Engine
LCV	Light Commercial Vehicle
M+S	Mud and Snow
PC	Passenger Car
PEV	Plug-in Electric Vehicle
PMR	Power to Mass Ratio index
RR	Rolling Resistance
WG	Wet Grip
WOT	Wide Open Throttle

3.Introduction

The goal of Work Package 6 (**WP6**) is to synthesise the knowledge gained during the project's experimental activities into potential new policies and regulations and to evaluate their possible future impact for the public health and wellbeing of citizens, as well as the social acceptance of the economic impacts that could derive from the new policies and regulations. Possible future policy scenarios include tyre airborne particle emissions (**Deliverable 6.1**), microplastics emissions (**Deliverable 6.2**), and tyre noise emissions (**Deliverable 6.3**).

The Commission's 2021 EU Action Plan, 'Towards Zero Pollution for Air, Water and Soil' aims to reduce pollution to levels that are no longer considered harmful to health and natural ecosystems. One of the 2030 key targets is to reduce the share of people who are chronically disturbed by transport noise by 30% compared to 2017.

Current automotive noise legislations define maximum noise emission limits that have to be complied with standardized pass-by noise test procedures. The currently applicable noise standards are UN R51, for vehicle pass-by noise, UN R117, for tyre noise, and Tyre Labelling (EU) 2020/740 which includes noise information for the consumers. Recently UN R138 introduced minimum sound levels for electric vehicles. A significant part of the overall pass-by noise test on a vehicle is will be caused by the tyres.

In this deliverable we went through the noise regulations for tyres, vehicles and electric vehicles. We collected measured data to assess current noise levels. We compared them with the literature. We collected data from EPREL and other databases and search for correlations between noise and other parameters such as wet grip, rolling resistance, abrasion and price. We developed a simplified model to estimate citizens' noise exposure and to assess various mitigation measures.

Two scenarios were considered in this Task 6.3 for tyre noise. The baseline scenario investigated the possible evolution of the problem assuming no policy changes. The second scenario examined the feasibility of imposing stringent tyre noise limits. The impact of the proposed scenarios on public health and well-being of citizens along with a cost-benefit analysis was examined and compared to the baseline scenario.

Note: The terms **noise** and **sound** are used interchangeable, even though GRBP decided to start using the term sound instead of noise after R 138. We also use the terms **dB** and **dB(A)** interchangeably.

4. Regulatory requirements for vehicle and tyres sound emission

4.1. UN Reg. 51 (vehicles) – UN Reg. 117 (tyres)

Considering the tyre rolling sound emissions as one of the main contributors to the total vehicle sound emission, we can compare the testing conditions and limit values of both Regulations (Table 1 to Table 4) to have a better understanding of their impact on the actual real sound emission level.

Table 1 : Test conditions for vehicle sound of M1 and N1 categories and rolling sound of C1 and C2 tyres.

Vehicle sound emission	Tyre rolling sound emission
Testing conditions M1 – N1	
R51.03 Annex 3 (outdoor)	R117.04 Annex 3 – C1/C2
Test track: ISO10844:2021	Test track: ISO10844:2021
Microphones: 7.5m from centre line / 1.2 high	Microphones: 7.5m from centre line / 1.2 high
Air Temp. 5°C – 40°C	Air Temp. 5°C – 40°C
Surface temp. 5°C – 60°C	Surface temp. 5°C – 50°C
Wind: < 5 m/s	Wind: < 5 m/s
Vehicle load: $0.9 m_{ro} \leq m_t \leq 1.2 m_{ro}$	Vehicle load: 75% ± 5 Tyre load index
Tyre conditioning: Run-in 100 km	Tyre conditioning: Run-in 100 km
Target speed: 50 km/h	Target speed: 80 km/h
Driving condition: Full accel. ($a \leq 2m/s^2$)	Driving condition: Coast-by

Table 2 : Limit values for vehicle sound of M1 and N1 categories and rolling sound of C1 and C2 tyres.

Limit values		Ph. 2	Ph. 3	Limit values – Stage 2		
M1	PMR ≤ 120	70	68	C1	185 and lower	70
	120 < PMR ≤ 160	71	69		Over 185 up to 245	71
	PMR > 160	73	71		Over 245 up to 275	72
	PMR > 200	74	72		Over 275	74
N1	M ≤ 2.5 t	71	69	C2	Normal / M+S	72
	M > 2.5 t	73	71		3PMSF	73
						Special

R51.03 Transitional provisions for new type approvals:

Phase 2: Mandatory for vehicles M1, N1:

1 July 2020

Phase 3: Mandatory for vehicles M1, N1:

1 July 2024

Table 3 : Test conditions for vehicle sound of M2/M3 and N2/N3 categories and rolling sound of C2 and C3 tyres.

Vehicle sound emission	Tyre rolling sound emission
Testing conditions M2/M3 – N2/N3	
R51.03 Annex 3 (outdoor)	R117.04 Annex 3 – C2/C3
Test track: ISO10844:2021	Test track: ISO10844:2021
Microphones: 7.5 m from centre line / 1.2 high	Microphones: 7.5 m from centre line / 1.2 high
Air Temp. 5°C – 40°C	Air Temp. 5°C – 40°C
Surface temp. 5°C – 60°C	Surface temp. 5°C – 50°C
Wind: < 5 m/s	Wind: < 5 m/s
Vehicle load: 50 [kg/kW] x P_n [kW]	Vehicle load: 75% ±5 Tyre load index
Tyre conditioning: Run-in 100 kms	Tyre conditioning: Run-in 100 kms
Target speed: 35 km/h	Target speed: 70 km/h
Driving condition: Full acceleration	Driving condition: Coast-by

Table 4 : Limit values for vehicle sound of M2/M3 and N2/N3 categories and rolling sound of C2 and C3 tyres.

Limit values		Ph. 2	Ph. 3	Limit values – Stage 2		
M2	M ≤ 2.5 t	70	69	C2 No traction	Normal / M+S	72
	2.5 t < M ≤ 3.5 t	72	71		3PMSF	73
	M > 3.5 t; P _n ≤ 135 kW	73	72		Special	74
	M > 3.5 t; P _n > 135 kW	74	72	C3 Traction	Normal / M+S	75
M3	P _n ≤ 150 kW	74	73		3PMSF	76
	150 kW < P _n ≤ 250 kW	77	76		Special	77
	P _n > 250 kW	78	77			
N2	P _n ≤ 135 kW	75	74			
	P _n > 135 kW	76	75			
N3	P _n ≤ 150 kW	77	76			
	150 kW < P _n ≤ 250 kW	79	77			
	P _n > 250 kW	81	79			

R51.03 Transitional provisions for new type approvals:

Phase 2:	Mandatory for vehicles other than N2:	1 July 2020
	Mandatory for vehicles N2:	1 July 2022
Phase 3:	Mandatory for vehicles other than N2, N3, M3:	1 July 2024
	Mandatory for vehicles N2, N3, M3:	1 July 2026

It should be added that for M1, N1 and M2≤3500 kg category vehicles, the final value (L_{urban}) is a combination of two by pass conditions: wide open throttle (WOT) runs and constant speed runs (CSR). Both tests should be performed with the same gear ratio selection in case of manual gearbox. The final calculation is using a weighting factor (k_p)

$$L_{urban} = L_{wot} - k_p * (L_{wot} - L_{crs}),$$

$$k_p = 1 - (a_{urban} / a_{wot}),$$

$$a_{urban} = 0.63 * \log_{10}(PMR) - 0.09$$

Practically speaking L_{urban} will be L_{wot} with small correction down.

For M2>3500 kg, M3, N2, N3 category vehicles, $L_{urban} = L_{wot}$

4.2. UN Reg. 138

For quiet vehicles, in addition to the requirements stated in UN R51, the vehicle must meet the requirements of UN R138 as well, which are minimum sound emissions to alert pedestrians and other vulnerable road users about the presence of the vehicle (Table 5).

Table 5 : Minimum sound level requirements in dB(A).

Frequency in Hz		Constant Speed Test paragraph 3.3.2. (10 km/h)	Constant Speed Test paragraph 3.3.2. (20 km/h)	Reversing Test paragraph 3.3.3.
Column 1	Column 2	Column 3	Column 4	Column 5
Overall		50	56	47
1/3 rd Octave Bands	160	45	50	
	200	44	49	
	250	43	48	
	315	44	49	
	400	45	50	
	500	45	50	
	630	46	51	
	800	46	51	
	1,000	46	51	
	1,250	46	51	
	1,600	44	49	
	2,000	42	47	
	2,500	39	44	
	3,150	36	41	
	4,000	34	39	
	5,000	31	36	

The relevant EU regulations are Regulation (EU) 540/2014 for cars, vans, buses and trucks, Regulation (EU) 2019/2144 on type approval of road vehicles including tyre requirements, and Regulation (EU) 2020/740 on tyre labelling.

5.UN Reg. 51 type approval values

During the last 2 years (2023-2024) IDIADA as technical service designated by some type approval authorities has performed several official test for vehicle type approval according to R51.03.

The summary of the test results following Annex 3 are as follows (Table 6):

Table 6 : UN R51 Pass-by sound test results at IDIADA (2023-2024).

Tests: 5	Category	propulsion type	result pass-by dB(A)
	M1	ICE	71,0
	M1	ICE	71,9
	M1	ICE	71,0
	M1	ICE	71,0
	M1	ICE	71,0
		Average:	71,2

Tests: 16	Category	propulsion type	result pass-by dB(A)
	M1	PEV	65,0
	M1	PEV	65,0
	M1	PEV	65,0
	M1	PEV	65,0
	M1	PEV	65,0
	M1	PEV	65,0
	M1	PEV	66,6
	M1	PEV	66,6
	M1	PEV	68,0
	M1	PEV	68,0
	M1	PEV	67,0
	M1	PEV	64,0
	M1	PEV	64,0
	M1	PEV	67,0
	M1	PEV	68,0
	M1	PEV	67,0
		Average:	66,0

Tests: 4	Category	propulsion type	result pass-by dB(A)
	N1	ICE	74,0
	N1	ICE	72,0
	N1	ICE	73,0
	N1	ICE	72,0
		Average:	72,8

Tests: 4	Category	propulsion type	result pass-by dB(A)
	N2	ICE	74,0
	N2	ICE	74,0
	N2	ICE	73,0
	N2	ICE	73,0
		Average:	73,5

Tests: 2	Category	propulsion type	result pass-by dB(A)
	N2	PEV	70,0
	N2	PEV	74,0
		Average:	72,0

Tests: 4	Category	propulsion type	result pass-by dB(A)
	N3	ICE	80,0
	N3	ICE	80,0
	N3	ICE	81,0
	N3	ICE	79,0
		Average:	80,0

Tests: 20	Category	propulsion type	result pass-by dB(A)
	M3	ICE	77,0
	M3	ICE	73,0
	M3	ICE	78,0
	M3	ICE	78,0
	M3	ICE	78,0
	M3	ICE	78,0
	M3	ICE	78,0
	M3	ICE	78,0
	M3	ICE	78,0
	M3	ICE	72,0
	M3	ICE	74,0
	M3	ICE	73,0
	M3	ICE	77,0
	M3	ICE	78,0
	M3	ICE	73,0
	M3	ICE	76,0
	M3	ICE	76,0
	M3	ICE	78,0
	M3	ICE	74,0
	M3	ICE	77,0
	M3	ICE	75,0
		Average:	76,1

Tests: 6	Category	propulsion type	result pass-by dB(A)
	M3	BEV	64,0
	M3	BEV	77,0
	M3	BEV	69,0
	M3	BEV	68,0
	M3	BEV	65,0
	M3	BEV	74,0
		Average:	69,5

Tests: 1	Category	propulsion type	result pass-by dB(A)
	M3	FCEV	67,0
		Average:	67,0

Table 7 summarises the results. PEV compared to ICEs for M1 category had on average 5 dB(A) lower sound. For M3 category there was a high difference of 7-9 dB(A) between BEX/FCEVs and ICEs. However, for N2 category the difference was only 1.5 dB(A). Note that, at the time of testing, for most vehicles, the Phase 2 limits were applicable.

Table 7 : Summary of UN R51 test results at IDIADA (2023-2024).

Category	#	Propulsion type	Pass-by dB(A)
M1	5	ICE	71.2 (71.0-71.9)
M1	16	PEV	66.0 (64.0-68.0)
N1	4	ICE	72.8 (72.0-74.0)
N2	4	ICE	73.5 (73.0-74.0)
N2	2	PEV	72.0 (70.0-74.0)
N3	4	ICE	80.0 (79.0-81.0)
M3	20	ICE	76.1 (72.0-78.0)
M3	6	BEV	69.5 (64.0-77.0)
M3	1	FCEV	67.0

The Table 8 summarises the results from the 2022 ACEA report [1]. Although direct comparison is not possible as L_{urban} values were reported, in general the agreement with IDIADA data is good considering also the different time periods (2020 vs 2024 IDIADA).

Table 8 : Overview of ACEA 2020 test results.

Category	#	Propulsion type	Pass-by dB(A)
M1 (L_{urban})	1655 (all)	ICE	68 (64-74)
M1 (L_{urban})	14	HEV	68 (64-71)
M1 (L_{urban})	27	BEV	67 (64-69)
M2 (L_{urban})	23	ICE	71.3 (69-75)
M3 (L_{urban})	42 (+2 BEV)	ICE	73.5 (71-78)
N1	156	ICE	70.3 (66-74)
N1	3	BEV	69 (67-71)
N2	74 (+2 BEV around 69)	ICE	72.4 (67-78)
N3	119 (+2 HEV around 79)	ICE	79.3 (74-84)
N3	6	BEV	71.7 (69-76)

6. Tyre rolling sound contribution to total vehicle sound emissions

As stated before, the tyres are tested according to R117 Annex 3. The tests are performed at a range of speeds:

- (a) From 70 to 90 km/h for class C1 and class C2 tyres;
- (b) From 60 to 80 km/h for class C3 tyres.

The correlation between sound emission and vehicle speed is then calculated based on linear regression. That is allowing to extrapolate the sound emission at different vehicle speed such as R51 Annex 3 target speed. We have taken all tests performed at IDIADA according to R117 Annex 3 over the last 2 years (2023-2024) and based on each regression line, we have been able to extrapolate what would be the tyre rolling sound emission at vehicle target speed according to R51. A few tests at 50 km/h vehicle speed confirmed the relationship.

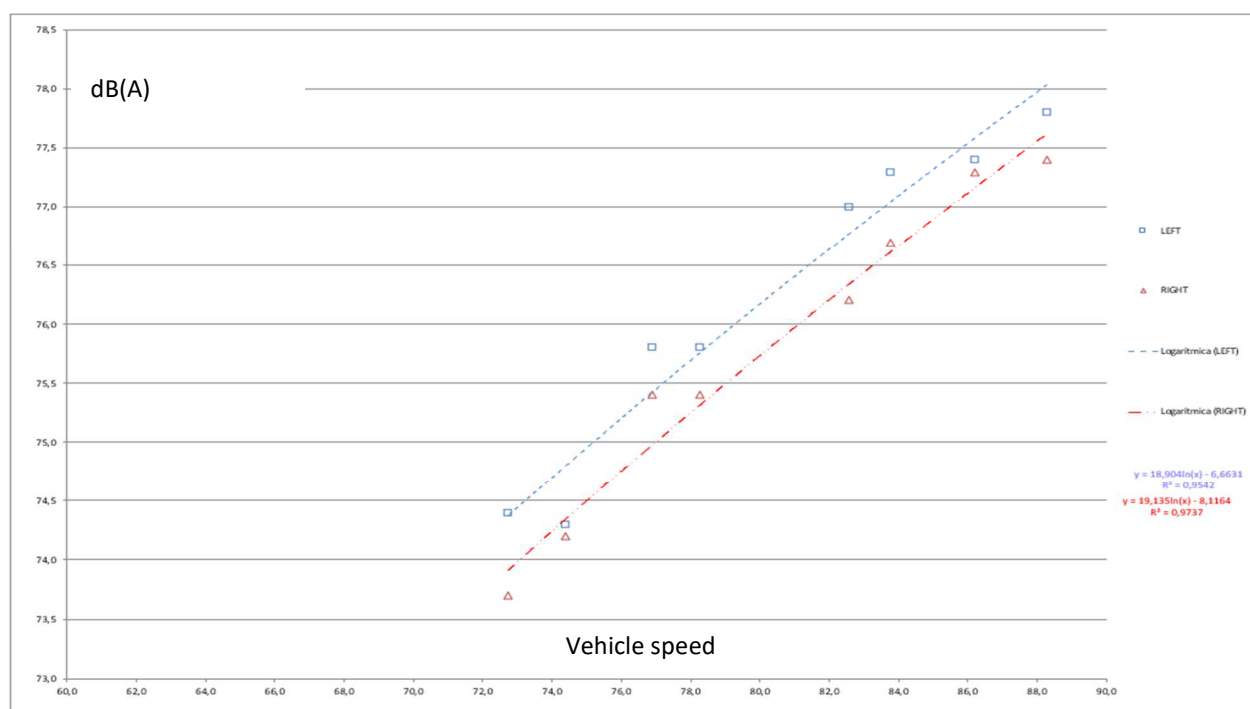


Figure 1 : Speed vs. tyre noise.

The following tables are showing the number of tests performed, the average tyre rolling sound emission at coast-by vehicle speed according to R117, the average of all calculated tyre rolling sound emission at vehicle speed according to R51:

Considering vehicle category:

- M1 will be equipped with C1 class tyres
- N1 will be equipped with C2 class tyres
- M2, M3, N2, N3 will be equipped with C3 tyres

Table 9 : Tyre rolling sound emissions according to R117 at IDIADA

C1				
	# tests	80 km/h	50 km/h	50 km/h
2023	63	70,4	63,4	63,6
2024	62	70,6	63,8	

C2				
	# tests	80 km/h	50 km/h	50 km/h
2023	4	72,2	65,5	65,0
2024	10	73,0	64,8	




C3				
	# tests	70 km/h	35 km/h	35 km/h
2023	33	70,6	58,0	58,2
2024	28	71,8	58,5	

Considering that tyre rolling sound emission is just a part of the total vehicle sound emission, we could then use the commonly accepted approach for combined different sound emission sources:

$$dB_{total} = 10 \cdot \log_{10} \cdot (10^{dB1/10} + 10^{dB2/10} + \dots + 10^{dBn/10})$$

The calculated average sound emission of the non-tyre part for each vehicle category and propulsion technology will be as shown in the following table. Vehicle sound emission taken from [Chapter 5](#) (dB_{total}) and tyre sound emission taken from above table in this page (dB_1). We have then calculated non tyre sound (dB_2).

Table 10 : Contribution of tyre rolling noise to vehicle sound.

						
		Vehicle sound	Tyre	Non tyre sound	Tyre sound	% tyre
M1	ICE	71,2	C1	70,4	63,6	1,2%
M1	PEV	66,0	C1	62,3	63,6	5,6%
N1	ICE	72,8	C2	72,0	65,0	1,1%
N2	ICE	73,5	C2	72,8	65,0	1,0%
N2	PEV	72,0	C2	71,0	65,0	1,4%
N3	ICE	80,0	C3	80,0	58,2	0,0%
M3	ICE	76,1	C3	76,0	58,2	0,1%
M3	BEV	69,5	C3	69,2	58,2	0,4%
M3	FCEV	67,0	C3	66,4	58,2	0,9%

We can also see the real contribution of the tyre rolling sound over the total vehicle sound emission as percentage in the last column.

7. Impact of road surface to tyre rolling sound emission

The GRBP set up the Task Force Measurement Uncertainties subgroup in 2019 to identify the different sources of variability on sound emission measurement, especially focused on R51 and R117.

After several analysis related to R117 Coast-by measured according to Annex 3, the following main categories of uncertainty were found as shown in the following Table 11.

We can see the test track surface is the highest one, even comparing among several test tracks approved according to ISO10844. In real roads the values should be higher.

Table 11 : Sources of uncertainty of sound measurements.

	Uncertainty categories	Systematic or Random	Standard Uncertainty [dB] 95% confidence interval	Description
1	Test Repeatability (day by day)	Random	± 0.6 ^(b)	Result variability once tyres, track, acquisition system, vehicle and modus operandi are the same (Day and driver might be different)
1.1	Test Repeatability (run to run)	Random	± 0.3 ^(b)	Result variability for consecutive test once tyres, track, acquisition system, vehicle and modus operandi are the same
1.2	Track Humidity	Random	Unknown	Definition of "dry" is quite vague Humidity may affect more R51 Drive-by than R117
1.3	Speed effect	Random	± 0.13	Minimum requirement for sensor accuracy in R117 is $\pm 1 \text{ km/h}$ - tyre noise vs speed sensitivity= 0.2 dB/km/h PtoP = $0.2 \text{ dB} \cdot 2 \text{ km/h} = 0.4 \text{ dB}$ (± 0.13)
1.4	Temperature influence (after temperature correction)	Random	± 0.3 ^(b)	Despite temperature correction a residual error remains (Formula not fully correct). Only applicable for C1/C2 tyres
2	Temperature influence (without temperature correction)	Systematic	± 0.6	The systematic error is removed in Reg.117 (except for C3) but not in Reg.51 Reg. 117 allows following temperature ranges: air $> 5^\circ\text{C}$, $< 40^\circ\text{C}$ surface temperature $> 5^\circ\text{C}$, $< 50^\circ\text{C}$ Estimated peak to peak by Reg.117 formula = 1.8 dB ($\pm 0.6 \text{ dB}$)
3	Track to Track	Systematic	± 1.8 ^(a)	Estimated by VDA round robin test results
4	Tyre to tyre	Random	± 0.5 ^(b)	Uncertainty due to production variability (Different plants, different period....) Excluding ageing effect
5	Sound meter-to sound meter	Random	± 0.4 ^(a)	Measurement system shall meet class 1 requirements
6	Vehicle influence	Systematic / Random	± 1.0 ^(b)	Possibility to use different vehicles. Uncertainty takes into consideration differences on: Wheel adjustment, Suspension, Tyre load and inflation, Body-road clearance, shadowing and reflecting properties, Rim, Transmission noise, Bearings, Brake noise (brakes not completely released), Body shape - aerodynamic noise around the vehicle body and extra equipment
Total Uncertainty C1/C2 tyres			$\pm 2.2 \text{ dB}$	Combined standard uncertainty $U = \sqrt{(u_1^2 + u_3^2 + u_4^2 + u_5^2 + u_6^2)}$
Total Uncertainty C3 tyres			$\pm 2.3 \text{ dB}$	Combined standard uncertainty $U = \sqrt{(u_1^2 + u_2^2 + u_3^2 + u_4^2 + u_5^2 + u_6^2)}$

According to European Tyre & Rubber Manufacturers Association (ETRMA), this variability means that a homologated value could be 2.3 dB higher or lower (with low probability <5%). ETRMA demonstrated that reducing the uncertainty to half would reduce tyres exceeding the limit due to the methodology uncertainties from 33% to 11% [2].

