

European  
Automobile  
Manufacturers  
Association

## Addressing the problem of noise pollution in road transport

ACEA's position



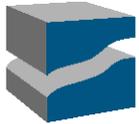
ACEA



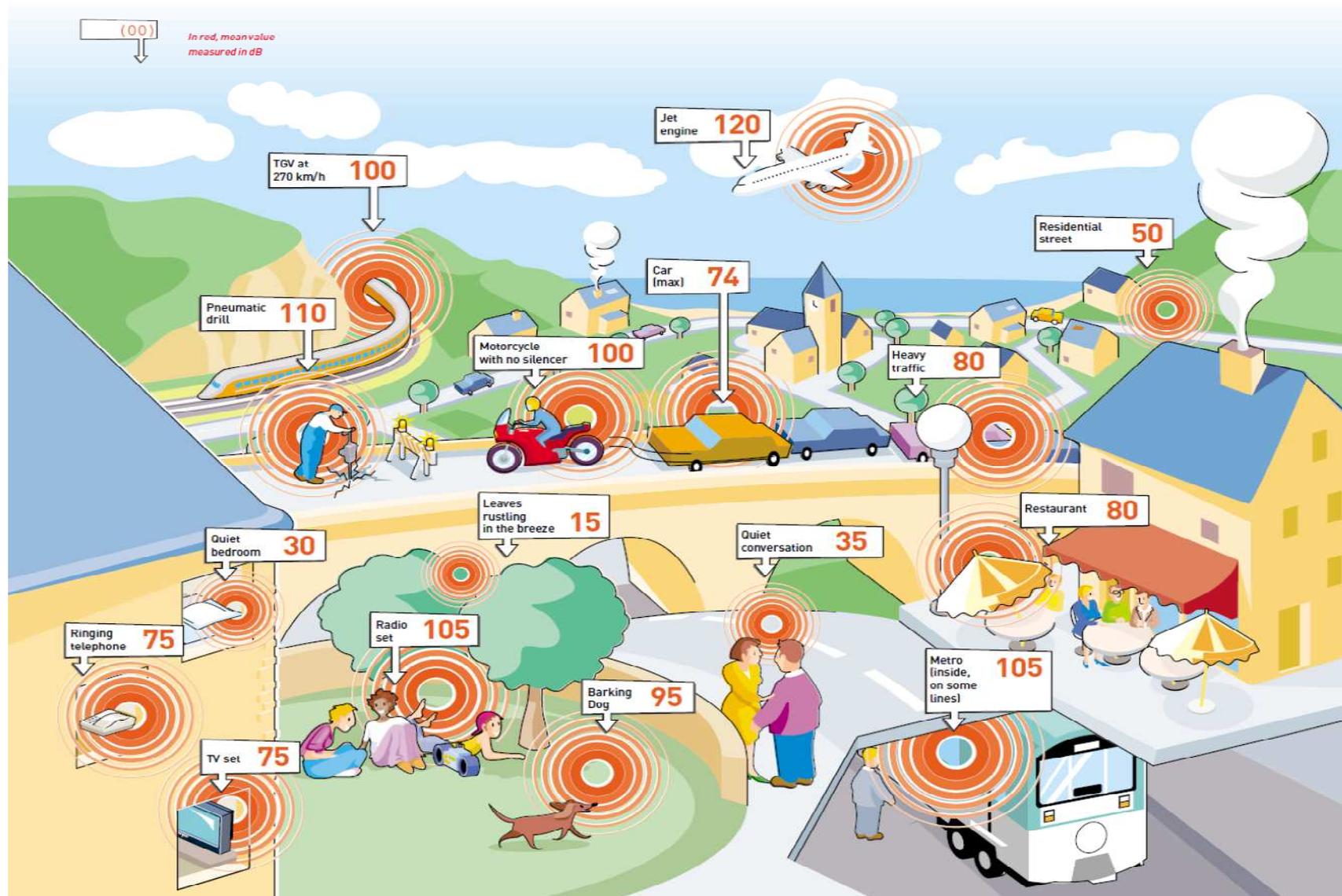
## Noise: What is it

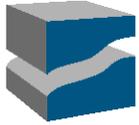
- **Sound are variations of barometric pressure in a range between 16 Hz and approximately 20.000 Hz perceived by the human sense of hearing.**
- **When the sound impressions are perceived as bothersome or annoying by humans, they are not described as sound anymore, but rather as noise.**

**Noise is unwelcome sound!**



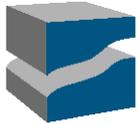
# Sources of noise in everyday life





## Noise Abatement

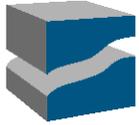
- **4 EU Directives since 1970 to reduce sound levels of motor vehicles (-90%)**
- **Last Directive (1996) fixed a 74 dB (A) for passenger cars and 80 dB (A) for commercial vehicles**
- **Lowering the Noise level of a vehicle was not reflected in the Noise perception of citizens:**
  - Other factors influence noise levels
  - The test-method used did not reflect actual driving behaviour and traffic conditions



