



# Low Resistance Tires Supporting Green Freight - Experiences from EU Tire Regulations, Standards and Labelling

China Green Freight Initiative Seminar (2014)

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# Driving Forces for the Development of Low Rolling Resistant tires





## Energy Saving

### How does Rolling Resistance contribute to Vehicle Fuel Consumption?

- The vehicle engine has to provide a force to compensate RR. This consumes some fuel and so contributes to the vehicle fuel consumption.
- Tires account for 20% to 30% of fuel consumption depending on vehicle speed (over 70km/h, aerodynamic drag exceeds rolling resistance as a parameter influencing consumption).
- For truck tires a 1kg/t variation in RR means on average a 5% saving.



# Air Quality and PM Emission

## Reduction of Nitrogen Dioxide Emission by improved Tires

In many EU cities the EU air quality standards for nitrogen dioxide are violated frequently.

By reducing the rolling resistance the nitrogen oxide and particle emissions will be reduced accordingly.



# Rolling Noise

## WHO and JRC: Burden of Disease from Environmental Noise

In the European Union Member States and other western European countries, DALYs ( disability-adjusted life-years ) estimated lost from environmental noise:

- ✓ Ischaemic heart disease : 61 000 years
- ✓ Cognitive impairment of children : 45 000 years
- ✓ Sleep disturbance : 903 000 years
- ✓ Tinnitus : 22 000 years
- ✓ Annoyance : 654 000 years

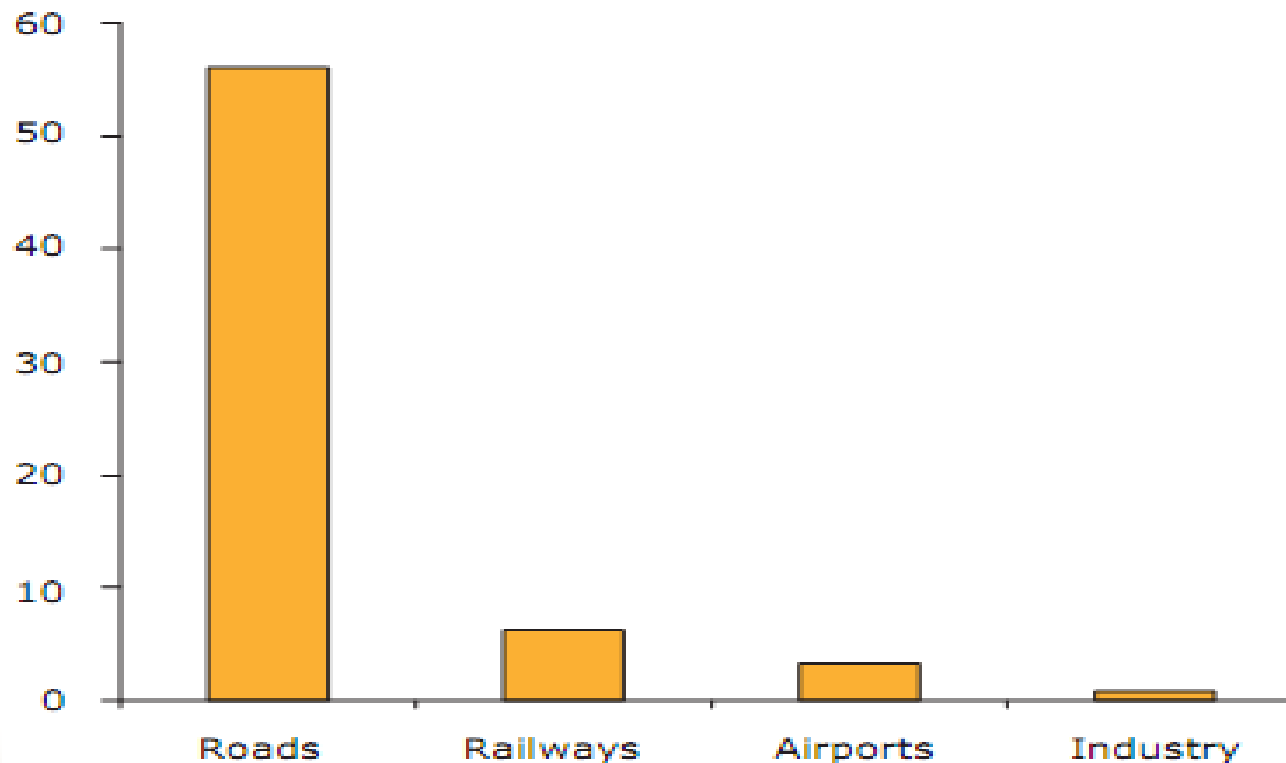
At least one million healthy life years are lost every year from traffic-related noise in the western part of Europe.