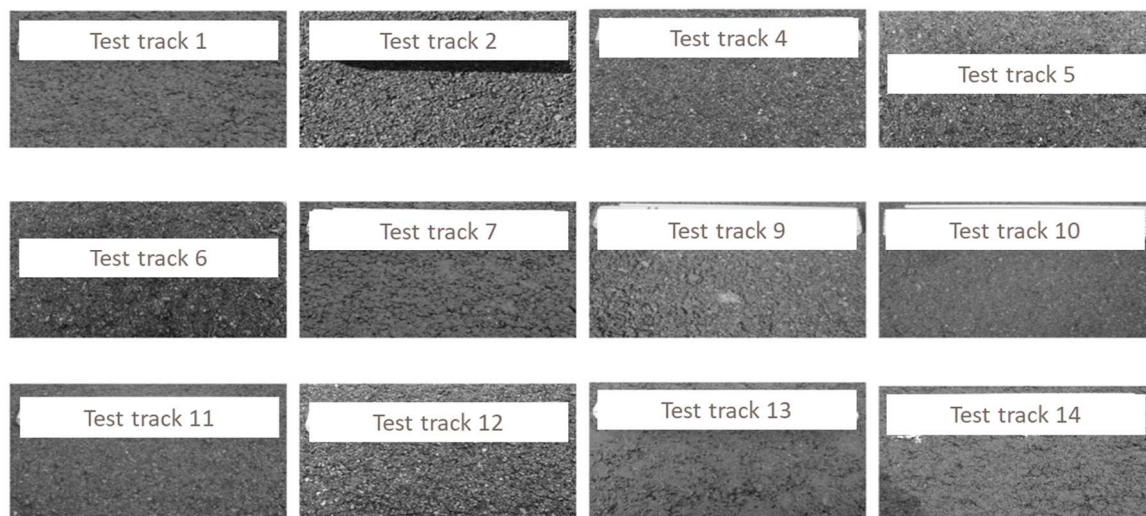


Figure 2 : Test track surfaces.

8. Study on label parameters

This chapter aims to verify whether there is any correlation between noise and the other parameters on the label, as well as interaction between noise levels and price.

8.1. Methodology

We considered the five best-selling sizes for each type of tyre (C1, C2 and C3) in order to extract a representative market sample and look for a correlation between the values of the labelling of the tyres, the rolling resistance (RR) and wet grip (WG) with the noise level. The most accurate tyre labelling data is EPREL. The size of the sample extracted was of 450 hundred tyres in total. 150 tyres per type of tyre, being 30 tyres per size. For the sample selection we considered several factors to ensure its representativeness. Firstly, we made sure that brands were not excessively repeated. Additionally, the percentage distribution of premium, mid-range, and low-cost tires for each size was adjusted to match the actual sales percentages in the market. We also ensured that the selected tires were verified in the EPREL database, as some tires uploaded to the platform still display an alert indicating they are pending verification. For each tyre, we provide the dimensions, brand, model, identifier, season (winter, non-winter), load index, and the labelling values (RR, WB, and Noise). All this information, as previously explained, was extracted from EPREL. The last two columns indicate the average European price of the tyre and the budget range. For the prices of C1 and C2 tyres, we consulted an international sales platform and calculated an average price for each tyre model. For C3 tyres, we consulted our list of 150 tyres with a supplier who has access to the average European prices for all models. In this case, the supplier informed us about models that were no longer sold or had been updated with improved properties, and we made the necessary adjustments accordingly. Table 12 shows a section of the list of tyres with the information explained above.

Table 12 : Overview of xls file with information collected.

	Dimensions	Brand	Model	Identifier	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
1	205/55R16	Continental	EcoContact 6	314991	No	Std	A	B	71	89,5	Premium
2	205/55R16	Lassa	REVOLA	218004AP	No	Reinf.	B	A	71		Mid Range
8	205/55R16	Giti Tire	GitiSynergy H2	A4893H	No	Reinf.	C	A	72		Mid Range
3	205/55R16	Apollo	Alnac 4G	871469298621	No	Std	B	B	69		Mid Range
4	205/55R16	Admiral	RCB008	P00-3220018186	No	Std	D	C	71		Mid Range

8.2. Results

First of all, we looked for a correlation between noise and RR categories, and noise and WG categories for each type of tyre comparing all the data directly. The following graphics represent 150 tyres classified for each RR category (A, B, C, D or E) compared to its noise values generating an average box. The same is done with the WG category (A, B, C or D). We observed a tendency between the RR category and the noise level, but the same cannot be said for WG. However, no definitive conclusions can be drawn. To analyse this trend in greater detail, we classified the tyres by type (C1, C2, or C3), size, season (winter or non-winter), and RR or WG categories. We then calculated the average noise levels for each category to gain a clearer understanding of potential correlations. We also analysed the category prices to explore relationships between price and noise.

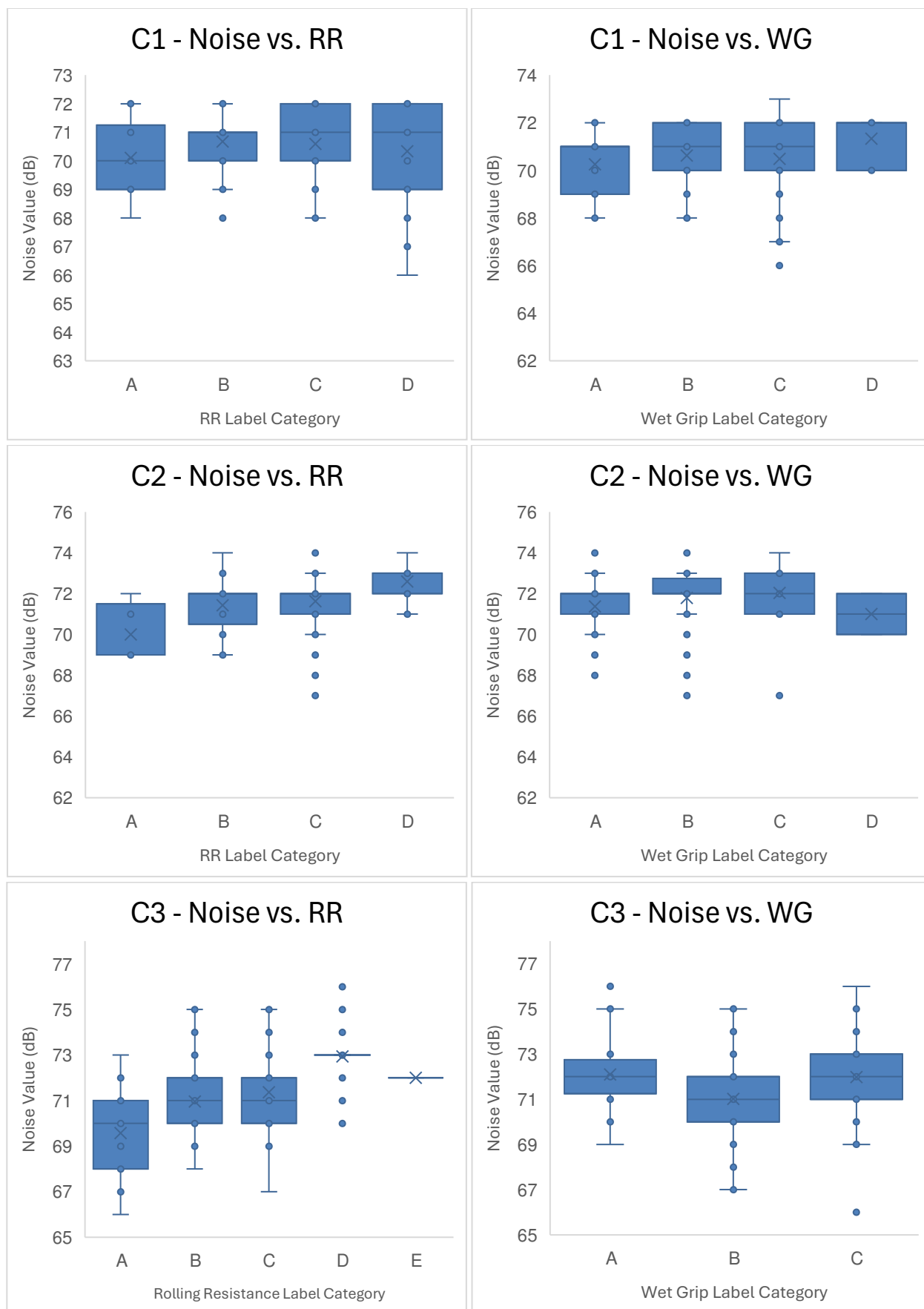


Figure 3 : Noise levels for various RR (left) and WG (right) levels for C1 (up), C2 (middle), C3 (lower) tyres.

8.2.1. C1 tyres

Next tables show relations between RR, WG and noise for various season and tyre sizes.

Table 13 : Relation of RR category and noise levels for season and sizes of C1 tyres.

Size	Winter	RR category	Sample size	Average Noise (dB)	Average Price (€)
205/55R16	No	A	2	71.00	86.50
		B	5	70.00	91.67
		C	6	70.00	97.99
		D	2	71.00	-
	Yes	B	5	70.80	96.50
		C	7	71.14	116.33
		D	3	69.33	93.50
225/45R17	No	A	2	68.50	106.00
		B	5	70.40	85.48
		C	6	70.50	92.79
		D	2	70.50	-
	Yes	B	1	72.00	-
		C	13	70.77	122.57
		D	1	68.00	-
195/65R15	No	A	3	70.33	83.50
		B	3	71.00	85.00
		C	7	70.00	84.33
		D	2	68.00	-
	Yes	B	8	71.00	86.83
		C	7	70.43	81.25
225/40R18	No	A	2	69.50	120.50
		B	5	70.20	91.50
		C	6	70.83	95.50
		D	2	70.50	102.00
	Yes	A	1	72.00	-
		B	3	70.67	-
		C	6	71.00	122.75
		D	5	71.60	98.00
225/60R16	No	B	3	70.67	171.75
		C	12	70.42	165.00
	Yes	B	5	71.00	174.83
		C	9	70.78	129.70
		D	1	72.00	-

Table 14 : Relation of WG category and noise levels for season and sizes of C1 tyres.

Size	Winter	WG category	Sample size	Average Noise (dB)	Average Price (€)
205/55R16	No	A	6	70.17	96.01
		B	4	70.50	89.50
		C	4	70.25	86.50
		D	1	70.00	90.50
	Yes	A	1	72.00	-
		B	6	70.33	113.1
		C	8	70.75	83.25
225/45R17	No	A	10	70.20	93.67
		B	5	70.20	107.50
	Yes	B	11	70.36	121.92
		C	4	71.50	126.50
195/65R15	No	A	6	70.17	84.33
		B	5	70.40	84.00
		C	3	69.00	-
		D	1	70.00	-
	Yes	A	1	72.00	82.00
		B	8	70.75	85.00
		C	5	70.20	88.00
		D	1	72.00	72.50
225/40R18	No	A	9	70.22	96.67
		B	6	70.67	136.00
	Yes	A	1	68.00	-
		B	11	71.27	117.80
		C	1	72.00	-
		D	2	72.00	-
225/60R16	No	A	7	70.57	165.00
		B	8	70.38	171.75
	Yes	B	11	70.82	154.58
		C	3	71.00	122.75
		D	1	72.00	-

8.2.2. C2 tyres

Table 15 : Relation of RR category and noise levels for season and sizes of C2 tyres

Size	Winter	RR category	Sample size	Average Noise (dB)	Average Price (€)
215/65R16	No	A	2	70.00	192.00
		B	4	71.25	165.75
		C	9	71.00	133.83
	Yes	C	11	71.91	163.27
		D	4	73.25	137.39
235/65R16	No	A	1	69.00	-
		B	2	72.00	178.75
		C	12	71.33	150.17
	Yes	B	3	72.67	218.00
		C	8	72.25	166.50
		D	4	72.25	-
205/65R16	No	B	2	72.00	159.50
		C	12	71.41	139.79
		D	1	71.00	-
	Yes	B	1	69.00	163.50
		C	10	71.67	137.38
		D	4	72.50	135.00
205/75R16	No	A	2	70.50	159.50
		B	2	72.00	146.00
		C	11	71.46	124.40
	Yes	B	2	71.50	-
		C	11	72.09	171.75
		D	2	73.00	123.00
225/65R16	No	B	5	70.60	185.33
		C	9	71.67	138.20
		D	1	72.00	-
	Yes	C	11	71.55	171.67
		D	4	72.75	-

Table 16 : Relation of WG category and noise levels for season and sizes of C2 tyres.

Size	Winter	WG category	Sample size	Average Noise (dB)	Average Price (€)
215/65R16	No	A	6	70.50	170.25
		B	9	71.22	122.00
	Yes	A	4	70.75	153.66
		B	10	72.70	161.64
		C	1	74.00	134.00
235/65R16	No	A	7	71.29	157.25
		B	6	70.83	179.00
		C	2	72.50	-
	Yes	A	6	72.17	250.49
		B	6	72.50	195.17
		C	3	72.33	151.00
205/65R16	No	A	4	71.50	158.54
		B	9	71.33	122.00
		C	2	72.00	-
	Yes	A	6	71.33	145.51
		B	5	71.40	-
		C	4	72.75	146.75
205/75R16	No	A	7	71.57	144.60
		B	6	71.83	116.83
		C	2	69.50	-
	Yes	A	3	73.00	181.00
		B	7	72.29	162.50
		C	4	71.75	123.00
		D	1	70.00	-
225/65R16	No	A	5	70.40	172.63
		B	7	71.71	142.25
		C	2	72.00	159.50
		D	1	72.00	112.50
	Yes	A	5	71.80	197.50
		B	7	71.86	120.00
		C	3	72.00	-

8.2.3. C3 tyres

Table 17 : Relation of RR category and noise levels for season and sizes of C3 tyres.

Size	Winter	RR category	Sample size	Average Noise (dB)	Average Price (€)
315/80R22.5	No	B	1	70.00	904.00
		C	8	70.88	748.13
		D	6	72.17	570.47
	Yes	A	1	67.00	1169.00
		B	2	70.00	987.25
		C	10	71.00	616.26
		D	2	74.00	639.24
315/70R22.5	No	A	2	72.00	-
		B	2	72.00	1033.00
		C	3	73.00	912.91
		D	8	72.63	370.28
	Yes	A	2	72.50	980.25
		B	5	71.60	743.32
		C	7	71.86	700.13
		D	1	76.00	1124.00
385/65R22.5	No	A	1	68.00	1078.00
		B	3	69.67	639.00
		C	9	71.22	597.22
		D	2	72.50	428.19
	Yes	A	2	69.50	1105.00
		B	1	74.00	-
		C	6	71.83	781.26
		D	6	73.00	414.40
295/80R22.5	No	C	8	70.75	800.62
		D	7	72.43	545.04
	Yes	B	3	72.00	617.73
		C	8	71.13	611.39
		D	3	74.67	543.17
385/55R22.5	No	E	1	72.00	-
		A	3	68.00	892.33
		B	5	71.20	616.05
	Yes	C	7	72.00	511.60
		A	3	70.33	986.00
		B	5	69.80	919.87
		C	6	71.33	613.25
		D	1	74.00	843.00

Table 18 : Relation of WG category and noise levels for season and sizes of C3 tyres

Size	Winter	WG category	Sample size	Average Noise (dB)	Average Price (€)
315/80R22.5	No	A	2	71.00	784.95
		B	10	71.10	801.08
		C	3	72.33	509.63
	Yes	A	2	72.50	354.45
		B	9	70.78	759.90
		C	4	70.75	856.43
315/70R22.5	No	A	1	75.00	-
		B	4	70.25	1033.00
		C	10	72.80	478.81
	Yes	A	2	73.00	886.60
		B	6	72.00	714.70
		C	7	72.00	850.98
385/65R22.5	No	A	3	72.00	689.80
		B	9	70.56	672.23
		C	3	70.67	441.76
	Yes	A	2	72.50	766.00
		B	7	71.86	804.86
		C	6	72.33	696.49
295/80R22.5	No	A	2	72.00	362.80
		B	7	71.00	923.19
		C	6	72.00	406.75
	Yes	A	3	72.00	529.60
		B	8	71.63	546.91
		C	4	73.00	745.50
385/55R22.5	No	B	6	70.67	798.35
		C	9	71.11	544.56
	Yes	A	3	71.00	625.49
		B	10	70.40	932.82
		C	2	72.50	916.25

8.3. Summary

From the previous analysis:

- Average market tyres noise levels: C1: 70.5 dB, C2: 71.7 dB, C3: 71.5 dB

Correlations of the five best selling tyre sizes (all data, seasons, and sizes) showed a tendency of lower noise with improving (lower) letter of rolling resistance (RR) for C1, C2 and C3 tyres. For WG there was no correlation (C2, C3) or lower noise with improving (lower) letter (C1). Thus, in general we do not expect worse performance by lowering the noise of high noise tyres.

A more detailed analysis was not possible due to the lack of detailed info for RR and WG. This will be the topic of the next chapter. However, the general tendency was:

- For C1: With improving (decreasing) RR letter, noise increases (negative). With improving (decreasing) WG letter, noise decreases (positive).
- For C2: With improving (decreasing) RR letter, noise decreases (positive). With improving (decreasing) WG letter, noise decreases (positive).
- For C3: With improving (decreasing) RR letter, noise decreases (positive). With improving (decreasing) WG letter, noise decreases (positive).

Keeping RR and WG the same and correlating noise and tyre price the following trends were found:

- For C1: Lower noise tyres had on average also lower price (2% per dB)
- For C2: Lower noise tyres had on average higher price (2% per dB)
- For C3: Lower noise tyres had on average higher price (6% per dB)

It should also be added that on average, the difference of the maximum noise tyres to the average was 1.5 dB (C1), 1.3 dB (C2) and 2.9 dB (C3) for the EPREL analysis, and 1 dB (C1), 1 dB (C2) and 1.3 dB (C3) for the tyre size specific analysis.

9. Analysis of consumers tyre testing data

The test were conducted by well-established organizations or magazines (Auto-Motor und Sport, Auto Bild, Auto Zeitung, Allgemeiner Deutscher Automobil-Club (ADAC) and the organization behind the website www.tyrereviews.com. Table 19 summarises the sets, number of tyres per set, the parameters that were tested and the organisations that carried out the tests. Although the protocols among different organisations might not be always the same, the tyres of a specific set, tested by the same organisation are comparable. For this reason, each set (i.e. row in Table 19) was analysed separately and then the trends of all sets were combined. In total, 300 tyres from 63 manufactures were tested, ranging from premium to mid-range to budget brands. The companies with the most tyres tested (50%) were Michelin, Continental, Bridgestone, Goodyear, Falken, Hankook, Maxxis, Nexen, Pirelli. Note that the last set (22) is not from [tyrereviews.com](http://www.tyrereviews.com), but from UTAC on behalf of ACEA [3], and was used only for the abrasion data in this data set. It is separately discussed at the end of this chapter.

Table 19 : Overview of consumer tyre testing.

Test set	Tyre size	Nr of tyres	Test data Supplier	Noise	Dry grip	Wet grip	Aqua straight	Aqua curve	Rolling res.	Abrasion	Tread life	Handling Dry	Handling Wet
1	245/45 R19 102Y	10	AMS	X	X	X	X	X	X	-	-	X	X
2	245/40 R19 98Y	10	Auto Bild	X	X	X	X	X	X	-	-	X	X
3	225/45 R18	11	Auto Bild	X	X	X	X	X	X	-	-	X	X
4	215/55 R17	22	Auto Bild	X	X	X	X	X	X	-	X	X	X
5	215/55 R17 94W	10	Auto Zeitung	X	X	X	X	-	X	-	-	X	X
6	225/45 R17 91Y	9	Tyre Reviews	X	X	X	X	-	X	-	-	X	X
7	205/55 R16 91V	50	ADAC	X	X	X	X	X	-	X	X	-	-
8	225/40 R18 92Y	13	Auto Bild	X	X	X	X	X	X	-	-	X	X
9	225/45 R18 95Y	21	Auto Bild	X	X	X	X	X	X	-	X	X	X
10	235/35 R19 91Y	10	Auto Zeitung	X	X	X	X	-	X	-	-	X	X
11	225/65 R17 106V	12	Auto Bild	X	X	X	X	X	X	-	-	X	X
12	255/45 R20 105Y	10	AMS	X	X	X	X	X	X	-	-	X	X
13	205/55 R16	8	PMM	X	X	X	X	-	X	-	-	X	X
14	225/40 R18 92Y	11	Tyre Reviews	X	X	X	X	X	X	-	-	X	X
15	205/55 R16 91V	13	Tyre Reviews	X	X	X	X	X	X	-	-	X	X
16	215/55 R17	16	ADAC	X	X	X	X	X	-	X	X	-	-
17	235/55 R18 100V	8	AMS	X	X	X	X	X	X	-	-	X	X
18	205/55 R16 91V	21	Auto Bild	X	X	X	X	X	X	-	X	X	X
19	235/55 R19 105Y	9	Auto Bild	X	X	X	X	X	X	-	X	X	X
20	235/55 R19	11	Auto Bild	X	X	X	X	X	X	-	-	X	X
21	205/55 R16	9	Tyre Reviews	X	X	X	X	X	X	-	-	X	X
22	245/45R19 102Y	6	UTAC	X	-	-	-	-	-	X	X	-	-

AMS = Auto Motor und Sport; PMM = The Polish Motor Magazine

Table cont.

Set	Tyre size	#	Average	Min	Max
1	245/45 R19 102Y	10	69.3	67.3	71.1
2	245/40 R19 98Y	10	71.8	70.6	73.6
3	225/45 R18	11	72.9	70.8	74.1
4	215/55 R17	22	68.9	67.1	70.1
5	215/55 R17 94W	10	71.3	70.0	72.0
6	225/45 R17 91Y	9	70.1	67.8	72.5
7	205/55 R16 91V	50	71.1	69.1	73.6
8	225/40 R18 92Y	13	67.5	66.5	69.0
9	225/45 R18 95Y	21	73.1	71.9	75.3
10	235/35 R19 91Y	10	69.6	67.0	72.0
11	225/65 R17 106V	12	69.3	67.3	70.4
12	255/45 R20 105Y	10	72.7	71.9	73.5
13	205/55 R16	8	64.7	64.0	65.3
14	225/40 R18 92Y	11	71.3	69.7	73.3
15	205/55 R16 91V	13	71.4	70.2	72.8
16	215/55 R17	16	71.4	70.0	72.6
17	235/55 R18 100V	8	70.8	69.3	73.2
18	205/55 R16 91V	21	73.5	72.3	74.5
19	235/55 R19 105Y	9	70.3	68.6	71.3
20	235/55 R19	11	70.4	68.6	72.8
21	205/55 R16	9	72.2	70.2	74.4
22	245/45R19 102Y	6	71.9	70.2	73.8

For each set, linear regression analysis between noise and a parameter was conducted, in order to see whether the increase of noise will result in higher or lower values of the other parameter. As an example Figure 4 plots noise and abrasion for the only 3 data sets available.

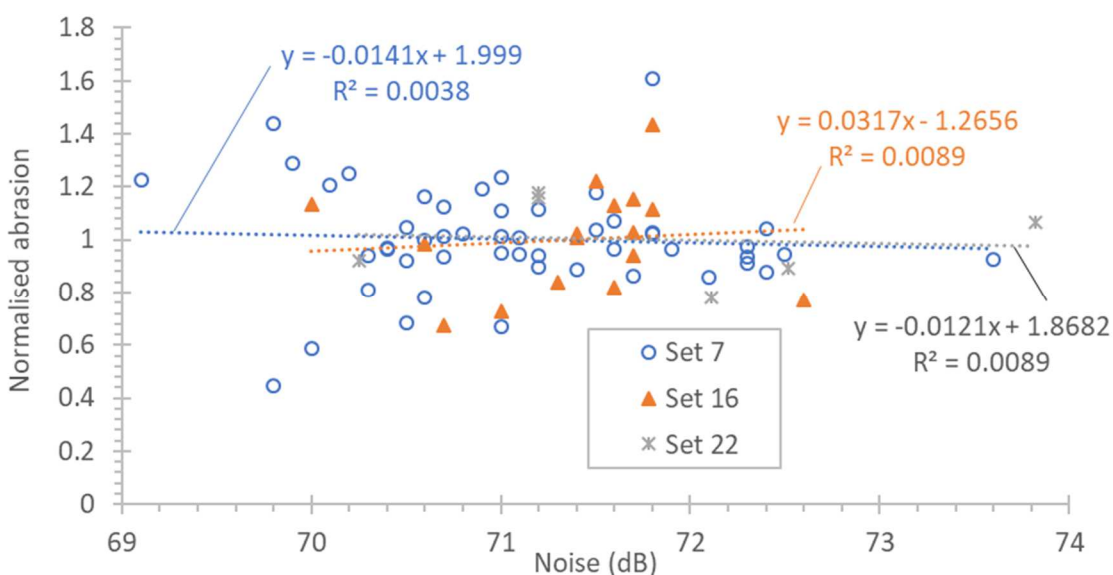


Figure 4 : Correlations between noise and abrasion for three sets of tests.

