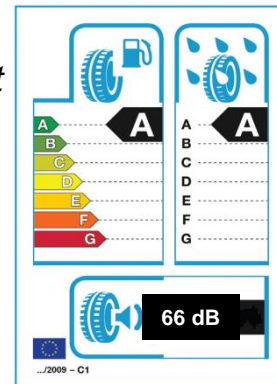


***Triple-A* tyres – benefits for environment, noise, safety and economy**

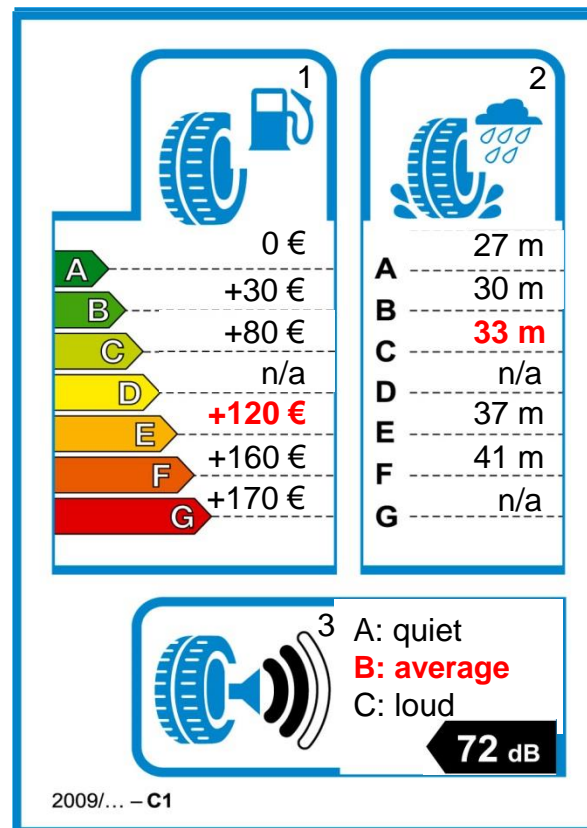
*Results of 'Potential benefits of Triple-A tyres in the Netherlands',
a study performed by order of the Dutch Ministry of Infrastructure & Environment*

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What are tyre labels good for?

...hidden savings for the end-user!



¹ Fuel cost savings

mileage: 17000 km/j
 fuel price: 1,75 €/l
 economy: 7,5 l/100km
 tyre lifetime: 4 years

² Braking distance

from 80 to 0 km/h
 on wet road surface

³ Noise

A: reference
 B: +1-3dB*
 C: +4-6dB*

*3dB is equivalent to a doubling of the noise level, i.e. doubling of the traffic intensity

Content

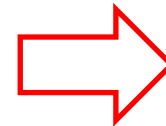
- › Core question ‘What is the potential benefit of AAA-tyres in NL?’
- › Approach ‘How to calculate this benefit?’
- › Results
 - ‘What is the current distribution of tyres in NL?’
 - ‘What are societal benefits of AAA-tyres in NL?’
 - ‘What are end-user benefits of AAA-tyres in NL?’

 - ‘What are potential benefits of AAA-tyres in EU?’
- › Conclusion
 - ‘What can we learn from these results?’
 - ‘Are the results in line with your expectations?’

What is the potential benefit of AAA-tyres in NL?

› Status quo ('average tyre')

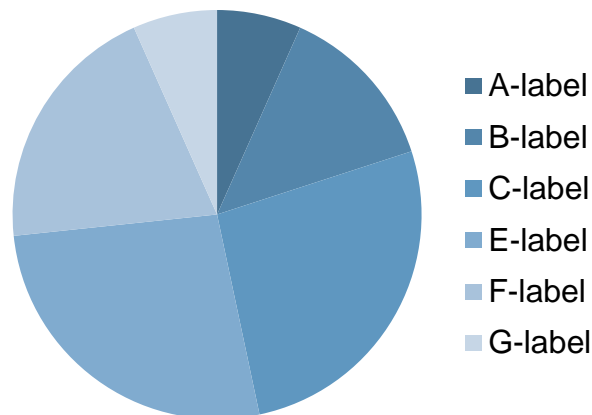
› AAA ('best tyre')



How to calculate this benefit?