# Rolling Noise

**Reported noise exposure > 55 dB Lden in European agglomerations with more than 250 000 inhabitants based on the results of strategic noise mapping.**

Number of people in millions



Source: NOISE, 2010.

Noise source

# EU Tires Regulation



## EU Tire Rolling Resistance Limits

Tire Category	Max. Rolling Resistance (Kg/Tonne)	
	Stage 1	Stage 2
C1	12	10.5
C2	10.5	9
C3	8	6.5



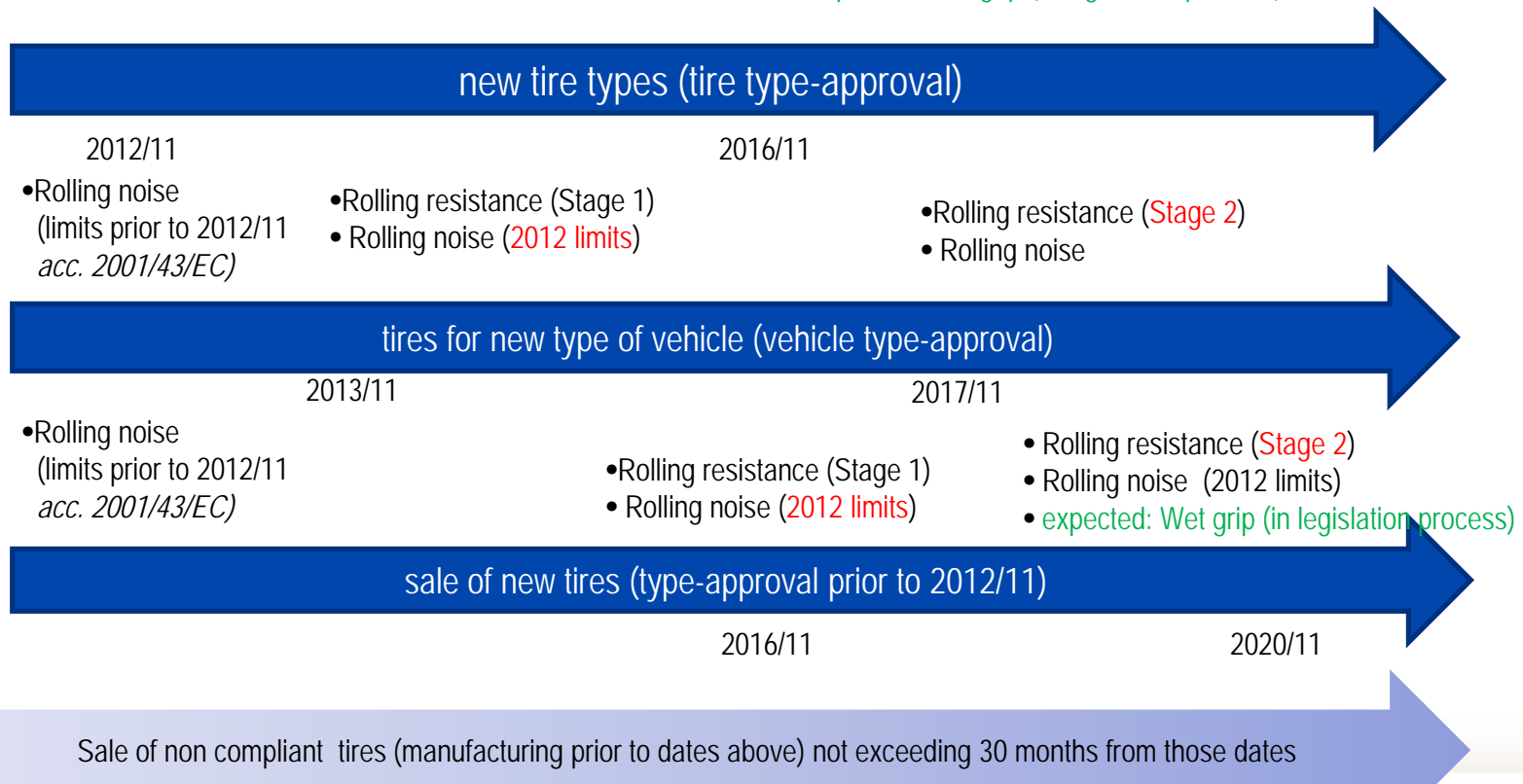


# Legal Situation in Europe – C3 Tires

Legal situation of tires for commercial transport vehicles in Europe regarding type approval and sales