Next step was to combine all the slopes of all data sets for a specific parameter. Figure 5 plots the average of slopes of all sets available for various parameters (price, rolling resistance, abrasion, mileage). Error bars give one standard deviation. There is no clear effect of reduction of noise to any parameters and in all cases the average goes to the positive side.

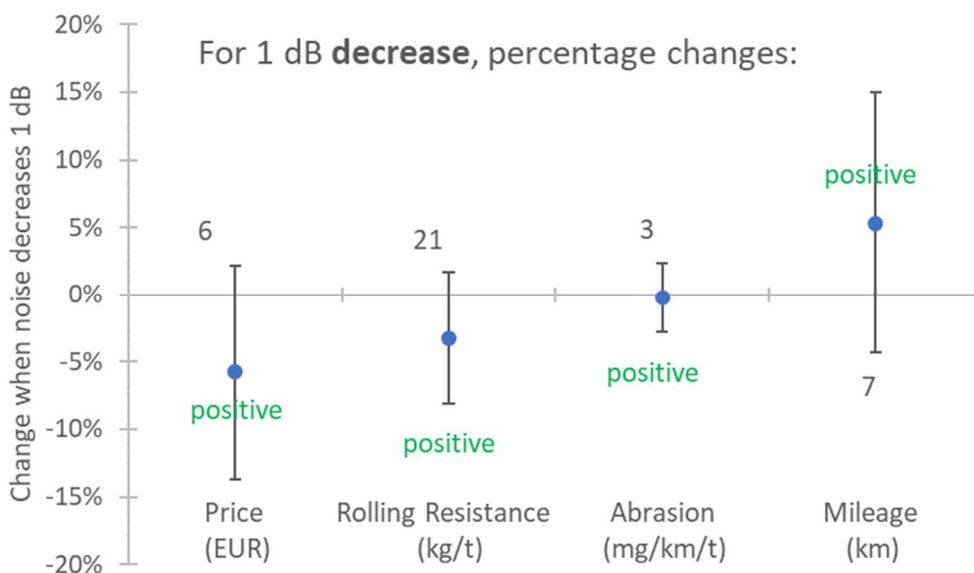


Figure 5 : Impact of lowering noise on various parameters.

Similarly for other safety parameters decreasing noise has a positive impact (Figure 6). However, as the error bars (variability) crosses zero, this impact is not statistically significant. These results demonstrate that current tyres in the market with the current noise levels do not show any impact of noise on other parameters.

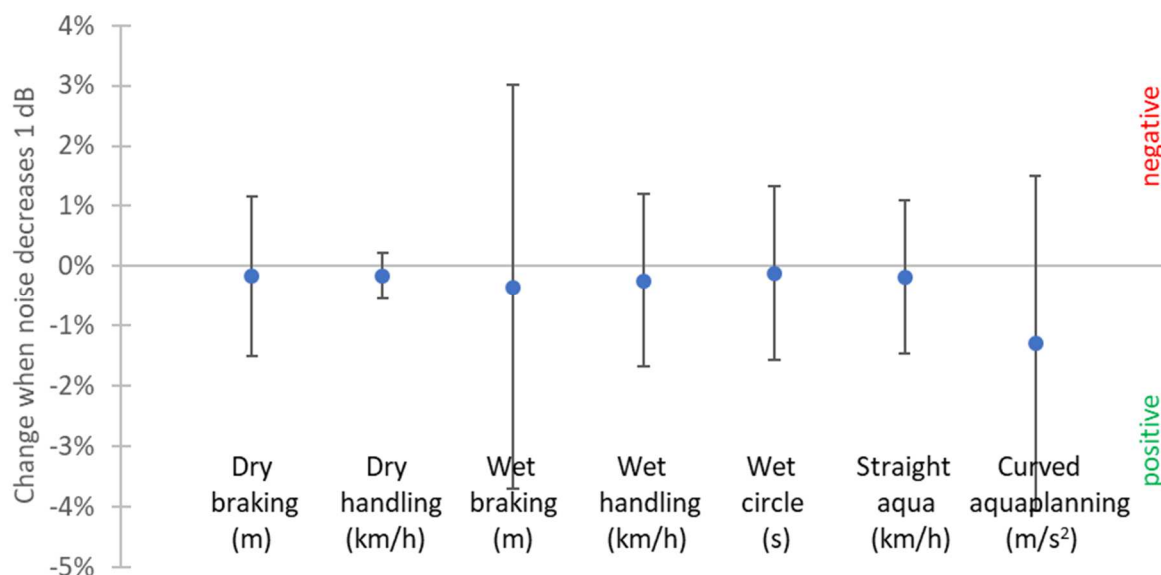


Figure 6 : Impact of noise reduction on various safety parameters.

A dedicated study by UTAC (ACEA) [3] with 16 tyres, based on a statistical analysis, concluded that noise and handling improve together, but there is a conflict between noise and safety performances. No conclusion could be drawn for RR.

10. Noise calculation tool

The cost to human health of noise can be estimated by multiplying the people exposure to high noise levels with the respective costs per dB(A) as given in the Handbook of costs [10]. There are a few studies that have assessed the environmental impact of noise (e.g. ATEEL-ACEA [1], EU projects Heimtsa [4], Venoliva [5], Phenomena [6], M-N noise study [7]). Instead of using the noise exposure of the people moving along daily, noise levels at the facades of the dwellings of the citizens are used as approximations [4]. A good estimation of the actual exposure distribution of EU Member States was reported by the European Environmental Agency (EEA) in the framework of Environmental Noise Directive (END) noise mapping (latest year available 2017) [8]. However, a model is needed in order to assess various mitigation measures. We developed a simplified model combining all previous studies. The model is depicted in Figure 7.

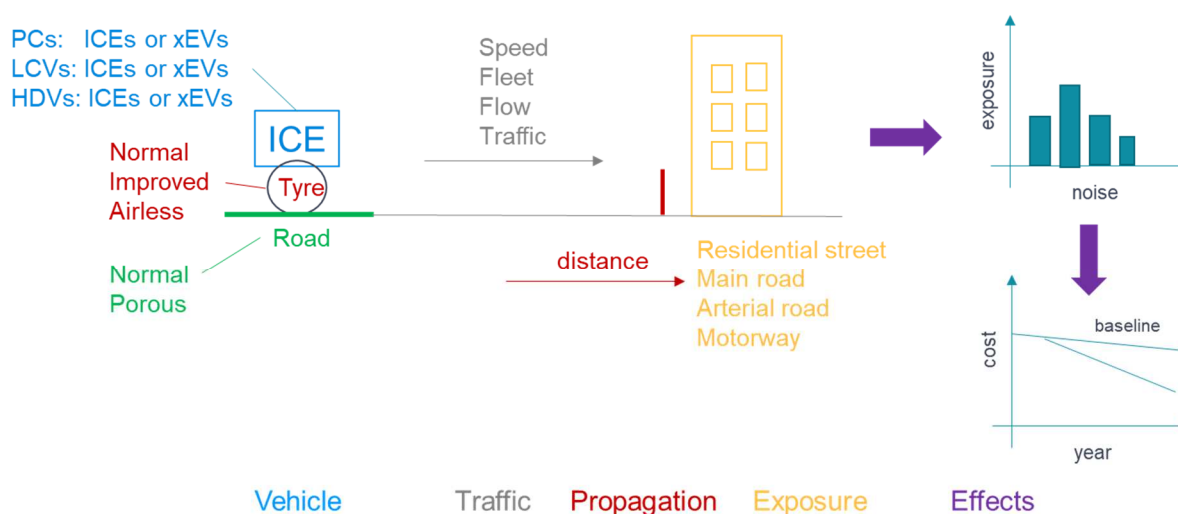


Figure 7 : Schematic representation of the noise calculation model.

The model has five sections: (i) vehicle; (ii) traffic; (iii) propagation; (iv) exposure; (v) effects. The basis of the vehicle model is the CNOSSOS-EU study [9] that estimates the noise emitted by a vehicle depending on the propulsion engine, the tyres rolling noise and the road surface (plus other parameters, such as temperature etc.). However, in our model the initial values are based on the type approval values of tyres and vehicles. This approach has the advantage that any limit changes in the regulations can be directly assessed. The traffic and propagation parts (combined in our simplified model) calculate the noise for various vehicle shares (ICE or electrified), traffic conditions (number of vehicles per hour, average speed, smooth or interment flow) and roads (compared to the ISO surface during type approval or quieter) and propagated to the facades taking into account distance and barriers. The exposure is then calculated based on the population living near various types of roads. Using the cost of noise per dB(A) (from the Handbook on external costs of transport [10]), a cost to the society can be calculated. The calculation can be done for many years assuming various reference conditions: e.g. a specific fleet increase, population increase, electrification penetration etc. From this baseline scenario, various mitigation measures (abatement solutions) can

be assessed by changing one or more parameters (e.g. quieter tyres, quieter surfaces etc.).

The model was ‘calibrated’ with the 2017 END exposure distributions, as extrapolated to EU27 in the M-N study [7, 8]. Then, baseline year was considered 2025 assuming all tyres and vehicles fulfil the latest phases and stages of the regulations (i.e. full compliance with the latest limits). Then the reference scenario assumed only electrification of the fleet. Different scenarios examined various mitigation measures. Details of these steps follow.

10.1. Vehicle

Vehicles are classified to various categories (M1, M2, M3, N1, N2, N3) depending on the number of seats and whether they are designed for carrying passengers or goods. Tyres are classified as C1, C2 and C3. The CNOSSOS-EU model [9], which calculates the noise emissions of individual vehicles, has three vehicle categories light (passenger cars and vans), medium-heavy (vans >3.5 t, busses with two axles), and heavy vehicles (trucks, buses with more than 3 axles).

In order to simplify the categorisation, we considered that C1 tyres are fitted to passenger cars, C2 tyres to light-commercial vehicles, and C3 tyres to heavy-duty vehicles (Table 20). Thus, C1 and C2 tyres are fitted to light vehicles according to CNOSSOS-EU, and C3 tyres to heavy vehicles. For simplification reasons we assumed no medium-heavy category.

Table 20 : Model vehicle category *m* and tyres categories.

This model	CNOSSOS-EU	Vehicle categories	Tyres categories
PCs	Light vehicles	M1	C1
LCVs	Light vehicles	N1	C2
-	Medium-heavy >3.5 t	M2, M3 and N2, N3	C3
HDVs	Heavy	M2, M3 with trailer, M3, N3	C3

Depending on the available propulsion engine(s), the vehicles in our model are categorized as: (i) only internal combustion engine (ICE); (ii) only electric engine (BEV, FCEV); (iii) hybrids (mild, plug-in PEV)

The simplified model calculates noise $L_{w,m,corr}$ from a vehicle of category *m* (PC, LCV, HDV) according to this equation:

$$L_{w,m,corr} = L_{w,m} + \Delta L_{intermittent} + \Delta L_{road} + \Delta L_{barrier} + \Delta L_{offset}$$

Where the uncorrected noise of a vehicle $L_{w,m}$ in function of speed *v* is:

$$L_{w,m}(v) = 10 \log (10^{L_{w,R,m}(v)/10} + 10^{L_{w,P,m}(v)/10})$$

Where $L_{w,R,m}$ is the tyre rolling noise and $L_{w,P,m}$ is the propulsion noise of the vehicle of category *m*. For $L_{w,R,m}$ we used a simplified formula based on fitting of ACEA data [1] as we wanted to have a function of noise and speed, but based on type approval values.

The curve is similar to our measurements (Chapter 6) and slightly steeper than CNOSSOS-EU:

$$L_{w,R,m}(v) = TA_R + 3 + 35 \log(v/v_{TA,R})$$

The value 3 is due to the higher noise in actual road surface than in type approval ISO surfaces. The type approval speed $v_{TA,R}$ is 80 km/h for C1, C2 tyres and 70 km/h for C3 tyres. We used the stage 2 values for our 2025+ calculations. Only for 2017 we used the stage 1 values (Table 21).

Table 21 : TA_R values used in the model based on UN Reg. 117.

Year	C1 (PC)	C2 (LCV)	C3 (HDV)	
2017	75	75	76	Stage 1
2025 +	71	72	75	Stage 2

For $L_{w,P,m}$ we used fixed values as in the Table 22, independently of the speed. Although there is a small vehicle speed dependence, the engine speed is more important factor; and for typical driving conditions this varies in a small range. This simplification introduces some uncertainty for high and low vehicle speeds; nevertheless not important for the scope of this study. Electric vehicles were assumed to have a propulsion noise of 64 dB(A) based on the lowest measurement (Chapter 5) and not 56 dB(A) (the lowest value in R138). For hybrids we used the average of ICEs and BEVs.

Table 22 : $L_{w,P,m}$ values used in the model based on UN Reg. 51 and UN Reg. 138.

Year	M1 (PC)	N1 (LCV)	M3, N3 (HDV)	
2017	71	73	78	Phase 2 (ICE)
2025 +	69	71	77	Phase 3 (ICE)
2025 +	64	64	64	BEV/FCEV

Note: The table values will underestimate the average noise because they do not consider the higher limits of more powerful vehicle. This underestimation will be covered by the offset.

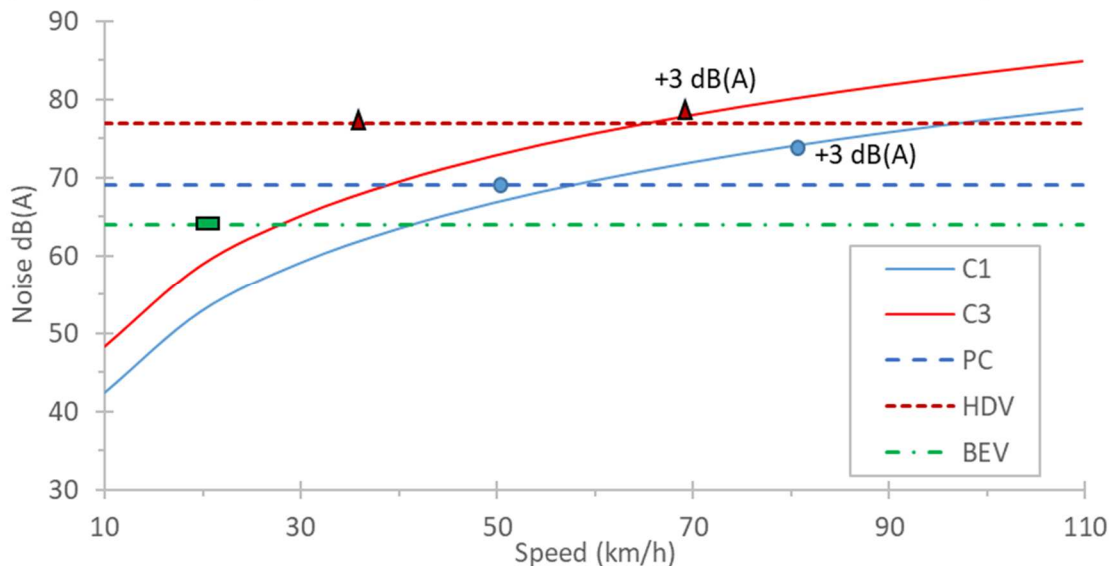


Figure 8 : Noise of tyres (C1 and C3) and propulsion engines (of PC and HDV or BEV) as used in the model. Symbols indicate the speed of the type approval tests for the tyres and propulsion engines PCs (circles), HDVs (triangles) and electric vehicles (square)

From Figure 8, tyre noise becomes significant at high speeds >50 km/h or >40 km/h for electric vehicles. Thus, for high speed roads (motorways) tyre rolling noise plays a major role.

For the rest corrections:

- For **intermittent traffic**, $\Delta L_{intermittent}$, a +3 dB(A) value was added to all vehicles, including BEV/FCEVs. According to CNOSSOS-EU, this correction integrates, in addition to the propulsion engine, the effect of speed variation on tyre noise.
- For the **road surface** effect, ΔL_{road} , we applied subtracted -5 dB(A) for quiet roads.
- For **barriers**, $\Delta L_{barrier}$ we applied a -10 dB(A) correction.
- We also applied an **offset correction**, ΔL_{offset} , of 3.5 dB(A). This (fixed) value was added to bring the year 2017 model results to the END noise urban exposure distribution [8]. It includes noise difference between type approval (ISO tracks) and real roads, temperature, road slope, additional load, different size of tyres effects etc. It also includes uncertainties of the values that were used. For example, we consider C1=69 dB, while the average we calculated was 70.5 (see Chapter 8). Furthermore, we used a single value: the type approval value of one category instead of a distribution of values for all vehicles. Such corrections have been applied to other models as well (M-N [7] and ATEEL [1]) and were of the same order (3 dB for road effect).

10.2. Traffic

The noise of a traffic flow was calculated by the equation provided in the CNOSSOS-EU model, which considers the average velocity v_m and the (steady) traffic flow Q_m for vehicles of category m .

$$L_{w,flow,m} = L_{w,m,corr} + 10 \log (Q_m/v_m/1000)$$

The fleet information are summarised in Table 23 for different periods of the day j (day=8 h, evening=4 h, night=8 h).

Table 23 : Traffic intensities assumed for the noise model. Based on [5].

Road	PC			LCV			HDV		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
1*									
2**	34	25.5	3.4	6.8	3.4	1.7	0.68	1.7	0.85
3*									
4	500	400	50	50	20	5	44	11	5
5	1100	1100	220	121	121	24.2	121	55	33
6***	2500	1875	625	250	187.5	62.5	287.5	182.5	111.3

* Road 1, 3: Increased 25% compared to 2 and 4 respectively due to intermittent traffic

** Road 2: Increased 70% compared to original source

*** Road 6: Increased 25% compared to original source

For the combined flow at a specific period of the day j (day, evening, night):

$$L_j = 10 \log (10^{L_{w,flow,LD}/10} + 10^{L_{w,flow,LCV}/10} + 10^{L_{w,flow,HDV}/10})$$

The long-term average noise indicator is the day-evening-night indicator L_{den} :

$$L_{den} = 10 \log \left(\frac{12}{24} 10^{L_{day}/10} + \frac{4}{24} 10^{(L_{evening}+5)/10} + \frac{8}{24} 10^{(L_{night}+10)/10} \right)$$

Based on previous studies [5, 7], the road types, inhabited length and number of people living (per km) in the model are given in Table 24. The study focused only on urban environments.

Table 24 : Characteristics of urban roads. Based on [5, 7].

	Road type	Traffic	Inhab. length (km)	Inhab./ km	Veh/ 24h	PC km/h	LCV km/h	HDV km/h
1	Residential	Intermit.	643,768	200	835 *	30	30	30
2		Free	321,884	200	668	50	40	40
3	Main	Intermit.	66,599	450	11,665 *	40	40	40
4		Free	133,197	450	9,332	50	50	50
5	Arterial	Free	94,118	500	23,426	80	80	70
6	Motorway	Free	3,824	1,000	51,820	100	90	90

* It was assumed that with intermittent traffic the vehicle flow is 25% higher than free flow.

10.3. Propagation

No distance correction was applied. The ‘offset’ should include this as well. As, it was mentioned, for barrier attenuation a mean reduction of -10 dB(A) was applied.

10.4. Exposure

Table 24 presented the people living close to various roads. The numbers were taken from the M-N study [7]. Based on the people living close to roads and the noise calculated for each road category a noise exposure distribution can be found.

EEA reported measured exposure distribution due to road traffic. This was based on END 2017 data. The measured exposure is based on EEA’s report of END 2017 data and was extrapolated to EU27 level at other projects (Heimtsa [4]) and was presented in the M-N study [7]. The assumption is that 334 million people are exposed at urban areas (75% of the EU population). 45% of them (150 million people) are exposed to $L_{den}>55$ dB(A).

Our model was ‘calibrated’ in order to match as possible the measured exposed distribution. The main parameter was the ‘offset’. Slight changes had also to be made at the fleet traffic density. Figure 9 and Figure 10 show the measured and our modelled exposure distribution for 2017.

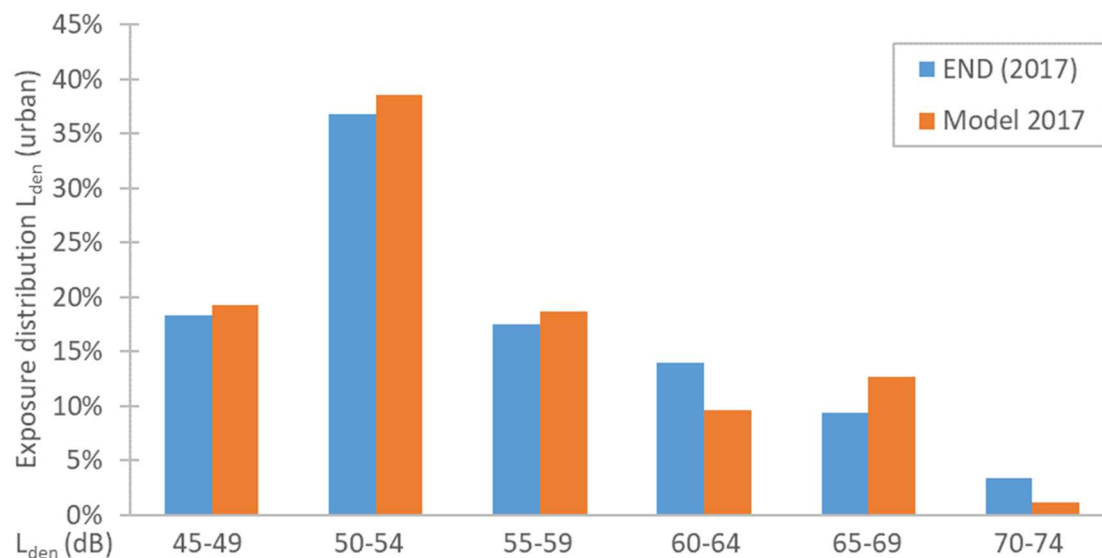


Figure 9 : Noise distributions L_{den} as measured and extrapolated for 2017 (END) and as modelled in this study for 2017.

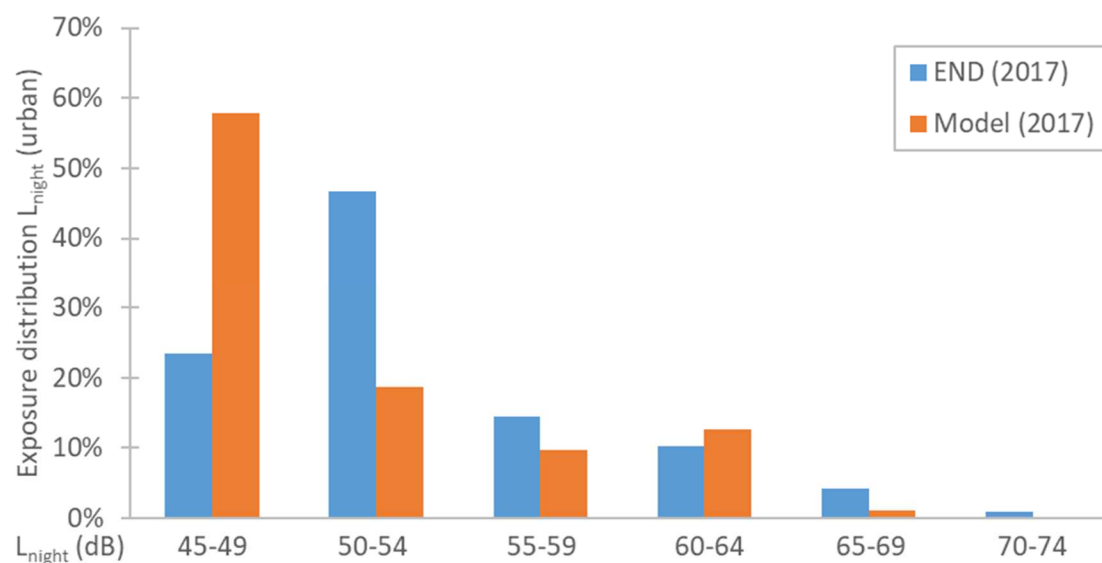


Figure 10 : Noise distributions L_{night} as measured and extrapolated for 2017 (END) and as modelled in this study for 2017.