1. Current tyre distribution in NL determined with help of the tyre type data base of VACO
2. Benefits of **AAA-tyres** determined in terms of:
 - energy (fuel cost savings and reduced amount of CO₂)
 - safety (reduced amount of accidents and slight, serious and fatal injuries)
 - noise (reduced amount of annoyed and sleep disturbed people)

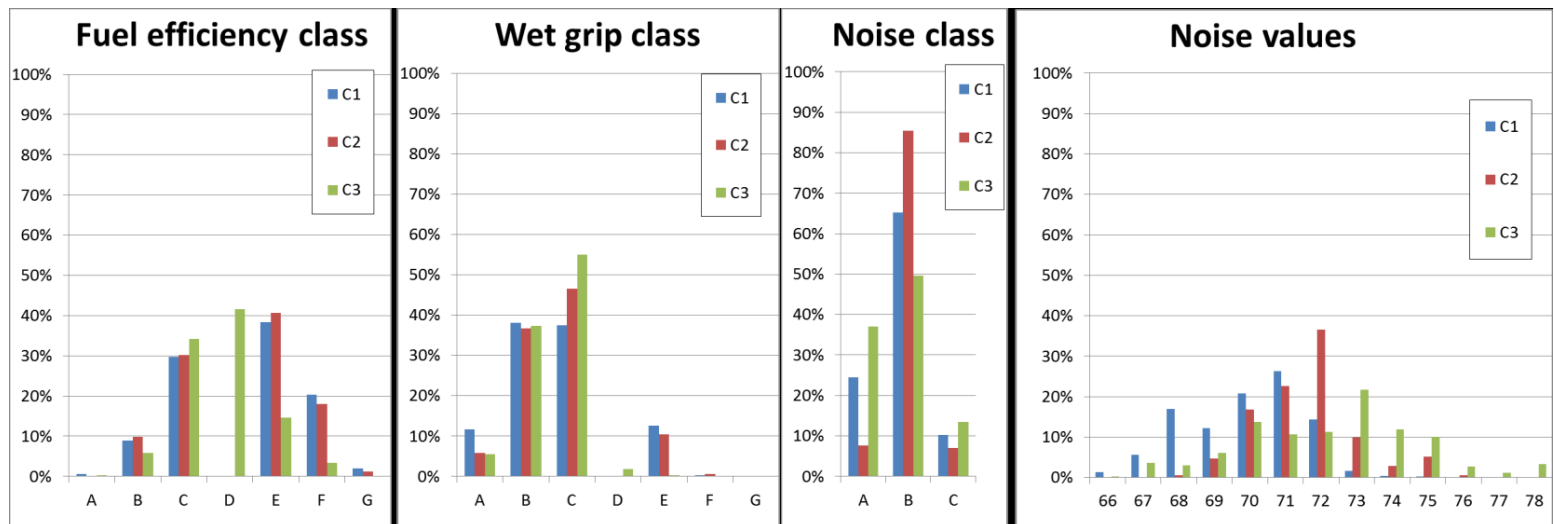
Verkoopcijfers



$$\begin{aligned}
 & \text{savings potential } A \text{ (energy)} \\
 & + \text{savings potential } A \text{ (safety)} \\
 & + \text{savings potential } A \text{ (noise)} \\
 \hline
 & = \text{savings potential } AAA
 \end{aligned}$$

What is the current tyre distribution in NL?

Tyre type	Energy	Safety	Noise	Noise (dB)
C1	4.4 ('D-label')	2.6 ('C-label')	1.9 ('B-label')	69.9
C2	4.3 ('D-label')	2.7 ('C-label')	2.0 ('B-label')	71.6
C3	3.7 ('D-label')	2.5 ('C-label')	1.8 ('B-label')	72.2



▶ On average, NL drives on *DCB* tyres (*D*=energy, *C*=safety, *B*=noise).

* Labelling: A = 1, B = 2, C = 3, D = 4, etc...

What are the potential societal benefits in NL? ...of A-rated tyre for energy

Vehicle class	Fuel type	Fuel savings [in MI]	Fuel cost savings [in M€]
Passenger cars	Petrol	249	170
Passenger cars	Diesel	95	72
Service/delivery	Diesel	61	46
Distribution	Diesel	1	1
Heavy duty	Diesel	92	70
Bus	Diesel	7	6
TOTAL		506	365

Vehicle class	Fuel type	CO ₂ -reduction [in MtCO ₂]
TOTAL	Mix	1.3

- › On a societal level, annual savings of nearly **506MI of fuel**, **365M€ of fuel costs** and a reduction of **1.3Mton in CO₂ emissions** can be achieved.

What are the potential societal benefits in NL? ...of A-rated tyre for safety

	C1	C2	C3	TOTAL
Reduced number of fatalities	37	4	2	43
Reduced number of serious injuries	218	29	13	260
Reduced number of slight injuries	323	10	30	364
Monetary benefits [in M€]	156.5	18.2	8.9	184

- ▶ A shift toward A-rated tyres for safety yearly yields 43 less fatalities, 260 less serious injuries and 364 less slight injuries in traffic accidents. In total, this saves the society 183 M€ each year.