- Rolling resistance (Table 1)
- Rolling noise (2012 limits)

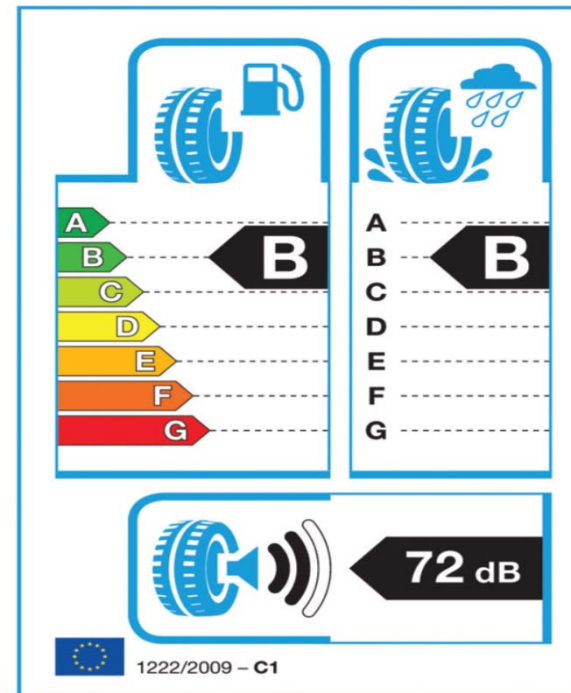
- Rolling resistance (Stage 1)
- Rolling noise
- Expected: Wet grip (in legislation process)





# Tire Labelling Regulation 1222/2009

Since November 2012 all new tires on sale in Europe are classified and labeled for fuel efficiency, wet grip and rolling noise performance.



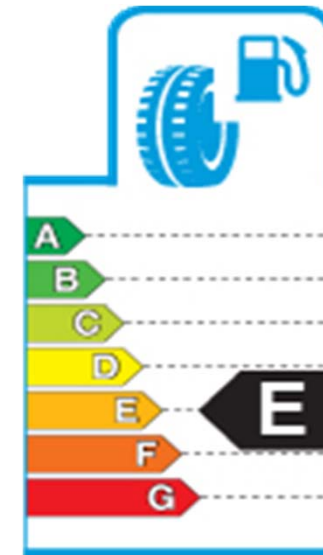


## Fuel efficiency requirements for C3 tires in Europe (limit values for the Rolling Resistance Coefficient “RRC”)

### Fuel efficiency classes of C3 tires :

Today's limit value  
for new tire type  
approval

RRC in kg/t	Energy efficiency class
$RRC \leq 4,0$	A
$4,1 \leq RRC \leq 5,0$	B
$5,1 \leq RRC \leq 6,0$	C
$6,1 \leq RRC \leq 7,0$	D
$7,1 \leq RRC \leq 8,0$	E
$RRC \geq 8,1$	F
Empty	G



The difference between a F and an A class for a complete set of tires could reduce fuel consumption for trucks up to 15%



## Possible Grading Scheme and End-User Benefits in 2012 per Set of 10 C3 tires (Winter and Summer, VAT excl., Fuel Tax incl.) for Moving from Band D to Higher Bands

	A	B	C	D	E	F	G
<b>RRC</b>	below 4	4 to 5	5 to 6	6 to 7	7 to 8	above 8	/
<b>Price premium</b>	1080	650	310	0	/	/	/
<b>Total fuel savings</b>	3780	2520	1260	0	/	/	/
<b>Payback period (months)</b>	<b>5</b>	<b>5</b>	<b>5</b>	0	/	/	/
<b>CO<sub>2</sub> g/km savings</b>	99	66	33	0	/	/	
<b>Market share in 2004</b>	1%	8%	23%	33%	23%	10%	/
<b>In 2020 (slow pace)</b>	11%	28%	43%	14%	3%	0%	/
<b>In 2020 (fast pace)</b>	39%	35%	21%	4%	1%	0%	/
<b>Baseline scenario in 2020</b>	3%	19%	51%	22%	6%	0%	/



For a fleet with 50 trucks a 4% fuel saving means:



4% { 200,000 km/year  
35L/100 km  
RMB 7.60/L

50辆 { .....