10.5. Noise costs

The costs were taken from the Handbook on the external costs of transport [10]. It should be added that this methodology, compared to calculations based on people affected and number of healthy life years lost (DALY), gave higher costs by a factor of 2 to 4 in the M-N study. A simple equation was fitted to calculate the costs of traffic noise which include road annoyance and health (in EUR/dB/person/year). The equation is valid for $L_{den} > 50$ dB (0 for lower L_{den}):

$$\text{Cost of traffic noise} = 1.2214 L_{den}^2 - 110.96 L_{den} + 2492.9$$

For administrative, research and development, and production costs we followed the calculation of **Deliverable 6.1**.

10.6. Scenarios

10.6.1. Reference scenario

As it was discussed before, the year 2017 was used only for model calibration. The reference scenario covers from 2025 to 2050. The fleet stock in 2025 was 10% higher compared to 2017. Assuming 0.7% fleet increase per year, the fleet in 2035 was 7.2% higher compared to 2025 and in 2050 19.1% higher than 2025. We assumed that the population increased 0.13% per year based on 2016-2023 data. Furthermore, the impact of higher load (or weight) of the vehicles was not considered, although heavier vehicles tend to be noisier as it is reflected by the tyre and propulsion regulation limits. For example, a study [11] found 0.5 dB higher noise with 25% higher load, a value close to the vehicle mass increase that is expected with fleet electrification. The share of electrified vehicles that we assumed are given in Table 25.

Table 25 : Electrification shares over the years.

Category	Electrification	2017	2025	2035	2050
PC	Hybrids	0%	8%	10%	10%
	BEV/FCEV	0%	5%	30%	85%
LCV	Hybrids	0%	7%	8%	10%
	BEV/FCEV	0%	0%	20%	80%
HDV	Hybrids	0%	0%	5%	10%
	BEV/FCEV	0%	0%	15%	75%

For the reference scenario we assumed that 5% of the length of road #5 had quiet surface and 5% of the length of road #5 had barrier.

10.6.2. Policy scenarios

The following case was examined:

- Quieter tyres -2 dB from 2035

Quieter propulsion engines were not considered as it is expected that ICEs will be phased out. Smooth (free) traffic and quieter road surfaces will be discussed only as they are out of the scope of this study.

10.7. Results

Table 26 summarises the L_{den} noise distributions and the population weighted average. It is clear that the distribution moves to lower noise levels as electrification increases. However, even in 2035, the distribution has not shifted considerably, leaving still the same percentage of the population with noise >55 dB.

Table 26 : Exposure noise distributions. Measured END (2017), model calibration for 2017, calculated from the model from 2025 to 2050.

dB(A)	END (2017)	2017	2025	2035	2050
<50	18.4%	19.3%	19.3%	19.3%	57.8%
50-54	36.8%	38.6%	39.3%	39.3%	0.7%
55-59	17.5%	18.7%	18.7%	18.7%	27.6%
60-64	14.0%	9.7%	21.7%	21.7%	12.7%
65-69	9.4%	12.7%	1.1%	0.0%	0.0%
70-74	3.3%	1.1%	0.0%	1.1%	1.1%
>75	0.5%	0.0%	0.0%	0.0%	0.0%
average	-	56.6	54.6	54.3	52.3

Figure 11 plots the noise evolution over the years with the reference scenario and additional mitigation measures. Already with the fleet electrification significant reductions can be achieved, and mitigation measures further decrease the noise. The L_{den} decreased 3.5% (almost 2 dB) from 2017 to 2025 due to the reduction of noise vehicle and tyre limits (3-4 dB for C1-C2 tyres and 1 dB for C3 tyres, 1-2 dB for the propulsion engines). The additional 20-25% electrification between 2025 and 2030 reduced 0.3 dB the average noise. High degree of electrification (85-95% of the total fleet) reduced the noise almost 2 dB.

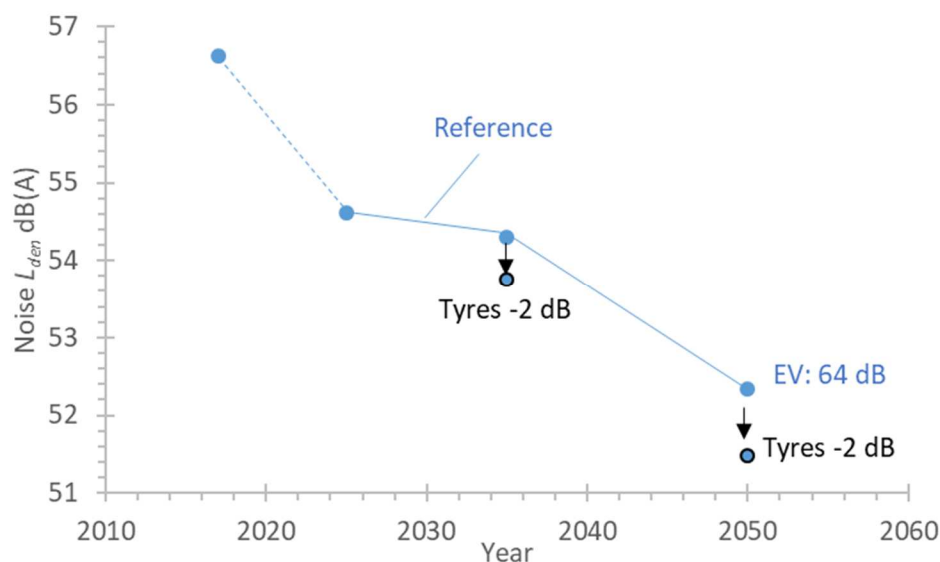


Figure 11 : Population weighted average L_{den} over the years for the reference scenario (blue line) and various mitigation measures.

Figure 12 plots the savings by noise reduction over the years setting 2025 as the baseline year. There is a clear benefit from the noise reduction even for the reference scenario. The savings start to increase slowly with the fleet electrification with 1 bil EUR savings in 2035, and 7 bil EUR only in 2050. Reduction of the tyre rolling noise by -2 dB can save almost 5 bil EUR in 2035 and 6.5 bil EUR in 2050.

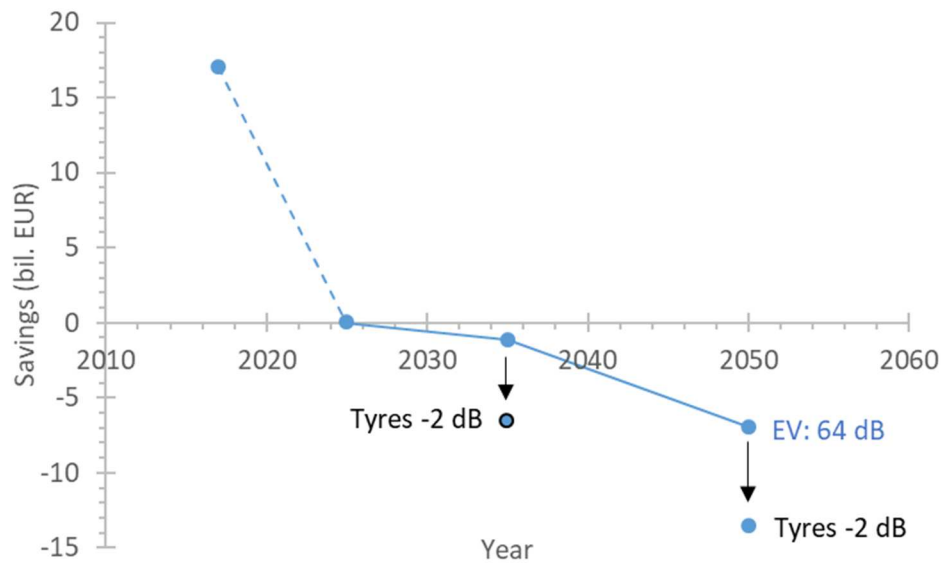


Figure 12 : Savings due to reduce noise compared to year 2025. The reference scenario is the blue line, while other mitigation measures are shown as points.

Regarding costs:

- Testing and administrative: in total 0.3 bil EUR for the period 2025-2050
- Research and development: in total 0.56 bil EUR for the period 2025-2050
- Production (assuming 2% increase of tyres cost of 1/3 of the market tyres): 6.6 bil EUR for the period 2025-2050

It is clear that there is a huge net benefit by noise reductions that by far exceed any costs.

11. Summary

11.1. Data analysis

UN R51 is for vehicles sound emissions and R117 for tyres rolling sound emissions. The main difference on test conditions is the driving condition of full acceleration for R51 compared to coast-by for R117. The target speed in front of the microphones is also different. Combining the average vehicle sound emission and their related tyre average rolling sound emission, we can see the real contribution of the tyres to the total vehicle sound pressure level. Under regulatory conditions, for M1 electric vehicles (quiet vehicles) the tyre has up to 5.6% contribution to the vehicle sound pressure level, while for N3 with internal combustion engine, the tyre has negligible contribution to the vehicle sound pressure level.

Pass-by noise levels were on the order of 71 dB for M1 vehicles, 66 dB for M1 plug-in hybrids, 1-2 dB higher for N1 and N2 vehicles, but around 80 dB for N3. M3 vehicles were on average at 76 dB, and M3 FCEV/BEV 7-9 dB lower.

Regarding the analysis of the label parameters, it is difficult to find a correlation between the labelling parameters, as the tyre's quality level also plays a role. In general, premium tyres tend to show better levels across all label parameters. The average noise levels of the five best selling tyre sizes for C1 tyres were 70.5 dB, for C2 tyres 71.7 dB, and for C3 tyres 71.5 dB. Correlations of all data (all seasons, and sizes) or even separately for each tyre dimension showed a tendency of improved rolling resistance (RR) or wet grip (WG) with lower noise tyres. Thus, in general we do not expect worse performance by lowering the noise of “high” noise tyres (in general reductions on the order of 1 dB). Tyres with the same RR and WG levels showed that lower noise tyres had higher price only for C2 and C3 tyres.

Analysis of the consumers' tyre testing data there is no clear effect of reduction of noise to any parameters (safety, abrasion, RR) and on average the impact was even positive (in general reductions of 1 dB). However, there are studies that show that there is a conflict between noise and safety performances.

11.2. Noise calculation tool

We developed a simplified noise calculation tool combining previous studies. We calibrated the model to the 2017 END noise exposure distributions and applied it to estimate a reference scenario from year 2025 to 2050 and the impact of various mitigation measures. The key characteristics of the model are:

- Tyre rolling noise varies with speed, but the type approval values (of latest Stage 2) are used at the reference regulatory speeds.

- The vehicle noise is fixed and equal to the type approval value (latest Phase 3). For electric vehicles we used a value of 64 dB based on our measurements. Hybrid vehicles were assumed to have noise in between the two (ICE and EVs).
- Intermittent flow increased the noise by 3 dB, quieter road decreased the noise by 5 dB, barriers by 10 dB.
- Based on the traffic conditions (number of vehicles per hour, average speed, smooth or intermittent flow), road characteristics (quiet, with barrier) and the population living close to roads the noise exposure distribution was calculated.
- Finally, the cost to the society was calculated using the values from the Handbook of road traffic costs.
- The procedure was repeated for every year of interest (from 2025 to 2050) assuming a 0.7% fleet increase, 0.13% population increase, and electrification of the fleet (95% by 2050).

The results clearly demonstrated the decrease of the average L_{den} over the years: 56.6 dB in 2017, 54.6 dB in 2025, 54.3 dB in 2035 and 52.3 dB in 2050. A -2 dB reduction of the tyre rolling noise limits has a -0.6 dB impact in 2035 and -0.9 dB in 2050.

The monetarised savings are large. In the first 10 years the annual savings would gradually reach 1 bil EUR per year, while until 2050 they would reach 7 bil EUR per year only by fleet electrification. Lowering the tyre rolling noise 2 dB would save another 5 bil EUR only in 2035 and another 6.5 bil EUR only in 2050.

11.3. Closing remarks

Based on a WHO review, L_{den} should be below 53 dB and L_{night} below 45. Thus the savings by decreasing noise could be higher than estimated in this study.

The study used the type approval values as actual noise levels (with an offset correction). Studies have pointed a bad correlation and ranking of tyres between type approval surfaces and real road surfaces [13]. While in our study tyre rolling and engine propulsion noise crossed at 50 km/h, other studies find lower speeds (30-50 km/h). Thus the benefits of reducing tyre noise of our study might have been underestimated.

The model assumed that intermittent traffic and quieter roads impact equally rolling and propulsion noise. However this assumption needs to be assessed. It is expected that low-noise road surfaces would have higher impact for rolling noise [1]. In any case, in this study we did not assess the impact of intermittent traffic and quieter roads.

This study did not assess the impact of average speed on noise (e.g. low speed areas with limits of 30 km/h instead of 50 km/h).

This study did not evaluate some mitigation measures such as greening, or fitting buildings with high insulating windows. Such solutions could apply locally in critical areas.

This study did not evaluate non-urban areas. In these areas the average speed is high and the dominant noise source is the tyre, thus fleet electrification will not have a big impact. Other abatement measures such as quieter road and barriers will be more effective (or quieter tyres). Implementation will affect a small percentage of the total (including urban areas) exposed population. Low noise surfaces have slow uptake. Tests with porous surfaces have shown that the surfaces are clogged after only one or two winter seasons, and then the noise reduction is severely reduced [13]. At the moment there is no 'efficiency' index for road surface noise and any assessment is theoretical. A future label for roads could help in a better future evaluation.

Contribution of other sources needs to be assessed, especially as vehicles become less noisy. For example, ETRMA reported that in some cities road transport can be a small percentage of the total noise and L_{den} does not address disturbances as felt by citizens. Local peaks can also contribute significantly.

Some of the measures that have not been assessed need initiatives by the Member States.

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13. Annex

13.1. C1 tyres

13.1.1. RR categories classification

	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
1	205/55R16	Continental	EcoContact 6	314991	No	Std	A	B	71	89.5	Premium
5	205/55R16	Goodyear	EFFICIENTGRIP PERFORMANCE	596239	No	Std	A	C	71	83.5	Premium
2	205/55R16	Lassa	REVOLA	218004AP	No	Reinf.	B	A	71		Mid Range
3	205/55R16	Apollo	Alnac 4G	8714692998621	No	Std	B	B	69		Mid Range
6	205/55R16	Dunlop	SPORT BLUESPONSE	595354	No	Std	B	C	71	89.5	Premium
13	205/55R16	Hankook	ION ST AS	1034012	No	Reinf.	B	D	70	90.5	Mid Range
15	205/55R16	Bridgestone	TURANZA 6	22298	No	Reinf.	B	A	69	95.02	Premium
8	205/55R16	Giti Tire	GitiSynergy H2	A4893H	No	Reinf.	C	A	72		Mid Range
9	205/55R16	GT Radial	FE2	A4346H	No	Std	C	A	69		Mid Range
10	205/55R16	Runway	ENDURO HP	AR1123H	No	Reinf.	C	C	68		Mid Range
11	205/55R16	Roadx	RXMOTION DU71	P00-3220017594	No	Reinf.	C	A	71		Mid Range
12	205/55R16	Michelin	PRIMACY 4+	444057	No	Std	C	A	69	97	Premium
14	205/55R16	Landsail	RapidDragon	LHMF105691WM	No	Std	C	B	71		Low Cost
4	205/55R16	Admiral	RCB008	P00-3220018186	No	Std	D	C	71		Mid Range
7	205/55R16	Atlanter	XSPORT-86	8FEL6PA	No	Std	D	B	71		Low Cost
16	205/55R16	Nokian Tyres	Snowproof 2	T433506	Yes	Reinf.	B	B	69	123	Mid Range
24	205/55R16	Barum	POLARIS 6	1541488	Yes	Reinf.	B	C	72		Mid Range
25	205/55R16	Viking	WinTech NewGen	1563424	Yes	Std	B	C	72	85	Mid Range
26	205/55R16	Dunlop	ALL SEASON 2	596472	Yes	Reinf.	B	C	71	81.5	Premium
28	205/55R16	Dynamo	SNOW-H MSL01	P00-3220016133	Yes	Reinf.	B	C	70		Low Cost
17	205/55R16	Pirelli	POWERGY ALL SEASON SF	44816	Yes	Reinf.	C	B	69	100.5	Premium
18	205/55R16	Bridgestone	BLIZZAK 6	31399	Yes	Std	C	B	70	109	Premium
19	205/55R16	Goldline	GL4Season+	GLMH105594VA	Yes	Reinf.	C	B	72		Low Cost
22	205/55R16	Michelin	ALPIN 7	174819	Yes	Reinf.	C	B	71	139.5	Premium
27	205/55R16	Sunny	NW211	NP1103870132	Yes	Std	C	C	72		Low Cost
29	205/55R16	Rotalla	SETULA W RACE S360	6093106	Yes	Reinf.	C	C	72		Mid Range
30	205/55R16	Delinte	AW6	TGDLMH105591VA	Yes	Std	C	A	72		Low Cost
20	205/55R16	Yokohama	BluEarth WINTER V906	S0343	Yes	Std	D	B	71	93.5	Mid Range
21	205/55R16	Roadstone	WINGUARD Snow'G WH2	15857	Yes	Reinf.	D	C	70		Mid Range
23	205/55R16	Nereus	NS805+	N1880H	Yes	Std	D	C	67		Low Cost
37	225/45R17	Falken	AZENIS FK520	356088	No	Reinf.	A	A	68	104.5	Mid Range
40	225/45R17	Bridgestone	TURANZA 6	26787	No	Reinf.	A	B	69	107.5	Premium
36	225/45R17	Nexentire	N'FERA Primus	13645	No	Std	B	A	71		Mid Range
39	225/45R17	Firestone	ROADHAWK 2	21507	No	Reinf.	B	A	71	85.48	Mid Range
41	225/45R17	Sentury	Qirin 990	STMD110294WM	No	Reinf.	B	B	71		Mid Range
42	225/45R17	Sailun	ATREZZO ZSR2	P00-3220018681	No	Reinf.	B	A	69		Low Cost
43	225/45R17	Kumho	KUMHO KU50	2327473	No	Std	B	B	70		Mid Range
32	225/45R17	Goodyear	EAGLE F1 ASYMMETRIC 6	587849	No	Std	C	A	69	82.39	Premium
34	225/45R17	Dunlop	SPORT BLUESPONSE	721017	No	Std	C	A	70	86.99	Premium
35	225/45R17	Roadx	RXMOTION DU71	P00-3220019734	No	Reinf.	C	A	71		Mid Range
38	225/45R17	Michelin	PILOT SPORT 5	140361	No	Reinf.	C	A	72	109	Premium
44	225/45R17	Goodyear	EAGLE SPORT 2 UHP	596148	No	Reinf.	C	B	70		Premium
45	225/45R17	Powertrac	ECOSPORT X77	2PQ2391H1	No	Reinf.	C	B	71		Low Cost
31	225/45R17	Gripmax	PureGrip RS Z-1	TP24000008	No	Reinf.	D	A	72		Low Cost
33	225/45R17	Gt Radial	SportActive 2	A4163H	No	Reinf.	D	A	69		Mid Range
60	225/45R17	Dynamo	SNOW-H MSL01	P00-3220016143	Yes	Reinf.	B	C	72		Low Cost
46	225/45R17	Vredestein	Wintrac Pro+	8714692802744	Yes	Std	C	C	71	126.5	Mid Range
47	225/45R17	Nexentire	N'blue 4Season 2	18999	Yes	Reinf.	C	B	72		Mid Range
48	225/45R17	Pirelli	POWERGY ALL SEASON SF	44809	Yes	Reinf.	C	B	69	96	Premium
49	225/45R17	Momo	W20-40	W20-40	Yes	Reinf.	C	B	72		Low Cost
50	225/45R17	Michelin	ALPIN 7	831149	Yes	Reinf.	C	B	71	174.5	Premium
51	225/45R17	Kingnate	TUTTI HP	K1337	Yes	Reinf.	C	C	71		Low Cost
52	225/45R17	Landsail	4-SEASONS 2	LHMH110294VA	Yes	Reinf.	C	B	72		Low Cost
53	225/45R17	Berlin Tires	ALL SEASON 2	ALL SEASON 2 - 20	Yes	Reinf.	C	B	71		Low Cost
54	225/45R17	Continental	AllSeasonContact 2	355376	Yes	Reinf.	C	B	71	112.5	Premium
55	225/45R17	Barum	POLARIS 6	1541504	Yes	Std	C	C	72		Mid Range
56	225/45R17	Bridgestone	BLIZZAK 6	21200	Yes	Reinf.	C	B	70	150.5	Premium
57	225/45R17	Kleber	QUADRAXER 3	447717	Yes	Reinf.	C	B	69	99	Mid Range
59	225/45R17	BFGoodrich	ADVANTAGE ALL-SEASON	5234	Yes	Reinf.	C	B	69	99	Mid Range
58	225/45R17	Kenda	WINTERGEN 2	KR501 K007B734	Yes	Reinf.	D	B	68		Mid Range
68	195/65R15	Michelin	E PRIMACY	33122	No	Std	A	B	69	94	Premium
71	195/65R15	Bridgestone	ECOPIA EP150	61487100	No	Std	A	C	70		Premium
74	195/65R15	Hankook	Kinergy ECO	1032194	No	Reinf.	A	B	72	73	Mid Range