Tyre label

Grip level

Braking distance

Impact speed

Personal injury

Societal cost

What are the potential societal benefits in NL? ...of A-rated tyre for noise

	TOTAL
Reduced number of highly annoyed people	216000
Reduced number of annoyed people	361000
Reduced number of highly sleep disturbed people	204000
Reduced number of sleep disturbed people	310000
Monetary benefits [in M€]	389

- ▶ A shift towards A-rated tyres for noise results in reduction of several hundreds of thousands of (highly) annoyed and (highly) sleep-disturbed people. This corresponds to annual societal savings of 389M€.

What are the potential societal benefits in NL? ...of AAA-rated tyre for energy, safety AND noise

	Energy	Safety	Noise	TOTAL
Annual fuel savings [in MI]	506	-	-	506
Annual CO2 reduction [in MtCO2]	1.3	-	-	1.3
Reduced number of fatalities	-	43	-	43
Reduced number of serious injuries	-	260	-	260
Reduced number of slight injuries	-	364	-	364
Reduced number of highly annoyed people	-	-	216000	216000
Reduced number of annoyed people	-	-	361000	361000
Reduced number of highly sleep disturbed people	-	-	204000	204000
Reduced number of sleep disturbed people	-	-	310000	310000
Annual cost savings [in M€]	365	184	389	938

- ▶ The societal benefits of AAA-rated tyres are calculated as the sum of the independent benefits of energy, safety and noise. It can be stated, that a shift to AAA-rated tyres yield benefits for the end-user as well as the Dutch society.

What are the potential end-user benefits? ...of AAA-rated tyres: Fuel cost savings!

Vehicle class	Fuel type	Fuel savings [in l]	Fuel cost savings [in €]
Passenger cars (family)	Petrol	67	117
Passenger cars (lease)	Diesel	114	171
Service/delivery	Diesel	300	449
Urban delivery/collection	Diesel	449	674
Municipal utility	Diesel	507	761
Regional delivery/collection	Diesel	574	862
Long haul	Diesel	1612	2418
Construction	Diesel	526	790
Bus	Diesel	691	1036
Coach	Diesel	566	849

- › De fuel cost savings for the end-user vary between 117 € per year for an average passenger car on petrol up to 2.418 € per year for an average long haul truck.

What are the potential societal benefits in **EU***? ...of AAA-rated tyre for energy, safety AND noise

	<u>Same assumptions as in NL</u>	<u>Adopted assumptions to EU</u>
	<ul style="list-style-type: none"> › NL tyre distribution 	
Energy	<ul style="list-style-type: none"> › NL driving patterns › NL share of vehicle technologies › NL fuel consumption 	<ul style="list-style-type: none"> › EU vehicle fleet / vehicle-kilometres
Safety	<ul style="list-style-type: none"> › NL accident causation 	<ul style="list-style-type: none"> › EU road network › EU weather conditions › Calculation for car occupants only (EU)
Noise	<ul style="list-style-type: none"> › NL road surface characteristics › NL driving speeds 	<ul style="list-style-type: none"> › EU number of annoyed and sleep-disturbed people

* *Potential benefits of Triple-A tyres in Europe*, Zyl, Roo, Dittrich and Jansen, 2014

What are the potential societal benefits in **EU***? ...of AAA-rated tyre for energy, safety AND noise

	Energy	Safety	Noise	TOTAL
Annual fuel savings [in GI]	17	-	-	17
Annual CO2 reduction [in MtCO2]	42	-	-	42
Reduced number of fatalities	-	2567	-	2567
Reduced number of serious injuries	-	12353	-	12353
Reduced number of slight injuries	-	19631	-	19631
Reduced number of highly annoyed people [in millions]	-	-	8.2	8.2
Reduced number of annoyed people [in millions]	-	-	13.0	13.0
Reduced number of highly sleep disturbed people [in millions]	-	-	3.4	3.4
Reduced number of sleep disturbed people [in millions]	-	-	6.1	6.1
Annual cost savings [in G€]	13	10	11	34

- ▶ Based on differences between EU and NL in terms of VKMs (vehicle kilometres), road length, accident statistics, etc., the societal benefits of AAA-rated tyres in the EU are more than 30 times higher than in NL. The annual societal cost savings amount to about 34 billion Euros.

* Potential benefits of Triple-A tyres in Europe, Zyl, Roo, Dittrich and Jansen, 2014

Stakeholder discussion and questions

- › Successful stakeholder meeting in NL, June 2014:
 - › Demand for increased consumer awareness

- › Further questions:
 - › How can potential savings be monetized in practise?
 - › How can end-users be stimulated to purchase the 'best tyre'?
 - › Are Triple-A tyres really the 'best tyre'? What about other parameters like tyre-road interference?
 - › Proof-of-Mechanism: monitoring programme with different tyres