**RMB21,280 in fuel consumption costs can be saved annually.**

**RMB1,060,000 in fuel consumption costs can be saved annually.**



# Road Test



- Engine volume: 12.9
- Power: 340 Kw
- Gearbox: Automatic
- Load: 40 t total mass
- 3 axles



## First Test

Manufacture	Brand Name	Tire Size
MICHELIN	XZA 2 ENERGY / XDA 2+ ENERGY / XTA 2+	Lenkachse / Antriebsachse / Auflieger 315/80 R22.5 / 315/80 R22.5 / 385/65 R22.5
MICHELIN	XZE 2+ / XDE 2+ / XTE 3	
MICHELIN	X <sup>®</sup> ENERGY™ SAVERGREEN: XZ / XD / XT	

## Second Test

Manufacture	Brand Name	Tire Size
MICHELIN	X <sup>®</sup> ENERGY™ SAVERGREEN: XZ / XD / XT	Lenkachse / Antriebsachse / Auflieger 315/80 R22.5 / 315/80 R22.5 / 385/65 R22.5
CONTINENTAL	ECO-PLUS: HSL2 / HDL 2 / HTL 2	
PIRELLI	Amaranto ENERGY: FH88 / Amaranto ENERGY TH88 / ST35	
GOODYEAR	Marathon: LHS II / LHD II / LHT E	
BRIDGESTONE	R249 / M749 / R168	





# Results of the Tests

## First Test

MICHELIN X <sup>®</sup> ENERGY™ SAVERGREEN: XZ / XD / XT	MICHELIN XZA 2 ENERGY / XDA 2+ ENERGY / XTA 2+	MICHELIN XZE 2+ / XDE 2+ / XTE 3
-0.67 [l/100km] / -2.7%	0.0 [l/100km] / 0.0%	+2.00 [l/100km] / +7.9%

## Second Test

MICHELIN X <sup>®</sup> ENERGY™ SAVERGREEN: XZ / XD / XT	CONTINENTAL ECO-PLUS: HSL2 / HDL 2 / HTL 2	GOODYEAR MARATHON: LHS II / LHD II / LHT E	PIRELLI AMARANTO ENERGY: FH88 / AMARANTO ENERGY TH88 / ST35	BRIDGESTONE R249 / M749 / R168
0.0 [l/100km] / 0.0%	+0.67 [l/100km] +2.8%	+1.61 [l/100km] / +6.7%	+2.19 [l/100km] / +9.2%	+2.44 [l/100km] / +10.2%

Source: Tire Benchmark Test 2010 TÜV SÜD



# The label has had an impact on many stakeholders

## MANUFACTURERS/IMPORTERS

- **Technological challenge:** Accelerate progress on raw material and technology to improve quality of tires
- **Business & reputation challenge,** derived from increased market transparency
- **Compliance challenge and fair level playing field:** it is costly, in particular when the same performances maybe regulated with different technical prescriptions (test methods, markings,...)

## DEALERS

- Provides tire dealers with strong new selling arguments to ensure consumers make a better informed choice



## The label has had an impact on many stakeholders

### CONSUMERS

- Gives consumers more comparable information (*other than price and brand*) to help make a better purchasing decision

### EU and NATIONAL LEGISLATORS

- Gives Authorities an opportunity to highlight the social benefits that can be achieved through with the right tire choice. Increased integration of tire environmental criteria in public tenders

### MEDIA and PUBLIC

- Raises awareness on the significant influence tires have on a vehicle's safety and environmental performance



## Useful information on Fuel Efficiency of tires

The screenshot shows the European Commission website page for Energy Efficiency Tyres labelling. The page features a blue header with the European Commission logo and the word 'ENERGY'. Below the header, a navigation bar shows the path: European Commission > Energy > Energy Efficiency > Tyres. The main content area is titled 'Energy Efficiency' and 'Tyre labelling'. It includes a sidebar with a list of energy efficiency topics, a main text block explaining the EU regulation on tyre labelling (effective from 1st November 2012), and a section for 'Images of the tyre label for publication purposes'. The page also features a search bar, an RSS feed icon, and a 'Quick jump' section with links to 'Competitiveness and'.

Search | About this site | Contact | Legal notice | English (en)

European Commission

ENERGY

European Commission > Energy > Energy Efficiency > Tyres

### Energy Efficiency

- Energy Efficiency Directive
- Energy Efficiency Plan
- Financing Energy Efficiency
- Buildings
- Cogeneration
- End-use & Services
- Products
- Office equipment
- Tyres (labelling)

### Tyre labelling

On 1st November 2012, the EU regulation on labelling of tyres is applicable. The label provides information on fuel efficiency, wet grip and external rolling noise through clear pictograms. The label will allow consumers to make informed choices when buying tyres, ranked on a scale from A (best) to G (bad).