D6.3 – Policies and mitigation strategies on tyre noise emissions

	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
61	195/65R15	Double Coin	ECO-Max	ECO-Max 80542174	No	Std	B	C	71		Low Cost
64	195/65R15	Continental	EcoContact 6	314682	No	Std	B	B	71	85	Premium
67	195/65R15	Lassa	REVOLA	218027AP	No	Reinf.	B	A	71		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
62	195/65R15	Gr Radial	FE2	A4102H	No	Reinf.	C	A	69		Mid Range
63	195/65R15	Giti Tire	GitiSynergy H2	A4118H	No	Reinf.	C	A	71		Mid Range
65	195/65R15	Nokian Tyres	WETPROOF 1	T433206	No	Std	C	A	68	76.5	Mid Range
69	195/65R15	Maxxis	MA-P5	ETP00302100	No	Reinf.	C	B	70		Mid Range
70	195/65R15	Toyot Tyres	PROXES Comfort	10010924	No	Std	C	A	70	88	Mid Range
72	195/65R15	CST	MR61	TP00425000	No	Reinf.	C	B	70		Mid Range
75	195/65R15	Uniroyal	RainExpert 5	361215	No	Reinf.	C	A	72	88.5	Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
66	195/65R15	Goodyear	EXCELLENCE	532275	No	Std	D	D	70		Premium
73	195/65R15	Dunlop	ENASAVE EC300+	576190	No	Std	D	C	66		Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
77	195/65R15	Dynamo	SNOW-H MSL01	P00-3220016130	Yes	Reinf.	B	C	70		Low Cost
80	195/65R15	Starmaxx	PolarMaxx	517500	Yes	Reinf.	B	B	71		Mid Range
81	195/65R15	Petlas	SnowMaster 2	217500	Yes	Reinf.	B	B	71		Mid Range
82	195/65R15	Fulda	KRISTALL MONTERO 3	593138	Yes	Reinf.	B	D	72	72.5	Mid Range
87	195/65R15	Michelin	ALPIN 7	478502	Yes	Reinf.	B	B	71	107	Premium
88	195/65R15	Funtoma	RoadFun Winter	155940	Yes	Reinf.	B	B	71		Low Cost
89	195/65R15	Dunlop	ALL SEASON 2	596471	Yes	Reinf.	B	C	71	81	Premium
90	195/65R15	Arcron	F-AC1-004	F-AC1-004	Yes	Std	B	C	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
76	195/65R15	Sonix	PRIME A/S	2ESN426	Yes	Std	C	C	70		Low Cost
78	195/65R15	Pirelli	POWERGY ALL SEASON SF	45331	Yes	Reinf.	C	C	69	95	Premium
79	195/65R15	Midas	Tenor All Season	1032992	Yes	Reinf.	C	B	72		Low Cost
83	195/65R15	Bridgestone	WEATHER CONTROL A005 EVO	61351000	Yes	Reinf.	C	A	72	82	Premium
84	195/65R15	Milestone	CarMile Winter	125939	Yes	Std	C	B	71		Low Cost
85	195/65R15	Cooper	DISCOVERER ALL SEASON	590802	Yes	Reinf.	C	B	70	67	Mid Range
86	195/65R15	Kleber	QUADRAXER 3	445230	Yes	Reinf.	C	B	69	81	Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
91	225/40R18	Michelin	E PRIMACY ST *	851257	No	Reinf.	A	B	70		Premium
93	225/40R18	Goodyear	ASSURANCE COMFORTTRED	598893	No	Reinf.	A	A	69	136	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
92	225/40R18	Firestone	ROADHAWK 2	21517	No	Reinf.	B	A	71	84	Mid Range
94	225/40R18	Lassa	REVOLA	21801500	No	Reinf.	B	A	71		Mid Range
95	225/40R18	Sailun	ATREZZO ZSR2	P00-3220018686	No	Reinf.	B	A	69		Low Cost
98	225/40R18	Nexentire	N'FERA Sport	13340	No	Reinf.	B	A	71	98	Mid Range
99	225/40R18	Sentury	Qirin 990	TGSTMD110092WM	No	Reinf.	B	B	69		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
96	225/40R18	Nokian Tyres	POWERPROOF 1	T433251	No	Reinf.	C	A	69	96.5	Mid Range
97	225/40R18	Continental	PremiumContact 6	314708	No	Reinf.	C	B	72		Premium
101	225/40R18	Sunny	NA301	NP1101865129	No	Reinf.	C	B	70		Low Cost
102	225/40R18	Ovation	VI-588 Sport	201E1007	No	Reinf.	C	B	71		Low Cost
104	225/40R18	Feu Vert	Efficiency Summer 3	1559124	No	Reinf.	C	B	72		Mid Range
105	225/40R18	Dunlop	SPORT MAXX RT	542076	No	Reinf.	C	A	71	94.5	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
100	225/40R18	Bridgestone	POTENZA SPORT	31476	No	Reinf.	D	A	72	102	Premium
103	225/40R18	Momo	TOPRUN M300 AS SPORT	1YJ-3220012510	No	Reinf.	D	A	69		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
106	225/40R18	Dynamo	SNOW-H MSL01	P00-3220016142	Yes	Reinf.	A	C	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
111	225/40R18	Michelin	PRIMACY 4	253000	Yes	Reinf.	B	A	68		Premium
118	225/40R18	Radar	CENTIGRADE plus	S216	Yes	Reinf.	B	D	72		Mid Range
119	225/40R18	Roadcruza	ICE-FIGHTER II	S216	Yes	Reinf.	B	D	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
107	225/40R18	Linglong	GRIP MASTER 4S-48	GRIP MASTER 4S-48	Yes	Reinf.	C	B	69		Low Cost
110	225/40R18	Semperit	ALLSEASON-GRIP	373712	Yes	Reinf.	C	B	72	108.5	Mid Range
114	225/40R18	Pirelli	POWERGY ALL SEASON SF	44811	Yes	Reinf.	C	B	71	112.5	Premium
115	225/40R18	Zeta	ANTARCTICA 5	ZEAG109892VA	Yes	Reinf.	C	B	72		Low Cost
116	225/40R18	Bridgestone	BLIZZAK 6	28900	Yes	Reinf.	C	B	70	168.5	Premium
117	225/40R18	Dunlop	ALL SEASON 2	596481	Yes	Reinf.	C	B	72	101.5	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
108	225/40R18	Avon	AS7 ALL SEASON	589502	Yes	Reinf.	D	B	70	98	Mid Range
109	225/40R18	Platin	RP100 ALLSEASON	1032527	Yes	Reinf.	D	B	72		Mid Range
112	225/40R18	Nordexx	NA6000	4865225401872000	Yes	Reinf.	D	B	72		Low Cost
113	225/40R18	Norauto	4 Seasons	1029872	Yes	Reinf.	D	B	72		Mid Range
120	225/40R18	Triangle	SeasonX	CBPRTA122M18YFJ	Yes	Reinf.	D	B	72		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
121	225/60R16	Goodyear	EFFICIENTGRIP PERFORMANCE	549512	No	Reinf.	B	B	72	179.5	Premium
128	225/60R16	Dunlop	SPORT BLURESPONSE	549603	No	Reinf.	B	B	70	164	Premium
132	225/60R16	Pirelli	CINTURATO ROSSO	40465	No	Reinf.	B	A	70		Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
122	225/60R16	Matrax	CAMARGA	AHEB2PE	No	Std	C	B	71		Low Cost
123	225/60R16	Bridgestone	TURANZA 6	22341	No	Reinf.	C	B	71		Premium
124	225/60R16	Firestone	ROADHAWK	18182	No	Reinf.	C	A	72	150	Mid Range
125	225/60R16	Vittos	VSP06	VSP06-40	No	Std	C	B	70		Low Cost
126	225/60R16	Michelin	PRIMACY 4+	648327	No	Std	C	A	69	195.5	Premium
127	225/60R16	Yokohama	BluEarth-XT AE61	RS462	No	Std	C	B	68		Mid Range
129	225/60R16	Hankook	veNtus Prime 3	1021710	No	Std	C	A	71	143	Mid Range
130	225/60R16	Uniroyal	RainExpert 5	361189	No	Reinf.	C	A	72	149	Mid Range
131	225/60R16	Fronway	ECOGREEN 66	2EFW031	No	Std	C	B	70		Low Cost
133	225/60R16	Chuanishi	TOURING CP2+	YCH092HD00	No	Std	C	B	71		Low Cost
134	225/60R16	Bridgestone	WEATHER CONTROL A005 EVO	19428	No	Reinf.	C	A	71	187.5	Premium
135	225/60R16	Kleber	DYNAXER HP4	317156	No	Reinf.	C	A	69		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
137	225/60R16	Tercelo	CROSEASON 4S	1KWPLJF16 102V	Yes	Reinf.	B	B	71		Low Cost
139	225/60R16	Vredestein	Quatrac	8714692358463	Yes	Reinf.	B	B	71	148.5	Mid Range
143	225/60R16	Delmax	X-WEATHER 4S	1KWPLJF16 102V	Yes	Reinf.	B	B	71		Low Cost
144	225/60R16	Michelin	CROSSCLIMATE 2	430203	Yes	Reinf.	B	B	71	192	Premium
148	225/60R16	Continental	AllSeasonContact 2	355930	Yes	Reinf.	B	B	71	184	Premium

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	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
136	225/60R16	BFGoodrich	ADVANTAGE ALL-SEASON	458228	Yes	Reinf.	C	B	69		Mid Range
138	225/60R16	Gt Radial	ICEPRO3	A4865H	Yes	Std	C	D	72		Mid Range
140	225/60R16	Maxxis	AP3	ETP00258500	Yes	Reinf.	C	B	70	108.5	Mid Range
142	225/60R16	Fulda	MULTICONTROL	579232	Yes	Reinf.	C	C	71	121.5	Mid Range
145	225/60R16	Falken	EUROALL SEASON AS210	339307	Yes	Reinf.	C	B	70	129.5	Mid Range
146	225/60R16	Toyo Tires	SNOWPROX S943	15110910	Yes	Reinf.	C	C	70	124	Mid Range
147	225/60R16	Kumho	WP72	2247533	Yes	Reinf.	C	C	72		Mid Range
149	225/60R16	Delinte	WINTER WD1	DLBU116102TA	Yes	Reinf.	C	B	72		Low Cost
150	225/60R16	Goodyear	ULTRAGRIP PERFORMANCE +	587214	Yes	Reinf.	C	B	71	165	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
141	225/60R16	Doublstar	MAXIMUM DLA01	MAXIMUM DLA01 016	Yes	Std	D	B	72		Low Cost

13.1.2. WG categories classification

	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
2	205/55R16	Lassa	REVOLA	218004AP	No	Reinf.	B	A	71		Mid Range
8	205/55R16	Giti Tire	GitiSynergy H2	A4893H	No	Reinf.	C	A	72		Mid Range
9	205/55R16	GT Radial	FE2	A4346H	No	Std	C	A	69		Mid Range
11	205/55R16	Roadx	RXMOTION DU71	P00-3220017594	No	Reinf.	C	A	71		Mid Range
12	205/55R16	Michelin	PRIMACY 4+	444057	No	Std	C	A	69	97	Premium
15	205/55R16	Bridgestone	TURANZA 6	22298	No	Reinf.	B	A	69	95.02	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
1	205/55R16	Continental	EcoContact 6	314991	No	Std	A	B	71	89.5	Premium
3	205/55R16	Apollo	Alnac 4G	8714692998621	No	Std	B	B	69		Mid Range
7	205/55R16	Atlanter	XSPORT-86	8FE6PA	No	Std	D	B	71		Low Cost
14	205/55R16	Landsail	RapidDragon	LHMF105691WM	No	Std	C	B	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
4	205/55R16	Admiral	RCB008	P00-3220018186	No	Std	D	C	71		Mid Range
5	205/55R16	Goodyear	EFFICIENTGRIP PERFORMANCE	596239	No	Std	A	C	71	83.5	Premium
6	205/55R16	Dunlop	SPORT BLUESPONSE	595354	No	Std	B	C	71	89.5	Premium
10	205/55R16	Runway	ENDURO HP	AR1123H	No	Reinf.	C	C	68		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
13	205/55R16	Hankook	iON ST AS	1034012	No	Reinf.	B	D	70	90.5	Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
30	205/55R16	Delinte	AW6	TGDLMH105591VA	Yes	Std	C	A	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
16	205/55R16	Nokian Tyres	Snowproof 2	T433506	Yes	Reinf.	B	B	69	123	Mid Range
17	205/55R16	Pirelli	POWERGY ALL SEASON SF	44816	Yes	Reinf.	C	B	69	100.5	Premium
18	205/55R16	Bridgestone	BLIZZAK 6	31399	Yes	Std	C	B	70	109	Premium
19	205/55R16	Goldline	GL4Season+	GLMH105594VA	Yes	Reinf.	C	B	72		Low Cost
20	205/55R16	Yokohama	BluEarth*WINTER V906	S0343	Yes	Std	D	B	71	93.5	Mid Range
22	205/55R16	Michelin	ALPIN 7	174819	Yes	Reinf.	C	B	71	139.5	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
21	205/55R16	Roadstone	WINGUARD Snow'G WH2	15857	Yes	Reinf.	D	C	70		Mid Range
23	205/55R16	Nereus	NS805+	N1880H	Yes	Std	D	C	67		Low Cost
24	205/55R16	Barum	POLARIS 6	1541488	Yes	Reinf.	B	C	72		Mid Range
25	205/55R16	Viking	WinTech NewGen	1563424	Yes	Std	B	C	72	85	Mid Range
26	205/55R16	Dunlop	ALL SEASON 2	596472	Yes	Reinf.	B	C	71	81.5	Premium
27	205/55R16	Sunny	NW211	NP1103870132	Yes	Std	C	C	72		Low Cost
28	205/55R16	Dynamo	SNOW-H MSL01	P00-3220016133	Yes	Reinf.	B	C	72		Low Cost
29	205/55R16	Rotalia	SETULA W RACE S360	6093106	Yes	Reinf.	C	C	72		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
31	225/45R17	Gripmax	PureGrip RS Z-1	TP24000008	No	Reinf.	D	A	72		Low Cost
32	225/45R17	Goodyear	EAGLE F1 ASYMMETRIC 6	587849	No	Std	C	A	69	82.39	Premium
33	225/45R17	Gt Radial	SportActive 2	A4163H	No	Reinf.	D	A	69		Mid Range
34	225/45R17	Dunlop	SPORT BLUESPONSE	721017	No	Std	C	A	70	86.99	Premium
35	225/45R17	Roadx	RXMOTION DU71	P00-3220019734	No	Reinf.	C	A	71		Mid Range
36	225/45R17	Nexentire	N'FERA Primus	13645	No	Std	B	A	71		Mid Range
37	225/45R17	Falken	AZENIS FK520	356088	No	Reinf.	A	A	68	104.5	Mid Range
38	225/45R17	Michelin	PILOT SPORT 5	140361	No	Reinf.	C	A	72	109	Premium
39	225/45R17	Firestone	ROADHAWK 2	21507	No	Reinf.	B	A	71	85.48	Mid Range
42	225/45R17	Sailun	ATREZZO ZSR2	P00-3220018681	No	Reinf.	B	A	69		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
40	225/45R17	Bridgestone	TURANZA 6	26787	No	Reinf.	A	B	69	107.5	Premium
41	225/45R17	Sentury	Qirin 990	STMD110294WM	No	Reinf.	B	B	71		Mid Range
43	225/45R17	Kumho	KUMHO KU50	2327473	No	Std	B	B	70		Mid Range
44	225/45R17	Goodyear	EAGLE SPORT 2 UHP	596148	No	Reinf.	C	B	70		Premium
45	225/45R17	Powertrac	ECOSPORT X77	2PQ2391H1	No	Reinf.	C	B	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
47	225/45R17	Nexentire	N'blue 4Season 2	18999	Yes	Reinf.	C	B	72		Mid Range
48	225/45R17	Pirelli	POWERGY ALL SEASON SF	44809	Yes	Reinf.	C	B	69	96	Premium
49	225/45R17	Momo	W20-40	W20-40	Yes	Reinf.	C	B	72		Low Cost
50	225/45R17	Michelin	ALPIN 7	831149	Yes	Reinf.	C	B	71	174.5	Premium
52	225/45R17	Landsail	4-SEASONS 2	LHMH110294VA	Yes	Reinf.	C	B	72		Low Cost
53	225/45R17	Berlin Tires	ALL SEASON 2	ALL SEASON 2 - 20	Yes	Reinf.	C	B	71		Low Cost
54	225/45R17	Continental	AllSeasonContact 2	355376	Yes	Reinf.	C	B	71	112.5	Premium
56	225/45R17	Bridgestone	BLIZZAK 6	21200	Yes	Reinf.	C	B	70	150.5	Premium
57	225/45R17	Kleber	QUADRAXER 3	447717	Yes	Reinf.	C	B	69	99	Mid Range
58	225/45R17	Kenda	WINTERGEN 2	KR501 K007B734	Yes	Reinf.	D	B	68		Mid Range
59	225/45R17	BFGoodrich	ADVANTAGE ALL-SEASON	5234	Yes	Reinf.	C	B	69	99	Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
46	225/45R17	Vredestein	Wintrac Pro+	8714692802744	Yes	Std	C	C	71	126.5	Mid Range
51	225/45R17	Kingnate	TUTTI HP	K1337	Yes	Reinf.	C	C	71		Low Cost
55	225/45R17	Barum	POLARIS 6	1541504	Yes	Std	C	C	72		Mid Range
60	225/45R17	Dynamo	SNOW-H MSL01	P00-3220016143	Yes	Reinf.	B	C	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
62	195/65R15	Gt Radial	FE2	A4102H	No	Reinf.	C	A	69		Mid Range
63	195/65R15	Giti Tire	GitiSynergy H2	A4118H	No	Reinf.	C	A	71		Mid Range
65	195/65R15	Nokian Tyres	WETPROOF 1	T433206	No	Std	C	A	68	76.5	Mid Range
67	195/65R15	Lassa	REVOLA	218027AP	No	Reinf.	B	A	71		Mid Range
70	195/65R15	Toyo Tires	PROXES Comfort	10010924	No	Std	C	A	70	88	Mid Range
75	195/65R15	Uniroyal	RainExpert 5	361215	No	Reinf.	C	A	72	88.5	Mid Range

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	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
64	195/65R15	Continental	EcoContact 6	314682	No	Std	B	B	71	85	Premium
68	195/65R15	Michelin	E PRIMACY	33122	No	Std	A	B	69	94	Premium
69	195/65R15	Maxxis	MA-P5	ETP00302100	No	Reinf.	C	B	70		Mid Range
72	195/65R15	CST	MR61	TP00425000	No	Reinf.	C	B	70		Mid Range
74	195/65R15	Hankook	Kinergy ECO	1032194	No	Reinf.	A	B	72	73	Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
61	195/65R15	Double Coin	ECO-Max	ECO-Max 80542174	No	Std	B	C	71		Low Cost
71	195/65R15	Bridgestone	ECOPIA EP150	61487100	No	Std	A	C	70		Premium
73	195/65R15	Dunlop	ENASAVE EC300+	576190	No	Std	D	C	66		Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
66	195/65R15	Goodyear	EXCELLENCE	532275	No	Std	D	D	70		Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
83	195/65R15	Bridgestone	WEATHER CONTROL A005 EVO	61351000	Yes	Reinf.	C	A	72	82	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
79	195/65R15	Midas	Tenor All Season	1032992	Yes	Reinf.	C	B	72		Low Cost
80	195/65R15	Starmaxx	PolarMaxx	517500	Yes	Reinf.	B	B	71		Mid Range
81	195/65R15	Pettas	SnowMaster 2	217500	Yes	Reinf.	B	B	71		Mid Range
84	195/65R15	Milestone	CarMile Winter	125939	Yes	Std	C	B	71		Low Cost
85	195/65R15	Cooper	DISCOVER ALL SEASON	590802	Yes	Reinf.	C	B	70	67	Mid Range
86	195/65R15	Kleber	QUADRAXER 3	445230	Yes	Reinf.	C	B	69	81	Mid Range
87	195/65R15	Michelin	ALPIN 7	478502	Yes	Reinf.	B	B	71	107	Premium
88	195/65R15	Funtoma	RoadFun Winter	155940	Yes	Reinf.	B	B	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
76	195/65R15	Sonix	PRIME A/S	2ESN426	Yes	Std	C	C	70		Low cost
77	195/65R15	Dynamo	SNOW-H MSL01	P00-3220016130	Yes	Reinf.	B	C	70		Low Cost
78	195/65R15	Pirelli	POWERGY ALL SEASON SF	45331	Yes	Reinf.	C	C	69	95	Premium
89	195/65R15	Dunlop	ALL SEASON 2	596471	Yes	Reinf.	B	C	71	81	Premium
90	195/65R15	Arcron	F-AC1-004	F-AC1-004	Yes	Std	B	C	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
82	195/65R15	Fulda	KRISTALL MONTERO 3	593138	Yes	Reinf.	B	D	72	72.5	Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
92	225/40R18	Firestone	ROADHAWK 2	21517	No	Reinf.	B	A	71	84	Mid Range
93	225/40R18	Goodyear	ASSURANCE COMFORTTRED	598893	No	Reinf.	A	A	69	105	Premium
94	225/40R18	Lassa	REVOLA	21801500	No	Reinf.	B	A	71		Mid Range
95	225/40R18	Sailun	ATREZZO ZSR2	P00-3220018686	No	Reinf.	B	A	69		Low Cost
96	225/40R18	Nokian Tyres	POWERPROOF 1	7433251	No	Reinf.	C	A	69	96.5	Mid Range
98	225/40R18	Nexentire	N'FERA Sport	13340	No	Reinf.	B	A	71	98	Mid Range
100	225/40R18	Bridgestone	POTENZA SPORT	31476	No	Reinf.	D	A	72	102	Premium
103	225/40R18	Momo	TOPRUN M300 AS SPORT	1YJ-3220012510	No	Reinf.	D	A	69		Mid Range
105	225/40R18	Dunlop	SPORT MAXX RT	542076	No	Reinf.	C	A	71	94.5	Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
91	225/40R18	Michelin	E PRIMACY ST *	851257	No	Reinf.	A	B	70	136	Premium
97	225/40R18	Continental	PremiumContact 6	314708	No	Reinf.	C	B	72		Premium
99	225/40R18	Sentury	Qirin 990	TGSTMD110092WM	No	Reinf.	B	B	69		Mid Range
101	225/40R18	Sunny	NA301	NP1101865129	No	Reinf.	C	B	70		Low Cost
102	225/40R18	Ovation	VI-588 Sport	201E1007	No	Reinf.	C	B	71		Low Cost
104	225/40R18	Feu Vert	Efficiency Summer 3	1559124	No	Reinf.	C	B	72		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
111	225/40R18	Michelin	PRIMACY 4	253000	Yes	Reinf.	B	A	68		Premium
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
107	225/40R18	Linglong	GRIP MASTER 4S-48	GRIP MASTER 4S-48	Yes	Reinf.	C	B	69		Low Cost
108	225/40R18	Avon	AS7 ALL SEASON	589502	Yes	Reinf.	D	B	70	98	Mid Range
109	225/40R18	Platin	RP100 ALLSEASON	1032527	Yes	Reinf.	D	B	72		Mid Range
110	225/40R18	Semperit	ALLSEASON-GRIP	373712	Yes	Reinf.	C	B	72	108.5	Mid Range
112	225/40R18	Nordex	NA6000	4865225401872000	Yes	Reinf.	D	B	72		Low Cost
113	225/40R18	Norauto	4 Seasons	1029872	Yes	Reinf.	D	B	72		Mid Range
114	225/40R18	Pirelli	POWERGY ALL SEASON SF	44811	Yes	Reinf.	C	B	71	112.5	Premium
115	225/40R18	Zeta	ANTARCTICA 5	ZE99109892VA	Yes	Reinf.	C	B	72		Low Cost
116	225/40R18	Bridgestone	BLIZZAK 6	28900	Yes	Reinf.	C	B	70	168.5	Premium
117	225/40R18	Dunlop	ALL SEASON 2	596481	Yes	Reinf.	C	B	72	101.5	Premium
120	225/40R18	Triangle	SeasonX	CBPTRTA122M18VFJ	Yes	Reinf.	D	B	72		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
106	225/40R18	Dynamo	SNOW-H MSL01	P00-3220016142	Yes	Reinf.	A	C	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
118	225/40R18	Radar	CENTIGRADE plus	S216	Yes	Reinf.	B	D	72		Mid Range
119	225/40R18	Roadcruza	ICE-FIGHTER II	S216	Yes	Reinf.	B	D	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
124	225/60R16	Firestone	ROADHAWK	18182	No	Reinf.	C	A	72	150	Mid Range
126	225/60R16	Michelin	PRIMACY 4+	648327	No	Std	C	A	69	195.5	Premium
129	225/60R16	Hankook	veNtus Prime 3	1021710	No	Std	C	A	71	143	Mid Range
130	225/60R16	Uniroyal	RainExpert 5	361189	No	Reinf.	C	A	72	149	Mid Range
132	225/60R16	Pirelli	CINTURATO ROSSO	40465	No	Reinf.	B	A	70		Premium
134	225/60R16	Bridgestone	WEATHER CONTROL A005 EVO	19428	No	Reinf.	C	A	71	187.5	Premium
135	225/60R16	Kleber	DYNAXER HP4	317156	No	Reinf.	C	A	69		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
121	225/60R16	Goodyear	EFFICIENTGRIP PERFORMANCE	549512	No	Reinf.	B	B	72	179.5	Premium
122	225/60R16	Matrax	CAMARGA	AHEB2PE	No	Std	C	B	71		Low Cost
123	225/60R16	Bridgestone	TURANZA 6	22341	No	Reinf.	C	B	71		Premium
125	225/60R16	Vittos	VSP06	VSP06-40	No	Std	C	B	70		Low Cost
127	225/60R16	Yokohama	BluEarth-XT AE61	RS462	No	Std	C	B	68		Mid Range
128	225/60R16	Dunlop	SPORT BLUESPONSE	549603	No	Reinf.	B	B	70	164	Premium
131	225/60R16	Fronway	ECOGREEN 66	2EFW031	No	Std	C	B	70		Low Cost
133	225/60R16	Chuanishi	TOURING CP2+	YCH092HD0	No	Std	C	B	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
136	225/60R16	BFGoodrich	ADVANTAGE ALL-SEASON	458228	Yes	Reinf.	C	B	69		Mid Range
137	225/60R16	Tercelo	CROSEASON 4S	1KWPLUF16 102V	Yes	Reinf.	B	B	71		Low Cost
139	225/60R16	Vredestein	Quatrac	8714692358463	Yes	Reinf.	B	B	71	148.5	Mid Range
140	225/60R16	Maxxis	AP3	ETP00258500	Yes	Reinf.	C	B	70	108.5	Mid Range
141	225/60R16	Doublestar	MAXIMUM DLA01	MAXIMUM DLA01 016	Yes	Std	D	B	72		Low Cost
143	225/60R16	Delmax	X-WEATHER 4S	1KWPLUF16 102V	Yes	Reinf.	B	B	71		Low Cost
144	225/60R16	Michelin	CROSSCLIMATE 2	430203	Yes	Reinf.	B	B	71	192	Premium
145	225/60R16	Falken	EUROALL SEASON AS210	339307	Yes	Reinf.	C	B	70	129.5	Mid Range
148	225/60R16	Continental	AllSeasonContact 2	355930	Yes	Reinf.	B	B	71	184	Premium
149	225/60R16	Delinte	WINTER WD1	DLBU1116102TA	Yes	Reinf.	C	B	72		Low Cost
150	225/60R16	Goodyear	ULTRAGRIP PERFORMANCE +	587214	Yes	Reinf.	C	B	71	165	Premium