- [Question and answers](#) [120 KB]
- [Fuel savings calculator](#)

Images of the tyre label for publication purposes

RSS

Search  OK

**Günther Oettinger**  
Commissioner  
for Energy

**Philip Lowe**  
Director-General  
for Energy

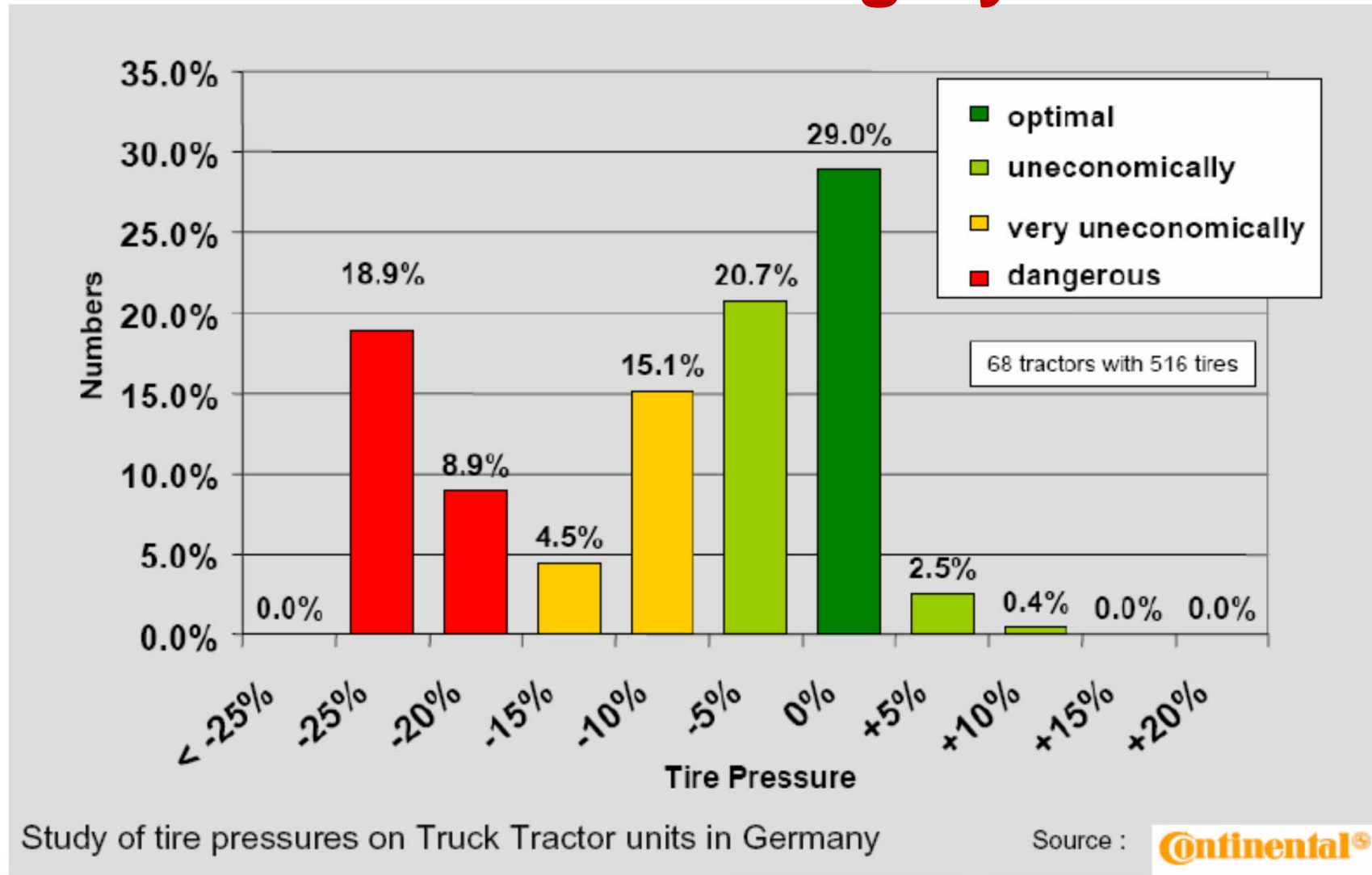
**Quick jump**

Competitiveness and

[http://ec.europa.eu/energy/efficiency/tires/labelling\\_en.htm](http://ec.europa.eu/energy/efficiency/tires/labelling_en.htm)



# Tire Pressure Monitoring System





# Thank you very much for your attention!

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