	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
142	225/60R16	Fulda	MULTICONTROL	579232	Yes	Reinf.	C	C	71	121.5	Mid Range
146	225/60R16	Toyo Tires	SNOWPROX S943	15110910	Yes	Reinf.	C	C	70	124	Mid Range
147	225/60R16	Kumho	WP72	2247533	Yes	Reinf.	C	C	72		Mid Range
	Dimensione	Marca	Modelo	Identificador	Winter	Std / Reinf.	RR	WG	Noise (dB)	Price (€)	Budget
138	225/60R16	Gt Radial	ICEPRO3	A4865H	Yes	Std	C	D	72		Mid Range

13.2. C2 tyres

13.2.1. RR categories classification

	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
1	215/65R16	Goodyear	EFFICIENTGRIP CARGO 2	595648	106	No	A	A	71	192	Premium
12	215/65R16	Kumho	CS01	2330513	109	No	A	A	69		Mid Range
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
2	215/65R16	Sentury	Qirin V88+	STD1086109/107TX	109	No	B	B	72		Mid Range
6	215/65R16	Michelin	AGILIS 3	371402	109	No	B	A	72	166.5	Premium
11	215/65R16	Bridgestone	DURAVIS VAN	20896	109	No	B	A	69	165	Premium
15	215/65R16	Sailun	COMMERCEIO PRO	153-3220014873	109	No	B	A	72		Low Cost
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
3	215/65R16	GT Radial	MAXMILER Pro	A4530H	109	No	C	B	71		Mid Range
4	215/65R16	Wanli	SL106	SL110506912	109	No	C	B	70		Low Cost
5	215/65R16	Pirelli	CARRIER	45673	109	No	C	A	70	157.5	Premium
7	215/65R16	Lassa	TRANSWAY 3	24374700	109	No	C	B	69		Mid Range
8	215/65R16	Admiral	CSB007	P00-3220018209	109	No	C	B	72		Mid Range
9	215/65R16	Apollo	Alttrust Grip	8714692999253	109	No	C	B	72		Mid Range
10	215/65R16	Uniroyal	Rain Max 5	452341	109	No	C	B	72	120.5	Mid Range
13	215/65R16	Semperit	VAN-LIFE 3	452319	109	No	C	B	72	123.5	Mid Range
14	215/65R16	Landsail	LSV88+	LHDX1086109/107TX-2	109	No	C	B	71		Low Cost
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
16	215/65R16	Kenda	KOMENDO 4S KR105	KR105 35063007	109	Yes	C	B	73		Mid Range
18	215/65R16	Berlin Tires	ALPINE GRIP C	ALPINE GRIP C - 5	109	Yes	C	B	72		Low Cost
19	215/65R16	Goldline	GL 4Season LT+	GLDY1086109/107TA	109	Yes	C	B	73		Low Cost
21	215/65R16	Tercelo	CROSEASON VAN	1KW CLHE16	109	Yes	C	B	72		Low Cost
23	215/65R16	Maxxis	Vansmart Snow WL2	ETL00001800	109	Yes	C	A	71	123	Mid Range
24	215/65R16	Petlas	VanMaster A/S +	420050	109	Yes	C	A	72		Mid Range
25	215/65R16	Starmaxx	VanMaxx A/S +	920050	109	Yes	C	A	72		Mid Range
26	215/65R16	Pirelli	CARRIER ALL SEASON	25660	109	Yes	C	A	68	184.32	Premium
27	215/65R16	Delinte	AW6 VAN	TGDLDY1086109/107TA	109	Yes	C	B	73		Low Cost
29	215/65R16	Continental	VANCONTACT WINTER	453297	109	Yes	C	B	72	182.5	Premium
30	215/65R16	Roadhog	RGASV02	TGRHDX1086109/107TA	109	Yes	C	B	73		Low Cost
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
17	215/65R16	Strial	ALL SEASON LIGHT TRUCK	397600	109	Yes	D	B	73		Low Cost
20	215/65R16	Kormoran	ALL SEASON LIGHT TRUCK	712719	109	Yes	D	B	73		Mid Range
22	215/65R16	Dunlop	ECONODRIVE AS	593495	109	Yes	D	C	74	134	Premium
28	215/65R16	Vredestein	Comtrac 2 Winter+	8714692811227	109	Yes	D	B	73	140.78	Mid Range
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
31	235/65R16	Giti Tire	GitiVan HD1	A4023H	115	No	A	A	69		Mid Range
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
36	235/65R16	Kleber	TRANSPRO 2	608184	115	No	B	A	72	167.5	Mid Range
38	235/65R16	Michelin	AGILIS 3	442491	115	No	B	A	72	190	Premium
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
32	235/65R16	CST	VR36	TL00124200	121	No	C	A	72		Mid Range
33	235/65R16	Bridgestone	Duravis R660	28210	115	No	C	B	72	179	Premium
34	235/65R16	Mabor	VAN-JET 3	460409	121	No	C	C	72		Mid Range
35	235/65R16	Iris	Stormy	Stormy 514014	115	No	C	A	70		Low Cost
37	235/65R16	Avon	AV12	589521	115	No	C	A	72	135	Mid Range
39	235/65R16	Sunny	NL106	NL110176552	115	No	C	B	71		Low Cost
40	235/65R16	Laufenn	X Fit Van	2021728	115	No	C	B	67		Mid Range
41	235/65R16	Greentrac	Superange-Van	GTW41144115/113TX	115	No	C	B	72		Low Cost
42	235/65R16	Cooper	EVOLUTION VAN	590353	115	No	C	A	72	136.5	Mid Range
43	235/65R16	Admiral	CSB007	P00-3220018213	121	No	C	B	72		Mid Range
44	235/65R16	Arivo	TRANSITO ARZ6-C	3EAR221	115	No	C	B	71		Low Cost
45	235/65R16	Kormoran	CARGOSPEEVEVO	569838	115	No	C	C	73		Mid Range
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
48	235/65R16	Bridgestone	DURAVIS ALL SEASON	4801636	121	Yes	B	A	72	250.49	Premium
54	235/65R16	Goodyear	VECTOR 4SEASONS CARGO	580558	115	Yes	B	B	74	169.5	Premium
59	235/65R16	Continental	VanContact A/S Ultra	451949	121	Yes	B	B	72	234	Premium
	Dimensione	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brands
46	235/65R16	Dunlop	ECONODRIVE WINTER	598822	115	Yes	C	C	73		Premium
47	235/65R16	Austone	DURATO 4S	2100_9235020386	121	Yes	C	A	72		Low Cost
49	235/65R16	Prinx	VANEA 4S	2170_9235250388	121	Yes	C	A	72		Low Cost
52	235/65R16	Delmax	X-WEATHER VAN 4S	1KW CLK16	115	Yes	C	B	72		Low Cost
53	235/65R16	Pirelli	CARRIER WINTER	43482	115	Yes	C	A	73		Premium
56	235/65R16	Churchill	RCB007 AS	153-3220014849	115	Yes	C	C	71		Low Cost
57	235/65R16	Bfgoodrich	ACTIVAN 4S	493731	115	Yes	C	B	72	182	Mid Range
60	235/65R16	Kumho	CWS1	2361393	115	Yes	C	C	73	151	Mid Range

D6.3 – Policies and mitigation strategies on tyre noise emissions

	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
50	235/65R16	Starmaxx	PROWIN ST960 +	92113	121	Yes	D	A	72		Mid Range
51	235/65R16	Infinity	ECOUTRASNOW-04	ECOUTRASNOW-04	121	Yes	D	B	73		Low Cost
55	235/65R16	Giti Tire	GitiVanAllSeason LA1	A4780	121	Yes	D	A	72		Mid Range
58	235/65R16	Otani	WM1000	WM1000 800554	115	Yes	D	B	72		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
61	205/65R16	Sentury	Qirin V88+	STDX1063107/105TX	107	No	B	B	72		Mid Range
62	205/65R16	Michelin	AGILIS 3 TV	817729	107	No	B	A	72	159.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
63	205/65R16	Pirelli	Carrier	45675	107	No	C	A	70	157.58	Premium
64	205/65R16	Dayton	VAN	D4350400	107	No	C	B	71		Mid Range
66	205/65R16	Charmhoo	SUMTIRA VAN	200579	107	No	C	B	69		Low Cost
67	205/65R16	Mirage	MR200	200M9021	107	No	C	B	72		Low Cost
68	205/65R16	Torque	TQ-05	6953913193090B	107	No	C	B	72		Low Cost
69	205/65R16	Uniroyal	Rain Max 5	452337	107	No	C	B	72	122	Mid Range
70	205/65R16	Eldorado	Cargo Van 3	2100_9205390526	107	No	C	A	72		Mid Range
71	205/65R16	Admiral	CSB007	P00-3220018207	107	No	C	B	72		Mid Range
72	205/65R16	Dynamo	HISCEND-H MC02	1KE-3220011214	107	No	C	B	72		Low Cost
73	205/65R16	Riken	CARGOSPDEDEVO	817900	107	No	C	C	73		Low Cost
74	205/65R16	Continental	VanContact Ultra	451974	107	No	C	A	72		Premium
75	205/65R16	Wanli	SL106	SL110176052	107	No	C	B	70		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
65	205/65R16	Runway	ENDURO 616	ARB36H	107	No	D	C	71		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
87	205/65R16	Bridgestone	DURAVIS VAN	64345300	107	Yes	B	A	69	163.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
77	205/65R16	Bridgestone	DURAVIS VAN WINTER	20922	107	Yes	C	A	72	164.53	Premium
78	205/65R16	General Tire	EUROVAN A/S 365	460218	107	Yes	C	A	73		Mid Range
79	205/65R16	Kingnate	TUTTI TRO	K1205	107	Yes	C	C	72		Low Cost
81	205/65R16	Kenda	KOMENDO 4S KR105	KR105 33573007	107	Yes	C	B	73		Mid Range
82	205/65R16	Austone	DURATO 4S	2100_9205020586	107	Yes	C	A	72		Low Cost
83	205/65R16	Maxxis	WL2	ETL00000800	107	Yes	C	A	71	108.5	Mid Range
85	205/65R16	Lanvigator	CATCHFORS VAN A/S	2HH2619H1	107	Yes	C	B	72		Low Cost
86	205/65R16	Goodyear	CARGO ULTRA GRIP 2 M+S	720825	107	Yes	C	C	73	158.5	Premium
88	205/65R16	Nereus	NS809	N8308H	107	Yes	C	B	68		Low Cost
90	205/65R16	Marshal	CX11	2287093	107	Yes	C	B	71	118	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
76	205/65R16	Kormoran	ALL SEASON LIGHT TRUCK	212535	107	Yes	D	B	73		Mid Range
80	205/65R16	GT Radial	MAXMILER AllSeason2	A4806H	107	Yes	D	A	71		Mid Range
84	205/65R16	Kumho	CW51	2361353	107	Yes	D	C	73		Mid Range
89	205/65R16	Dunlop	ECONODRIVE WINTER	598807	107	Yes	D	C	73	135	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
91	205/75R16	Giti Tire	GitiVan HD1	A4024H	113	No	A	A	69		Mid Range
92	205/75R16	Continental	VanContact Eco	451724	113	No	A	A	72	159.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
97	205/75R16	Kleber	TRANSPRO 2	435146	110	No	B	A	72	119	Mid Range
98	205/75R16	Michelin	AGILIS 3 TV	16419	113	No	B	A	72	173	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
93	205/75R16	Admiral	CSB007	P00-3220018217	113	No	C	B	72		Mid Range
94	205/75R16	Roadx	RXQUEST C02	1KE-3220013514	113	No	C	B	72		Mid Range
95	205/75R16	Austone	ASR71	2100_9205020371	110	No	C	A	72		Low Cost
96	205/75R16	Dunlop	ECONODRIVE LT	588539	113	No	C	B	72	126.5	Premium
99	205/75R16	Cooper	EVOLUTION VAN	590351	113	No	C	A	72	146	Mid Range
100	205/75R16	Mirage	MR300	201M9036	110	No	C	C	72		Low Cost
101	205/75R16	Avon	AV12	589533	113	No	C	A	72	125.5	Mid Range
102	205/75R16	GT Radial	MAXMILER Pro	A4528	113	No	C	B	71		Mid Range
103	205/75R16	Sava	TRENTA 2	571288	110	No	C	B	72	104	Mid Range
104	205/75R16	Fulda	CONVEO TOUR 2	571270	110	No	C	B	72	120	Mid Range
105	205/75R16	Laufenn	X FIT VaN	2020380	113	No	C	C	67		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
116	205/75R16	Sailun	COMMERCIO PRO	153-3220014870	113	Yes	B	B	70		Low Cost
120	205/75R16	Pirelli	CARRIER ALL SEASON SF2	41678	113	Yes	B	A	73		Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
107	205/75R16	Berlin Tires	ALPINE GRIP C	ALPINE GRIP C - 4	110	Yes	C	B	72		Low Cost
108	205/75R16	Funtoma	VanFun Winter	90894	113	Yes	C	C	72		Low Cost
110	205/75R16	Tercelo	CROSEASON VAN	1KW CLFC16	113	Yes	C	B	72		Low Cost
111	205/75R16	Petlas	VanMaster A/S +	408850	113	Yes	C	A	72		Mid Range
112	205/75R16	Admiral	RCB007 AS	P00-3220018086	110	Yes	C	C	71		Mid Range
113	205/75R16	Delinte	AW6 VAN	TGDLTY1068110/108TA	110	Yes	C	B	73		Low Cost
114	205/75R16	Charmhoo	GOWIn VAN	200338	110	Yes	C	D	70		Low Cost
115	205/75R16	Mastersteel	ALL WEATHER VAN 2	MS8859295846228	110	Yes	C	B	73		Low Cost
117	205/75R16	Evergreen	DYNAMASTER EA720VAN	153-3220014834	110	Yes	C	C	71		Low Cost
118	205/75R16	Bridgestone	DURAVIS VAN WINTER	20921	113	Yes	C	A	74	181	Premium
119	205/75R16	Continental	VanContact A/S Ultra	451791	113	Yes	C	B	73	162.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
106	205/75R16	Sebring	ALL SEASON LIGHT TRUCK	468841	110	Yes	D	B	73		Low Cost
109	205/75R16	Sava	ESKIMO LT	571849	110	Yes	D	C	73	123	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princ	Brand
122	225/65R16	Sentury	Qirin V88+	STDX1121112/110TX	112	No	B	B	72		Mid Range
123	225/65R16	Pirelli	CARRIER	27607	112	No	B	A	69	190	Premium
125	225/65R16	Continental	VanContact Ultra	451757	112	No	B	A	71	178.5	Premium
129	225/65R16	Bridgestone	DURAVIS VAN	20902	112	No	B	A	69	187.5	Premium
131	225/65R16	Triangle	TV701	CBCTV70122G16DHJ	112	No	B	B	72		Mid Range

D6.3 – Policies and mitigation strategies on tyre noise emissions

	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
121	225/65R16	Otani	MK2000	MK2000 800995	112	No	C	A	71		Mid Range
124	225/65R16	Avon	AV12	589519	112	No	C	A	72	134.5	Mid Range
126	225/65R16	Semperit	VAN-LIFE 3	452318	112	No	C	B	72	149.5	Mid Range
127	225/65R16	Uniroyal	Rain Max 5	452340	112	No	C	B	72	135	Mid Range
128	225/65R16	Barum	Vanis 3	443103	112	No	C	C	72	159.5	Mid Range
130	225/65R16	Sunny	NL106	NL110319152	112	No	C	B	70		Low Cost
132	225/65R16	Motrio	FAIRWAY VAN SUMMER	587131	112	No	C	B	72		Low Cost
133	225/65R16	Nexen tire	ROADIAN CT8	11595	112	No	C	D	72	112.5	Mid Range
135	225/65R16	Pace	PC18	PAD31121112/110TX	112	No	C	B	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
134	225/65R16	Fullrun	FRUN-VAN	S129 FRUN-VAN	112	No	D	C	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
136	225/65R16	Goodyear	VECTOR 4SEASONS CARGO	571864	112	Yes	C	A	73	166-188	Premium
139	225/65R16	Berlin Tires	ALPINE GRIP C	ALPINE GRIP C - 8	112	Yes	C	B	72		Low Cost
140	225/65R16	Kingnate	TUTTI TRO	K1202	112	Yes	C	C	72		Low Cost
141	225/65R16	Matador	Hectorra Van	424174	112	Yes	C	B	71	119-121	Mid Range
142	225/65R16	Pirelli	CARRIER ALL SEASON	45674	112	Yes	C	A	70		Premium
144	225/65R16	Starmaxx	VanMaxx A/S +	920650	112	Yes	C	A	72		Mid Range
145	225/65R16	Infinity	ECOULTRASNOW-03	ECOULTRASNOW-03	112	Yes	C	B	73		Low Cost
146	225/65R16	Royal Black	ROYAL VAN A/S	2RK2624H1	112	Yes	C	B	72		Low Cost
148	225/65R16	Michelin	CROSSCLIMATE CAMPING	400788	112	Yes	C	A	72	216-220	Premium
149	225/65R16	Dynamo	22	153-3220014844	112	Yes	C	C	71		Low Cost
150	225/65R16	Petlas	VanMaster A/S	42065	112	Yes	C	B	69		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
137	225/65R16	Giti Tire	GitiVanAllSeason LA1	A4776	112	Yes	D	A	72		Mid Range
138	225/65R16	Gripmax	SureGrip A/S Camping-03	SureGrip A/S Camping-03	112	Yes	D	B	73		Low Cost
143	225/65R16	Dunlop	ECONODRIVE WINTER	598818	112	Yes	D	C	73		Premium
147	225/65R16	Kormoran	ALL SEASON LIGHT TRUCK	346890	112	Yes	D	B	73		Mid Range

13.2.2. WG categories classification

	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
1	215/65R16	Goodyear	EFFICIENTGRIP CARGO 2	595648	106	No	A	A	71	192	Premium
5	215/65R16	Pirelli	CARRIER	45673	109	No	C	A	70	157.5	Premium
6	215/65R16	Michelin	AGILIS 3	371402	109	No	B	A	72	166.5	Premium
11	215/65R16	Bridgestone	DURAVIS VAN	20896	109	No	B	A	69	165	Premium
12	215/65R16	Kumho	CS01	2330513	109	No	A	A	69		Mid Range
15	215/65R16	Sailun	COMMERCIO PRO	153-3220014873	109	No	B	A	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
2	215/65R16	Sentury	Qirin V88+	STD1086109/107TX	109	No	B	B	72		Mid Range
3	215/65R16	GT Radial	MAXMILER Pro	A4530H	109	No	C	B	71		Mid Range
4	215/65R16	Wanli	SL106	SL110506912	109	No	C	B	70		Low Cost
7	215/65R16	Lassa	TRANSWAY 3	24374700	109	No	C	B	69		Mid Range
8	215/65R16	Admiral	CSB007	P00-3220018209	109	No	C	B	72		Mid Range
9	215/65R16	Apollo	Altrust Grip	8714692999253	109	No	C	B	72		Mid Range
10	215/65R16	Uniroyal	Rain Max 5	452341	109	No	C	B	72	120.5	Mid Range
13	215/65R16	Semperit	VAN-LIFE 3	452319	109	No	C	B	72	123.5	Mid Range
14	215/65R16	Landsail	LSV88+	LHDX1086109/107TX-2	109	No	C	B	71		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
23	215/65R16	Maxxis	Vansmart Snow WL2	ETL00001800	109	Yes	C	A	71	123	Mid Range
24	215/65R16	Petlas	VanMaster A/S +	420050	109	Yes	C	A	72		Mid Range
25	215/65R16	Starmaxx	VanMaxx A/S +	920050	109	Yes	C	A	72		Mid Range
26	215/65R16	Pirelli	CARRIER ALL SEASON	25660	109	Yes	C	A	68	184.32	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
16	215/65R16	Kenda	KOMENDO 4S KR105	KR105 35063007	109	Yes	C	B	73		Mid Range
17	215/65R16	Strial	ALL SEASON LIGHT TRUCK	397600	109	Yes	D	B	73		Low Cost
18	215/65R16	Berlin Tires	ALPINE GRIP C	ALPINE GRIP C - 5	109	Yes	C	B	72		Low Cost
19	215/65R16	Goldline	GL 4Season LT+	GLDY1086109/107TA	109	Yes	C	B	73		Low Cost
20	215/65R16	Kormoran	ALL SEASON LIGHT TRUCK	712719	109	Yes	D	B	73		Mid Range
21	215/65R16	Tercelo	CROSEASON VAN	1KW CLHE16	109	Yes	C	B	72		Low Cost
27	215/65R16	Delinte	AW6 VAN	TGDLDY1086109/107TA	109	Yes	C	B	73		Low Cost
28	215/65R16	Vredestein	Comtrac 2 Winter+	8714692811227	109	Yes	D	B	73	140.78	Mid Range
29	215/65R16	Continental	VANCONTACT WINTER	453297	109	Yes	C	B	72	182.5	Premium
30	215/65R16	Roadhog	RGASV02	TGRHDX1086109/107TA	109	Yes	C	B	73		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brands
22	215/65R16	Dunlop	ECONODRIVE AS	593495	109	Yes	D	C	74	134	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
31	235/65R16	Giti Tire	GitiVan HD1	A4023H	115	No	A	A	69		Mid Range
32	235/65R16	CST	VR36	TL00124200	121	No	C	A	72		Mid Range
35	235/65R16	Iris	Stormy	Stormy 514014	115	No	C	A	70		Low Cost
36	235/65R16	Kleber	TRANSPRO 2	608184	115	No	B	A	72	167.5	Mid Range
37	235/65R16	Avon	AV12	589521	115	No	C	A	72	135	Mid Range
38	235/65R16	Michelin	AGILIS 3	442491	115	No	B	A	72	190	Premium
42	235/65R16	Cooper	EVOLUTION VAN	590353	115	No	C	A	72	136.5	Mid Range

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	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
33	235/65R16	Bridgestone	Duravis R660	28210	115	No	C	B	72	179	Premium
39	235/65R16	Sunny	NL106	NL10176552	115	No	C	B	71		Low Cost
40	235/65R16	Laufenn	X Fit Van	2021728	115	No	C	B	67		Mid Range
41	235/65R16	Greentrac	Superange-Van	GTW41144115/113TX	115	No	C	B	72		Low Cost
43	235/65R16	Admiral	CSB007	P00-3220018213	121	No	C	B	72		Mid Range
44	235/65R16	Arivo	TRANSITO ARZ6-C	3EAR221	115	No	C	B	71		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
34	235/65R16	Mabor	VAN-JET 3	460409	121	No	C	C	72		Mid Range
45	235/65R16	Kormoran	CARGOSPEEDEVO	569838	115	No	C	C	73		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
47	235/65R16	Austone	DURATO 4S	2100_9235020386	121	Yes	C	A	72		Low Cost
48	235/65R16	Bridgestone	DURAVIS ALL SEASON	4801636	121	Yes	B	A	72	250.49	Premium
49	235/65R16	Prinx	VANEA 4S	2170_9235250388	121	Yes	C	A	72		Low Cost
50	235/65R16	Starmaxx	PROWIN ST960 +	92113	121	Yes	D	A	72		Mid Range
53	235/65R16	Pirelli	CARRIER WINTER	43482	115	Yes	C	A	73		Premium
55	235/65R16	Giti Tire	GitiVanAllSeason LA1	A4780	121	Yes	D	A	72		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
51	235/65R16	Infinity	ECOULTRASNOW-04	ECOULTRASNOW-04	121	Yes	D	B	73		Low Cost
52	235/65R16	Delmax	X-WEATHER VAN 4S	1KW CLK16	115	Yes	C	B	72		Low Cost
54	235/65R16	Goodyear	VECTOR 4SEASONS CARGO	580558	115	Yes	B	B	74	169.5	Premium
57	235/65R16	Bfgoodrich	ACTIVAN 4S	493731	115	Yes	C	B	72	182	Mid Range
58	235/65R16	Otani	WM1000	WM1000 800554	115	Yes	D	B	72		Mid Range
59	235/65R16	Continental	VanContact A/S Ultra	451949	121	Yes	B	B	72	234	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
46	235/65R16	Dunlop	ECONODRIVE WINTER	598822	115	Yes	C	C	73		Premium
56	235/65R16	Churchill	RCB007 AS	153-3220014849	115	Yes	C	C	71		Low Cost
60	235/65R16	Kumho	CW51	2361393	115	Yes	C	C	73	151	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
62	205/65R16	Michelin	AGILIS 3 TV	817729	107	No	B	A	72	159.5	Premium
63	205/65R16	Pirelli	Carrier	45675	107	No	C	A	70	157.58	Premium
70	205/65R16	Eldorado	Cargo Van 3	2100_9205390526	107	No	C	A	72		Mid Range
74	205/65R16	Continental	VanContact Ultra	451974	107	No	C	A	72		Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
61	205/65R16	Sentury	Qirin V88+	STDX1063107/105TX	107	No	B	B	72		Mid Range
64	205/65R16	Dayton	VAN	D4350400	107	No	C	B	71		Mid Range
66	205/65R16	Charmhoo	SUMTIRA VAN	200579	107	No	C	B	69		Low Cost
67	205/65R16	Mirage	MR200	200M9021	107	No	C	B	72		Low Cost
68	205/65R16	Torque	TQ-05	6953913193090B	107	No	C	B	72		Low Cost
69	205/65R16	Uniroyal	Rain Max 5	452337	107	No	C	B	72	122	Mid Range
71	205/65R16	Admiral	CSB007	P00-3220018207	107	No	C	B	72		Mid Range
72	205/65R16	Dynamo	HISCEND-H MC02	1KE-3220011214	107	No	C	B	72		Low Cost
75	205/65R16	Wanli	SL106	SL110176052	107	No	C	B	70		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
65	205/65R16	Runway	ENDURO 616	AR836H	107	No	D	C	71		Mid Range
73	205/65R16	Riken	CARGOSPEEDEVO	817900	107	No	C	C	73		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
77	205/65R16	Bridgestone	DURAVIS VAN WINTER	20922	107	Yes	C	A	72	164.53	Premium
78	205/65R16	General Tire	EUROVAN A/S 365	460218	107	Yes	C	A	73		Mid Range
80	205/65R16	GT Radial	MAXMILER AllSeason2	A4806H	107	Yes	D	A	71		Mid Range
82	205/65R16	Austone	DURATO 4S	2100_9205020586	107	Yes	C	A	72		Low Cost
83	205/65R16	Maxxis	WL2	ETL00000800	107	Yes	C	A	71	108.5	Mid Range
87	205/65R16	Bridgestone	DURAVIS VAN	64345300	107	Yes	B	A	69	163.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
76	205/65R16	Kormoran	ALL SEASON LIGHT TRUCK	212535	107	Yes	D	B	73		Mid Range
81	205/65R16	Kenda	KOMENDO 4S KR105	KR105 33573007	107	Yes	C	B	73		Mid Range
85	205/65R16	Lanvigator	CATCHFORS VAN A/S	2HH2619H1	107	Yes	C	B	72		Low Cost
88	205/65R16	Nereus	NS809	N8308H	107	Yes	C	B	68		Low Cost
90	205/65R16	Marshal	CX11	2287093	107	Yes	C	B	71	118	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
79	205/65R16	Kingnate	TUTTI TRO	K1205	107	Yes	C	C	72		Low Cost
84	205/65R16	Kumho	CW51	2361353	107	Yes	D	C	73		Mid Range
86	205/65R16	Goodyear	CARGO ULTRA GRIP 2 M+S	720825	107	Yes	C	C	73	158.5	Premium
89	205/65R16	Dunlop	ECONODRIVE WINTER	598807	107	Yes	D	C	73	135	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
91	205/75R16	Giti Tire	GitiVan HD1	A4024H	113	No	A	A	69		Mid Range
92	205/75R16	Continental	VanContact Eco	451724	113	No	A	A	72	159.5	Premium
95	205/75R16	Austone	ASR71	2100_9205020371	110	No	C	A	72		Low Cost
97	205/75R16	Kleber	TRANSPRO 2	435146	110	No	B	A	72	119	Mid Range
98	205/75R16	Michelin	AGILIS 3 TV	16419	113	No	B	A	72	173	Premium
99	205/75R16	Cooper	EVOLUTION VAN	590351	113	No	C	A	72	146	Mid Range
101	205/75R16	Avon	AV12	589533	113	No	C	A	72	125.5	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
93	205/75R16	Admiral	CSB007	P00-3220018217	113	No	C	B	72		Mid Range
94	205/75R16	Roadx	RXQUEST C02	1KE-3220013514	113	No	C	B	72		Mid Range
96	205/75R16	Dunlop	ECONODRIVE LT	588539	113	No	C	B	72	126.5	Premium
102	205/75R16	GT Radial	MAXMILER Pro	A4528	113	No	C	B	71		Mid Range
103	205/75R16	Sava	TRENTA 2	571288	110	No	C	B	72	104	Mid Range
104	205/75R16	Fulda	CONVEO TOUR 2	571270	110	No	C	B	72	120	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Princi	Brand
100	205/75R16	Mirage	MR300	201M9036	110	No	C	C	72		Low Cost
105	205/75R16	Laufenn	X FIT VaN	2020380	113	No	C	C	67		Mid Range

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	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
111	205/75R16	Petlas	VanMaster A/S +	408850	113	Yes	C	A	72		Mid Range
118	205/75R16	Bridgestone	DURAVIS VAN WINTER	20921	113	Yes	C	A	74	181	Premium
120	205/75R16	Pirelli	CARRIER ALL SEASON SF2	41678	113	Yes	B	A	73		Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
106	205/75R16	Sebring	ALL SEASON LIGHT TRUCK	468841	110	Yes	D	B	73		Low Cost
107	205/75R16	Berlin Tires	ALPINE GRIP C	ALPINE GRIP C - 4	110	Yes	C	B	72		Low Cost
110	205/75R16	Tercelo	CROSEASON VAN	1KW CLFC16	113	Yes	C	B	72		Low Cost
113	205/75R16	Delinte	AW6 VAN	TGDLDY1068110/108TA	110	Yes	C	B	73		Low Cost
115	205/75R16	Mastersteel	ALL WEATHER VAN 2	MS8859295846228	110	Yes	C	B	73		Low Cost
116	205/75R16	Sailun	COMMERCIO PRO	153-3220014870	113	Yes	B	B	70		Low Cost
119	205/75R16	Continental	VanContact A/S Ultra	451791	113	Yes	C	B	73	162.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
108	205/75R16	Funtoma	VanFun Winter	90894	113	Yes	C	C	72		Low Cost
109	205/75R16	Sava	ESKIMO LT	571849	110	Yes	D	C	73	123	Mid Range
112	205/75R16	Admiral	RCB007 AS	P00-3220018086	110	Yes	C	C	71		Mid Range
117	205/75R16	Evergreen	DYNAMASTER EA720VAN	153-3220014834	110	Yes	C	C	71		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
114	205/75R16	Charmhoo	GOWIn VAN	200338	110	Yes	C	D	70		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
121	225/65R16	Otani	MK2000	MK2000 800995	112	No	C	A	71		Mid Range
123	225/65R16	Pirelli	CARRIER	27607	112	No	B	A	69	190	Premium
124	225/65R16	Avon	AV12	589519	112	No	C	A	72	134.5	Mid Range
125	225/65R16	Continental	VanContact Ultra	451757	112	No	B	A	71	178.5	Premium
129	225/65R16	Bridgestone	DURAVIS VAN	20902	112	No	B	A	69	187.5	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
122	225/65R16	Sentury	Qirin V88+	STD1121112/110TX	112	No	B	B	72		Mid Range
126	225/65R16	Semperit	VAN-LIFE 3	452318	112	No	C	B	72	149.5	Mid Range
127	225/65R16	Uniroyal	Rain Max 5	452340	112	No	C	B	72	135	Mid Range
130	225/65R16	Sunny	NL106	NL110319152	112	No	C	B	70		Low Cost
131	225/65R16	Triangle	TV701	CBCTV70122G16DHJ	112	No	B	B	72		Mid Range
132	225/65R16	Motrio	FAIRWAY VAN SUMMER	587131	112	No	C	B	72		Low Cost
135	225/65R16	Pace	PC18	PAD31121112/110TX	112	No	C	B	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
128	225/65R16	Barum	Vanis 3	443103	112	No	C	C	72	159.5	Mid Range
134	225/65R16	Fullrun	FRUN-VAN	\$129 FRUN-VAN	112	No	D	C	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
133	225/65R16	Nexen tire	ROADIAN CT8	11595	112	No	C	D	72	112.5	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
136	225/65R16	Goodyear	VECTOR 4SEASONS CARGO	571864	112	Yes	C	A	73	177	Premium
137	225/65R16	Giti Tire	GitiVanAllSeason LA1	A4776	112	Yes	D	A	72		Mid Range
142	225/65R16	Pirelli	CARRIER ALL SEASON	45674	112	Yes	C	A	70		Premium
144	225/65R16	Starmaxx	VanMaxx A/S +	920650	112	Yes	C	A	72		Mid Range
148	225/65R16	Michelin	CROSSCLIMATE CAMPING	400788	112	Yes	C	A	72	218	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
138	225/65R16	Gripmax	SureGrip A/S Camping-03	SureGrip A/S Camping-03	112	Yes	D	B	73		Low Cost
139	225/65R16	Berlin Tires	ALPINE GRIP C	ALPINE GRIP C - 8	112	Yes	C	B	72		Low Cost
141	225/65R16	Matador	Hectorra Van	424174	112	Yes	C	B	71	120	Mid Range
145	225/65R16	Infinity	ECOULTRASNOW-03	ECOULTRASNOW-03	112	Yes	C	B	73		Low Cost
146	225/65R16	Royal Black	ROYAL VAN A/S	2RK2624H1	112	Yes	C	B	72		Low Cost
147	225/65R16	Kormoran	ALL SEASON LIGHT TRUCK	346890	112	Yes	D	B	73		Mid Range
150	225/65R16	Petlas	VanMaster A/S	42065	112	Yes	C	B	69		Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Princi	Brand
140	225/65R16	Kingate	TUTTI TRO	K1202	112	Yes	C	C	72		Low Cost
143	225/65R16	Dunlop	ECONODRIVE WINTER	598818	112	Yes	D	C	73		Premium
149	225/65R16	Dynamo	22	153-3220014844	112	Yes	C	C	71		Low Cost

13.3. C3 Tyres

13.3.1. RR categories classification

	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Price	Brand
10	315/80R22.5	Goodyear	KMAX S EXTREME GEN-2	581906	156	No	B	B	70	904	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winte	RR	WG	Noise	Price	Brand
1	315/80R22.5	Lexxis	Lex Energy HM6	15408-HM6	157	No	C	B	72		Low Cost
3	315/80R22.5	Kumho	KRS15	2115493	154	No	C	A	70	519.89	Mid Range
5	315/80R22.5	Yokohama	BluEarth 110L	B5027	156	No	C	B	67	924.02	Mid Range
7	315/80R22.5	Giti Tire	GT867	EH1416Q	158	No	C	C	72	528.89	Mid Range
9	315/80R22.5	Sava	AVANT MS2 PLUS	571100	156	No	C	B	72	626	Mid Range
12	315/80R22.5	Michelin	X MULTI HD Z VM	36863	156	No	C	A	72	1050	Premium
14	315/80R22.5	Headway	ALS201	ALS201 001	156	No	C	B	73		Low Cost
15	315/80R22.5	Dunlop	SP382	560670	156	No	C	B	69	840	Premium

D6.3 – Policies and mitigation strategies on tyre noise emissions

	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
2	315/80R22.5	Hankook	AM06	3000815	156	No	D	C	72	700	Mid Range
4	315/80R22.5	Roadx	ST351	T00-3120005785	156	No	D	B	70		Mid Range
6	315/80R22.5	Kinforest	KF-ST60	KF DLTR-04	157	No	D	B	72		Low Cost
8	315/80R22.5	Sailun	SDM76	T00-3120005905	156	No	D	B	73	711.4	Low Cost
11	315/80R22.5	Dynamo	MDM76	T00-3120004361	156	No	D	B	73		Low Cost
13	315/80R22.5	Ovation	VI-660	8935355510046	156	No	D	C	73	300	Low Cost
28	315/80R22.5	Bridgestone	ECOPIA STEER	19912	156	Yes	A	B	67	1196	Premium
17	315/80R22.5	Continental	Conti Coach HA3	565608	156	Yes	B	B	71	829.5	Premium
20	315/80R22.5	Pirelli	R02 PROFUEL STEER	40902	158	Yes	B	C	69	1145	Premium
18	315/80R22.5	Matador	PA100	2170_2641560100	158	Yes	C	A	70		Low Cost
19	315/80R22.5	Firestone	FS424	19731	154	Yes	C	B	69	883	Mid Range
21	315/80R22.5	Matador	F HR 4	512487	156	Yes	C	B	71	681.5	Mid Range
22	315/80R22.5	Toyot Tires	M966	10011587	156	Yes	C	C	71		Mid Range
23	315/80R22.5	Berlin Tires	PREMIUM LONG LIFE	PLD - 2	156	Yes	C	B	74		Low Cost
24	315/80R22.5	BFGoodrich	CROSS CONTROL S2 VM	363888	156	Yes	C	B	70	669.09	Mid Range
25	315/80R22.5	Crosswind	CW-WS06	CW-WS06-03	158	Yes	C	B	70	341	Low Cost
26	315/80R22.5	Falken	RI151	352707	156	Yes	C	C	71	567.85	Mid Range
29	315/80R22.5	Apollo	Endu"Race RA2	8714692999987	156	Yes	C	B	72	555.12	Mid Range
30	315/80R22.5	Zeta	Z-ZAGG	TGZEAM8014156/150KM4	156	Yes	C	C	72		Low Cost
16	315/80R22.5	Yokohama	301C	B5494	156	Yes	RR	B	73	924.02	Mid Range
27	315/80R22.5	Austone	ADM207	2170_2643020207	164	Yes	D	A	75	354.45	Low Cost
32	315/70R22.5	Aeolus	T105	1380589803	156	No	A	B	70		Mid Range
39	315/70R22.5	Aeolus	T105	1380589803	156	No	A	B	70		Mid Range
33	315/70R22.5	Michelin	X LINE ENERGY Z	952734	156	No	B	B	69	1033	Premium
38	315/70R22.5	Aufine	ENERGY ADR3	31570225ADR3	154	No	B	C	75		Low Cost
37	315/70R22.5	Toyot Tires	M144	18890321	152	No	C	C	71		Mid Range
42	315/70R22.5	Yokohama	104ZR	B4898	154	No	C	C	73	912.91	Mid Range
45	315/70R22.5	Amine	LION	1536	156	No	C	A	75		Low Cost
31	315/70R22.5	Torque	TQ660	8935355520298	154	No	D	C	73		Low Cost
34	315/70R22.5	Ovation	VI-660	8935355510299	154	No	D	C	73	300	Low Cost
35	315/70R22.5	Mirage	MG628	6935355525103	154	No	D	C	73		Low Cost
36	315/70R22.5	Sunfull	HF660	8935355515263	154	No	D	C	73		Low Cost
40	315/70R22.5	Royal Black	RS201	DRK7500263	156	No	D	C	73	419.9	Low Cost
41	315/70R22.5	Aplus	S201	DAP7500274	156	No	D	C	73	380	Low Cost
43	315/70R22.5	Triangle	TRS02	CQTTRS0231F25HHJ	152	No	D	C	71	381.23	Mid Range
44	315/70R22.5	Marlin	MFR13 006	MFR13 006	154	No	D	B	72		Low Cost
49	315/70R22.5	Pirelli	H02 PROFUEL DRIVE	60430	158	Yes	A	B	72	1124	Premium
55	315/70R22.5	Continental	Conti EfficientPro HD 5	521227	154	Yes	A	C	73	836.5	Premium
46	315/70R22.5	Michelin	X MULTI ENERGY Z2 VM	121315	158	Yes	B	C	72	1096	Premium
47	315/70R22.5	Kumho	KLS23	2311843	156	Yes	B	C	71	593.4	Mid Range
50	315/70R22.5	Giti Tire	GSR237EVO	EH2408Q	156	Yes	B	B	70	424	Mid Range
51	315/70R22.5	Goodyear	EQMAX D	581621	154	Yes	B	B	75	954	Premium
52	315/70R22.5	Sailun	TRANSPORT PRO S	T00-3120006297	156	Yes	B	A	70	649.2	Low Cost
53	315/70R22.5	Sava	AVANT 4 PLUS	570977	154	Yes	C	C	71	596	Mid Range
54	315/70R22.5	Fulda	ECOCONTROL 2 +	570962	154	Yes	C	C	71		Mid Range
56	315/70R22.5	Giti Tire	GSR237	EV2409Q	156	Yes	C	B	70	404	Mid Range
57	315/70R22.5	Amstrong	ASH11+	ASH11+ 1200063625	156	Yes	C	C	71		Mid Range
58	315/70R22.5	Matador	F HR 4	512485	156	Yes	C	B	71	667.5	Mid Range
59	315/70R22.5	Bridgestone	M749	4800012	162	Yes	C	C	75	1133	Premium
60	315/70R22.5	Berlin Tires	PREMIUM LONG LIFE	PLD - 1	154	Yes	C	B	74		Low Cost
65	385/65R22.5	Pirelli	ST: 01 NEVERENDING	41158	160	No	A	B	68	1078	Premium
69	385/65R22.5	Fulda	ECOTONN 2	572040	164	No	B	B	69	684	Mid Range
71	385/65R22.5	Sava	CARGO 4	572042	164	No	B	C	69	594	Mid Range
75	385/65R22.5	Maxxis	MS290	ETT00086900	160	No	B	B	71		Mid Range
61	385/65R22.5	Goodyear	KMAX T ENDURANCE	589278	164	No	C	B	71	884	Premium
62	385/65R22.5	Dynamo	MFR23	T00-3120005998	160	No	C	A	72		Low Cost
63	385/65R22.5	Sailun	SFR23	T00-3120005992	160	No	C	A	72	689.8	Low Cost
64	385/65R22.5	Roadx	DX233	T00-3120005993	160	No	C	A	72		Mid Range
66	385/65R22.5	Apollo	Endu"Race RT HD+	8714692996429	164	No	C	B	70	540.11	Mid Range
67	385/65R22.5	Triangle	TTM-A11	CQTITMA1138G25NP0	164	No	C	C	70	418.2	Mid Range
68	385/65R22.5	Dunlop	SP246	571791	164	No	C	B	69	798	Premium
70	385/65R22.5	Royal Black	RT707	RK7516125	164	No	C	B	73	473.3	Low Cost
72	385/65R22.5	Kelly	KMT ARMORSTEEL	572780	160	No	C	B	72	377.16	Mid Range
73	385/65R22.5	Apollo	Endu"Race RTN	8714692809996	160	No	D	B	72	543.3	Mid Range
74	385/65R22.5	Torque	TQ022	8935355520014	160	No	D	C	73	313.08	Low Cost
76	385/65R22.5	Bridgestone	ECOPIA STEER	19915	160	Yes	A	B	68	1227	Premium
85	385/65R22.5	Michelin	X LINE ENERGY TVQ	812967	160	Yes	A	C	71	983	Premium
77	385/65R22.5	Universal	UNZX02	TGUNVSA8017164KM4	164	Yes	B	B	74		Low Cost

D6.3 – Policies and mitigation strategies on tyre noise emissions

	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
78	385/65R22.5	Roadx	RFR2	T00-3120006046	164	Yes	C	A	73		Mid Range
80	385/65R22.5	Continental	Conti CrossTrac HT3	565611	160	Yes	C	A	72	766	Premium
81	385/65R22.5	Giti Tire	GTR956 HD	EH2131Q	164	Yes	C	B	70	636.85	Mid Range
82	385/65R22.5	Yokohama	B5568		164	Yes	C	C	72	928.74	Mid Range
86	385/65R22.5	Kumho	KWA03	2364073	164	Yes	C	B	72	550.72	Mid Range
90	385/65R22.5	Firestone	ROADHAWK WINTER STEER	30895	160	Yes	C	C	72	1024	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
79	385/65R22.5	Universal	UNKS01	TGUNVSDA8017164KM3	164	Yes	D	B	73		Low Cost
83	385/65R22.5	Benchmark	BT1863	BT1863-10	164	Yes	D	B	73		Low Cost
84	385/65R22.5	Infinity	ITL863	ITL863-13	164	Yes	D	B	73		Low Cost
87	385/65R22.5	Ovation	VI-022	8935355510121	164	Yes	D	C	73	343	Low Cost
88	385/65R22.5	Falken	SI011	357685	164	Yes	D	C	73	507.2	Mid Range
89	385/65R22.5	Hifly	HH107	8935355505332	164	Yes	D	C	73	393	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
91	295/80R22.5	Yokohama	104ZR	B4906	154	No	C	B	70	896.93	Mid Range
94	295/80R22.5	Michelin	X MULTI ENERGY Z VM	885534	154	No	C	B	71	1043	Premium
95	295/80R22.5	Fortune	FT103H	2100_2621032103	149	No	C	A	72	362.8	Low Cost
96	295/80R22.5	Pirelli	FH: 01 COACH	24766	154	No	C	B	70	973	Premium
97	295/80R22.5	Toyo Tires	M144A	12123620	152	No	C	C	70		Mid Range
98	295/80R22.5	Austone	AT103H	2100_2621022103	149	No	C	A	72		Low Cost
99	295/80R22.5	Goodyear	REGIONAL RHS II	568006	148	No	C	B	71	856	Premium
101	295/80R22.5	Hankook	AL10 e-cube	3001549	152	No	C	C	70	672	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
92	295/80R22.5	Bridgestone	R247 II	65665400	152	No	D	B	70	1104	Premium
93	295/80R22.5	BFGoodrich	CROSS CONTROL D VG	284008	152	No	D	B	75	666.2	Mid Range
100	295/80R22.5	Giti Tire	GAL817	EV1312Q2	149	No	D	B	70		Mid Range
102	295/80R22.5	Hifly	HH102	8935355505097	149	No	D	C	73	375	Low Cost
103	295/80R22.5	Ovation	VI-660	8935355510268	149	No	D	C	73	285	Low Cost
104	295/80R22.5	Sunfull	HF660	8935355515072	149	No	D	C	73		Low Cost
105	295/80R22.5	Ovation	VI-688	8935355510244	149	No	D	C	73	295	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
109	295/80R22.5	Sailun	TRANSPORT PRO D	T00-3120006171	149	Yes	B	A	72	519.6	Low Cost
114	295/80R22.5	Continental	Conti Eco HD 5	522564	152	Yes	B	C	73	794	Premium
115	295/80R22.5	Sailun	COACH	T01-3120004909	149	Yes	B	A	71	539.6	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
106	295/80R22.5	Universal	UNFS02	TGUNVSB88012154/149MM5	149	Yes	C	A	73		Low Cost
110	295/80R22.5	Giti Tire	GSR237	EV2456Q0	149	Yes	C	B	70	645.5	Mid Range
111	295/80R22.5	Matador	F HR 4	0512536	154	Yes	C	B	70	639.5	Mid Range
112	295/80R22.5	Armstrong	ASH11+	ASH11+ 1200063624	149	Yes	C	C	71		Mid Range
113	295/80R22.5	BFGoodrich	ROUTE CONTROL S2	401019	152	Yes	C	C	72	691	Mid Range
117	295/80R22.5	Kelly	KMS2 ARMORSTEEL	595571	152	Yes	C	B	72	343.56	Mid Range
118	295/80R22.5	Firestone	FS424	19728	152	Yes	C	B	69	823	Mid Range
119	295/80R22.5	Apollo	Endu"Race RA2	8.71469E+12	154	Yes	C	B	72	525.8	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
107	295/80R22.5	Otani	OH-201	OH-201 810496	150	Yes	D	B	73	275	Mid Range
108	295/80R22.5	Continental	WINTER HDW2 COACH	565588	149	Yes	D	C	76	778.5	Premium
116	295/80R22.5	Sava	AVANT 5	570681	148	Yes	D	B	75	576	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
120	295/80R22.5	Dynamo	MDW50	T00-3120005940	154	Yes	E	B	72		Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
122	385/55R22.5	Apollo	Endu"Mill LHT	8714692999994	160	No	A	C	70	573	Mid Range
125	385/55R22.5	Hankook	e-cube Blue TL20	3002380	160	No	A	C	66	970	Mid Range
129	385/55R22.5	Pirelli	ST: 01 NEVERENDING	41157	160	No	A	B	68	1134	Premium
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
121	385/55R22.5	Fulda	ECOTONN 2	570751	160	No	B	B	71	722	Mid Range
128	385/55R22.5	DoubleCoin	RT910	RT910 80355107	160	No	B	C	73	380	Low Cost
131	385/55R22.5	Sava	CARGO 4	570843	160	No	B	C	71	630	Mid Range
133	385/55R22.5	Doublestar	DSR128	DSR128 001	160	No	B	B	73	400	Low Cost
134	385/55R22.5	Yokohama	SUPER STEEL RY357	B5216	160	No	B	B	68	948.25	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
123	385/55R22.5	Triangle	TRT02	CQTRT0238J25LHJ	160	No	C	C	70	432.55	Mid Range
124	385/55R22.5	Ovation	ETL311	6920758611690	160	No	C	C	73	360	Low Cost
126	385/55R22.5	Torque	FTL311	6920758631605	160	No	C	C	73	466.35	Low Cost
127	385/55R22.5	Continental	Conti Hybrid HT3	565490	160	No	C	B	71	787.5	Premium
130	385/55R22.5	Hilo	385/55R22.5 706 HILO	385/55/22.5 706 HILO	160	No	C	C	71		Low Cost
132	385/55R22.5	Fullrun	TB1000	FR1000T22501	160	No	C	B	73		Low Cost
135	385/55R22.5	Powertrac	CROSSTRAC	PO7500576	160	No	C	C	73		Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
141	385/55R22.5	Bridgestone	ECOPIA STEER	32694	160	Yes	A	B	69	1237	Premium
143	385/55R22.5	Sailun	STL2	T00-3120005370	164	Yes	A	B	71	676	Low Cost
147	385/55R22.5	Michelin	X LINE ENERGY T VQ	139900	160	Yes	A	C	71	1045	Premium
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
136	385/55R22.5	Goodyear	EQMAX S	582543	160	Yes	B	B	70	1040	Premium
145	385/55R22.5	Prometeon	R02 PROFUEL STEER	60260	162	Yes	B	B	69	1190	Mid Range
146	385/55R22.5	Hankook	Smartflex AH51	3003987	160	Yes	B	B	70	752	Mid Range
149	385/55R22.5	Yokohama	BluEarth 132T	B5481	160	Yes	B	B	70	970.47	Mid Range
150	385/55R22.5	Giti Tire	GTR955	EH99868Q	164	Yes	B	B	70	646.9	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
137	385/55R22.5	Roadx	RTR2	T00-3120006140	160	Yes	C	A	72		Mid Range
138	385/55R22.5	Dynamo	MAW50	T00-3120005821	164	Yes	C	B	70		Low Cost
139	385/55R22.5	Otani	OH-119	OH-119 810465	160	Yes	C	A	69	300	Mid Range
142	385/55R22.5	Firestone	ROADHAWK WINTER STEER	30896	160	Yes	C	B	71	1040	Mid Range
144	385/55R22.5	Austone	BorealiaPro T803	2170_2648020803	160	Yes	C	A	72	325.49	Low Cost
148	385/55R22.5	Aeolus	Neo Allroads T2	1380609020	160	Yes	C	C	74	787.5	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
140	385/55R22.5	Continental	Conti Scandinavia HT3	565592	160	Yes	D	B	74	843	

13.3.2. WG categories classification

	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
3	315/80R22.5	Kumho	KRS15	2115493	154	No	C	A	70	519.89	Mid Range
12	315/80R22.5	Michelin	X MULTI HD Z VM	36863	156	No	C	A	72	1050	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
10	315/80R22.5	Goodyear	KMAX S EXTREME GEN-2	581906	156	No	B	B	70	904	Premium
1	315/80R22.5	Lexis	Lex Energy HM6	15408-HM6	157	No	C	B	72		Low Cost
4	315/80R22.5	Roadx	ST351	T00-3120005785	156	No	D	B	70		Mid Range
5	315/80R22.5	Yokohama	BluEarth 110L	B5027	156	No	C	B	67	924.02	Mid Range
6	315/80R22.5	Kinforest	KF-ST60	KF-DLTR-04	157	No	D	B	72		Low Cost
8	315/80R22.5	Sailun	SDM76	T00-3120005905	156	No	D	B	73	711.4	Low Cost
9	315/80R22.5	Sava	AVANT MS2 PLUS	571100	156	No	C	B	72	626	Mid Range
11	315/80R22.5	Dynamo	MDM76	T00-3120004361	156	No	D	B	73		Low Cost
14	315/80R22.5	Headway	ALS201	ALS201 001	156	No	C	B	73		Low Cost
15	315/80R22.5	Dunlop	SP382	560670	156	No	C	B	69	840	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
2	315/80R22.5	Hankook	AM06	3000815	156	No	D	C	72	700	Mid Range
7	315/80R22.5	Giti Tire	GT867	EH1416Q	158	No	C	C	72	528.89	Mid Range
13	315/80R22.5	Ovation	VI-660	8935355510046	156	No	D	C	73	300	Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
18	315/80R22.5	Matoro	PA100	2170_2641560100	158	Yes	C	A	70		Low Cost
27	315/80R22.5	Austone	ADM207	2170_2643020207	164	Yes	D	A	75	354.45	Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
28	315/80R22.5	Bridgestone	ECOPIA STEER	19912	156	Yes	A	B	67	1196	Premium
16	315/80R22.5	Yokohama	301C	B5494	156	Yes	D	B	73	924.02	Mid Range
17	315/80R22.5	Continental	Conti Coach HA3	565608	156	Yes	B	B	71	829.5	Premium
19	315/80R22.5	Firestone	FS424	19731	154	Yes	C	B	69	883	Mid Range
21	315/80R22.5	Matador	F HR 4	512487	156	Yes	C	B	71	681.5	Mid Range
23	315/80R22.5	Berlin Tires	PREMIUM LONG LIFE	PLD - 2	156	Yes	C	B	74		Low Cost
24	315/80R22.5	BFGoodrich	CROSS CONTROL S2 VM	363888	156	Yes	C	B	70	669.09	Mid Range
25	315/80R22.5	Crosswind	CW-WS06	CW-WS06-03	158	Yes	C	B	70	341	Low Cost
29	315/80R22.5	Apollo	Endu"Race RA2	8714692999987	156	Yes	C	B	72	555.12	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
20	315/80R22.5	Pirelli	R02 PROFUEL STEER	40902	158	Yes	B	C	69	1145	Premium
22	315/80R22.5	Toyo Tires	M966	10011587	156	Yes	C	C	71		Mid Range
26	315/80R22.5	Falken	RI151	352707	156	Yes	C	C	71	567.85	Mid Range
30	315/80R22.5	Zeta	Z-ZAGG	TGZEAM8014156/150KM4	156	Yes	C	C	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
45	315/70R22.5	Amine	LION	1536	156	No	C	A	75		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
32	315/70R22.5	Aeolus	T105	1380589803	156	No	A	B	70		Mid Range
33	315/70R22.5	Michelin	X LINE ENERGY Z	952734	156	No	B	B	69	1033	Premium
39	315/70R22.5	Aeolus	T105	1380589803	156	No	A	B	70		Mid Range
44	315/70R22.5	Marlin	MFR13 006	MFR13 006	154	No	D	B	72		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
31	315/70R22.5	Torque	TQ660	8935355520298	154	No	D	C	73		Low Cost
34	315/70R22.5	Ovation	VI-660	8935355510299	154	No	D	C	73	300	Low Cost
35	315/70R22.5	Mirage	MG628	6935355525103	154	No	D	C	73		Low Cost
36	315/70R22.5	Sunfull	HF660	8935355515263	154	No	D	C	73		Low Cost
37	315/70R22.5	Toyo Tires	M144	18890321	152	No	C	C	71		Mid Range
38	315/70R22.5	Aufine	ENERGY ADR3	31570225ADR3	154	No	B	C	75		Low Cost
40	315/70R22.5	Royal Black	RS201	DRK7500263	156	No	D	C	73	419.9	Low Cost
41	315/70R22.5	Aplus	S201	DAP7500274	156	No	D	C	73	380	Low Cost
42	315/70R22.5	Yokohama	104ZR	B4898	154	No	C	C	73	912.91	Mid Range
43	315/70R22.5	Triangle	TRS02	CQTTRS0231F25HHJ	152	No	D	C	71	381.23	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
48	315/70R22.5	Prometeon	R02 PROWAY DRIVE	60454	158	Yes	D	A	76	1124	Mid Range
52	315/70R22.5	Sailun	TRANSPORT PRO S	T00-3120006297	156	Yes	B	A	70	649.2	Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
49	315/70R22.5	Pirelli	H02 PROFUEL DRIVE	60430	158	Yes	A	B	72	1124	Premium
50	315/70R22.5	Giti Tire	GSR237EVO	EH2408Q	156	Yes	B	B	70	424	Mid Range
51	315/70R22.5	Goodyear	EQMAX D	581621	154	Yes	B	B	75	954	Premium
56	315/70R22.5	Giti Tire	GSR237	EV2409Q	156	Yes	C	B	70	404	Mid Range
58	315/70R22.5	Matador	F HR 4	512485	156	Yes	C	B	71	667.5	Mid Range
60	315/70R22.5	Berlin Tires	PREMIUM LONG LIFE	PLD - 1	154	Yes	C	B	74		Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
46	315/70R22.5	Michelin	X MULTI ENERGY Z2 VM	121315	158	Yes	B	C	72	1096	Premium
47	315/70R22.5	Kumho	KLS23	2311843	156	Yes	B	C	71	593.4	Mid Range
53	315/70R22.5	Sava	AVANT 4 PLUS	570977	154	Yes	C	C	71	596	Mid Range
54	315/70R22.5	Fulda	ECOCONTROL 2 +	570962	154	Yes	C	C	71		Mid Range
55	315/70R22.5	Continental	Conti EfficientPro HD 5	521227	154	Yes	A	C	73	836.5	Premium
57	315/70R22.5	Amstrong	ASH11+	ASH11+ 1200063625	156	Yes	C	C	71		Mid Range
59	315/70R22.5	Bridgestone	M749	4800012	162	Yes	C	C	75	1133	Premium
	Dimension	Marca	Modelo	Identificador	Load-capacity ind	Winter	RR	WG	Noise	Price	Brand
62	385/65R22.5	Dynamo	MFR23	T00-3120005998	160	No	C	A	72		Low Cost
63	385/65R22.5	Sailun	SFR23	T00-3120005992	160	No	C	A	72	689.8	Low Cost
64	385/65R22.5	Roadx	DX233	T00-3120005993	160	No	C	A	72		Mid Range

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	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
61	385/65R22.5	Goodyear	KMAX T ENDURANCE	589278	164	No	C	B	71	884	Premium
65	385/65R22.5	Pirelli	ST: 01 NEVERENDING	41158	160	No	A	B	68	1078	Premium
66	385/65R22.5	Apollo	Endu"Race RT HD+	8714692996429	164	No	C	B	70	540.11	Mid Range
68	385/65R22.5	Dunlop	SP246	571791	164	No	C	B	69	798	Premium
69	385/65R22.5	Fulda	ECOTONN 2	572040	164	No	B	B	69	684	Mid Range
70	385/65R22.5	Royal Black	RT707	RK7516125	164	No	C	B	73	473.3	Low Cost
72	385/65R22.5	Kelly	KMT ARMORSTEEL	572780	160	No	C	B	72	377.16	Mid Range
73	385/65R22.5	Apollo	Endu"Race RTM	8714692809996	160	No	D	B	72	543.3	Mid Range
75	385/65R22.5	Maxxis	MS290	ETT00086900	160	No	B	B	71		Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
67	385/65R22.5	Triangle	TTM-A11	CQT1MA1138G25NP0	164	No	C	C	70	418.2	Mid Range
71	385/65R22.5	Sava	CARGO 4	572042	164	No	B	C	69	594	Mid Range
74	385/65R22.5	Torque	TQ022	8935355520014	160	No	D	C	73	313.08	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
78	385/65R22.5	Roadx	RFR2	T00-3120006046	164	Yes	C	A	73		Mid Range
80	385/65R22.5	Continental	Conti CrossTrac HT3	565611	160	Yes	C	A	72	766	Premium
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
76	385/65R22.5	Bridgestone	ECOPIA STEER	19915	160	Yes	A	B	68	1227	Premium
77	385/65R22.5	Universal	UNZX02	TGUNVSA8017164KM4	164	Yes	B	B	74		Low Cost
79	385/65R22.5	Universal	UNKS01	TGUNVSDA8017164KM3	164	Yes	D	B	73		Low Cost
81	385/65R22.5	Giti Tire	GTR956 HD	EH2131Q	164	Yes	C	B	70	636.85	Mid Range
83	385/65R22.5	Benchmark	BT1863	BT1863-10	164	Yes	D	B	73		Low Cost
84	385/65R22.5	Infinity	ITL863	ITL863-13	164	Yes	D	B	73		Low Cost
86	385/65R22.5	Kumho	KWA03	2364073	164	Yes	C	B	72	550.72	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
82	385/65R22.5	Yokohama	505C	B5568	164	Yes	C	C	72	928.74	Mid Range
85	385/65R22.5	Michelin	X LINE ENERGY TVQ	812967	160	Yes	A	C	71	983	Premium
87	385/65R22.5	Ovation	VI-022	8935355510121	164	Yes	D	C	73	343	Low Cost
88	385/65R22.5	Falken	SI011	357685	164	Yes	D	C	73	507.2	Mid Range
89	385/65R22.5	Hifly	HH107	8935355505332	164	Yes	D	C	73	393	Low Cost
90	385/65R22.5	Firestone	ROADHAWK WINTER STEER	30895	160	Yes	C	C	72	1024	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
95	295/80R22.5	Fortune	FT103H	2100_2621032103	149	No	C	A	72	362.8	Low Cost
98	295/80R22.5	Austone	AT103H	2100_2621022103	149	No	C	A	72		Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
91	295/80R22.5	Yokohama	104ZR	B4906	154	No	C	B	70	896.93	Mid Range
92	295/80R22.5	Bridgestone	R247 II	65665400	152	No	D	B	70	1104	Premium
93	295/80R22.5	BFGoodrich	CROSS CONTROL D VG	284008	152	No	D	B	75	666.2	Mid Range
94	295/80R22.5	Michelin	X MULTI ENERGY Z VM	885534	154	No	C	B	71	1043	Premium
96	295/80R22.5	Pirelli	FH: 01 COACH	24766	154	No	C	B	70	973	Premium
99	295/80R22.5	Goodyear	REGIONAL RHS II	568006	148	No	C	B	71	856	Premium
100	295/80R22.5	Giti Tire	GAL817	EV1312I2Q	149	No	D	B	70		Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
97	295/80R22.5	Toyot Tires	M144A	12123620	152	No	C	C	70		Mid Range
101	295/80R22.5	Hankook	AL10 e-cube	3001549	152	No	C	C	70	672	Mid Range
102	295/80R22.5	Hifly	HH102	8935355505097	149	No	D	C	73	375	Low Cost
103	295/80R22.5	Ovation	VI-660	8935355510268	149	No	D	C	73	285	Low Cost
104	295/80R22.5	Sunfull	HF660	8935355515072	149	No	D	C	73		Low Cost
105	295/80R22.5	Ovation	VI-688	8935355510244	149	No	D	C	73	295	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
106	295/80R22.5	Universal	UNFS02	TGUNVSB88012154/149MM5	149	Yes	C	A	73		Low Cost
109	295/80R22.5	Sailun	TRANSPORT PRO D	T00-3120006171	149	Yes	B	A	72	519.6	Low Cost
115	295/80R22.5	Sailun	COACH	T01-3120004909	149	Yes	B	A	71	539.6	Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
107	295/80R22.5	Otani	OH-201	OH-201 810496	150	Yes	D	B	73	275	Mid Range
110	295/80R22.5	Giti Tire	GSR237	EV2456Q0	149	Yes	C	B	70	645.5	Mid Range
111	295/80R22.5	Matador	F HR 4	0512536	154	Yes	C	B	70	639.5	Mid Range
116	295/80R22.5	Sava	AVANT 5	570681	148	Yes	D	B	75	576	Low Cost
117	295/80R22.5	Kelly	KMS2 ARMORSTEEL	595571	152	Yes	C	B	72	343.56	Mid Range
118	295/80R22.5	Firestone	FS424	19728	152	Yes	C	B	69	823	Mid Range
119	295/80R22.5	Apollo	Endu"Race RA2	8.71469E+12	154	Yes	C	B	72	525.8	Mid Range
120	295/80R22.5	Dynamo	MDW50	T00-3120005940	154	Yes	E	B	72		Low Cost
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
108	295/80R22.5	Continental	WINTER HDW2 COACH	565588	149	Yes	D	C	76	778.5	Premium
112	295/80R22.5	Armstrong	ASH11+	ASH11+ 1200063624	149	Yes	C	C	71		Mid Range
113	295/80R22.5	BFGoodrich	ROUTE CONTROL S2	401019	152	Yes	C	C	72	691	Mid Range
114	295/80R22.5	Continental	Conti Eco HD 5	522564	152	Yes	B	C	73	794	Premium
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
121	385/55R22.5	Fulda	ECOTONN 2	570751	160	No	B	B	71	722	Mid Range
127	385/55R22.5	Continental	Conti Hybrid HT3	565490	160	No	C	B	71	787.5	Premium
129	385/55R22.5	Pirelli	ST: 01 NEVERENDING	41157	160	No	A	B	68	1134	Premium
132	385/55R22.5	Fullrun	TB1000	FR1000T22501	160	No	C	B	73		Low Cost
133	385/55R22.5	Doublestar	DSR128	DSR128 001	160	No	B	B	73	400	Low Cost
134	385/55R22.5	Yokohama	SUPER STEEL RY357	B5216	160	No	B	B	68	948.25	Mid Range
	Dimensioni	Marca	Modelo	Identificador	Load-capacity inde	Winter	RR	WG	Noise	Price	Brand
122	385/55R22.5	Apollo	Endu"mile LHT	8714692999994	160	No	A	C	70	573	Mid Range
123	385/55R22.5	Triangle	TRT02	CQTRT0238J25LHJ	160	No	C	C	70	432.55	Mid Range
124	385/55R22.5	Ovation	ETL311	6920758611690	160	No	C	C	73	360	Low Cost
125	385/55R22.5	Hankook	e-cube Blue TL20	3002380	160	No	A	C	66	970	Mid Range
126	385/55R22.5	Torque	FTL311	6920758631605	160	No	C	C	73	466.35	Low Cost
128	385/55R22.5	DoubleCoin	RT910	RT910 80355107	160	No	B	C	73	380	Low Cost
130	385/55R22.5	Hilo	385/55R22.5 706 HILO	385/55R22.5 706 HILO	160	No	C	C	71		Low Cost
131	385/55R22.5	Sava	CARGO 4	570843	160	No	B	C	71	630	Mid Range
135	385/55R22.5	Powertrac	CROSSSTRAC	PO7500576	160	No	C	C	73		Low Cost

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	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brand
137	385/55R22.5	Roadx	RTR2	T00-3120006140	160	Yes	C	A	72		Mid Range
139	385/55R22.5	Otani	OH-119	OH-119 810465	160	Yes	C	A	69	300	Mid Range
144	385/55R22.5	Austone	BorealiaPro T803	2170_2648020803	160	Yes	C	A	72	325.49	Low Cost
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brand
136	385/55R22.5	Goodyear	EQMAX S	582543	160	Yes	B	B	70	1040	Premium
138	385/55R22.5	Dynamo	MAW50	T00-3120005821	164	Yes	C	B	70		Low Cost
140	385/55R22.5	Continental	Conti Scandinavia HT3	565592	160	Yes	D	B	74	843	Premium
141	385/55R22.5	Bridgestone	ECOPIA STEER	32694	160	Yes	A	B	69	1237	Premium
142	385/55R22.5	Firestone	ROADHAWK WINTER STEER	30896	160	Yes	C	B	71	1040	Mid Range
143	385/55R22.5	Sailun	STL2	T00-3120005370	164	Yes	A	B	71	676	Low Cost
145	385/55R22.5	Prometeon	R02 PROFUEL STEER	60260	162	Yes	B	B	69	1190	Mid Range
146	385/55R22.5	Hankook	Smartflex AH51	3003987	160	Yes	B	B	70	752	Mid Range
149	385/55R22.5	Yokohama	BluEarth 132T	B5481	160	Yes	B	B	70	970.47	Mid Range
150	385/55R22.5	Giti Tire	GTR955	EH99868Q	164	Yes	B	B	70	646.9	Mid Range
	Dimension	Marca	Modelo	Identificador	Load-capacity index	Winter	RR	WG	Noise	Price	Brand
147	385/55R22.5	Michelin	X LINE ENERGY TVQ	139900	160	Yes	A	C	71	1045	Premium
148	385/55R22.5	Aeolus	Neo Allroads T2	1380609020	160	Yes	C	C	74	787.5	Mid Range