# Integrated approach

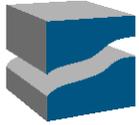
- **An integrated approach can bring cost effective abatements and is necessary to “hear” results:**
- **Examples for possible counter measures are:**
  - Road surface quality
    - ⇒ Maintenance
    - ⇒ Special low noise surfaces
  - Driving behaviour
  - Intelligent Traffic Management
  - Local Infrastructure
    - ⇒ Bypass roads
    - ⇒ tunnels
    - ⇒ Sound barriers and walls
  - Vehicle in-use noise control
    - ⇒ Law enforcement (maintenance and illegal parts)
    - ⇒ Replacement tyres
- **Most measures provide more potential in shorter times and at lower costs compared to enforcement of limit values for new vehicle types.**





## The new test method

- **A new test method was devised at UNECE level and adopted in 2005;**
- **Following the adoption of the new method a monitoring databank was established by measuring the sound levels of vehicles with the old and new methods during 3 years**
- **The data bank was then analysed by TNO for the Commission and by UTAC/TuV for ACEA** (see: [www.acea.be/images/uploads/files/Monitoring\\_procedure\\_in\\_the\\_vehicle\\_noise\\_regulation.pdf](http://www.acea.be/images/uploads/files/Monitoring_procedure_in_the_vehicle_noise_regulation.pdf))
- **The aim: to establish a reduction of the noise limits of the vehicle which will work out in real life (and remain feasible for the industry!)**



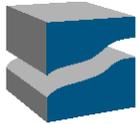
## The industry's 3 biggest issues

- **Categorisation**
  - **Limits**
- **Lead-time**



## Vehicle categorisation

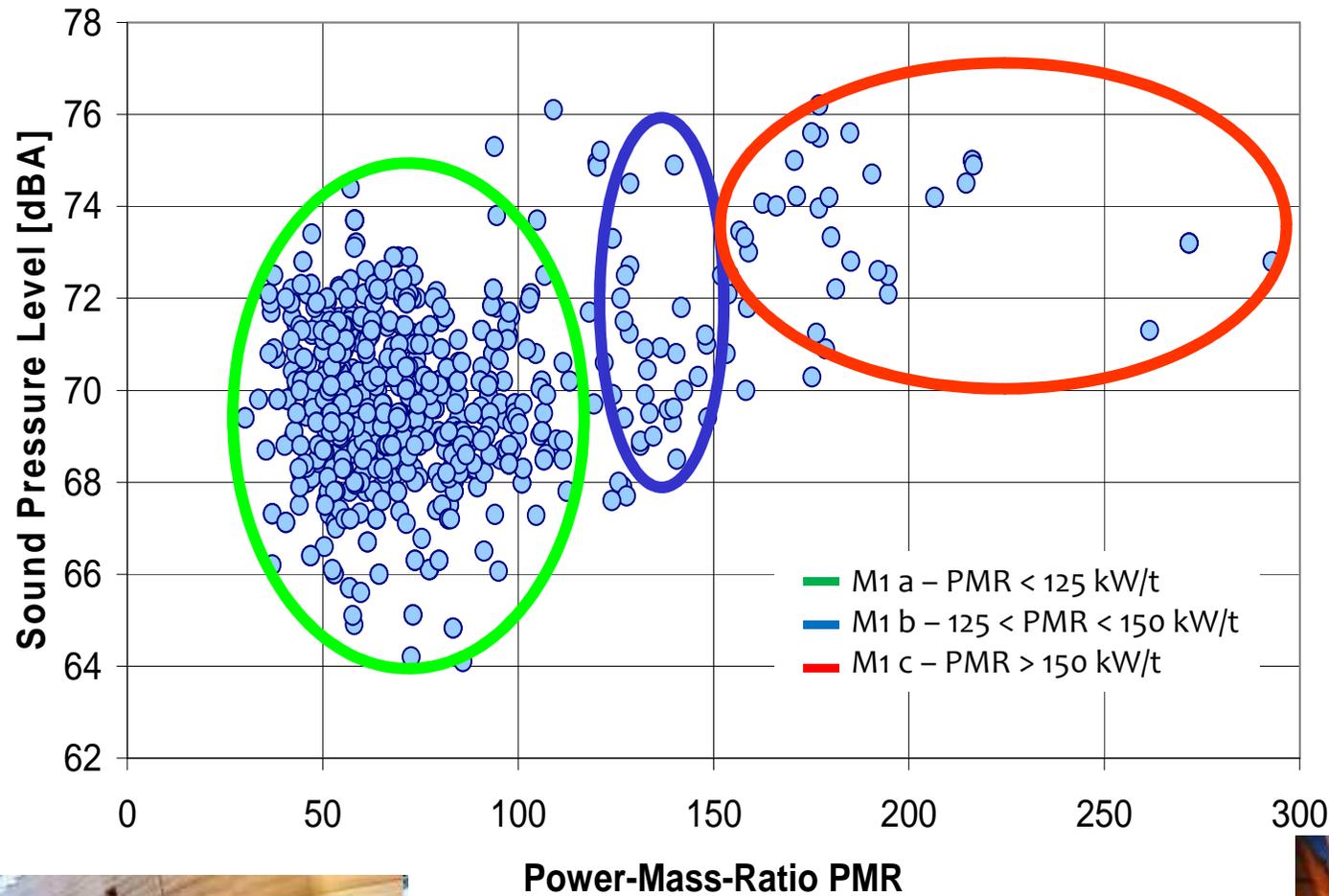
- **The Commission used – with very minor changes – the same categorisation as previously based on the fleet in 1985**
- **ACEA on the other hand proposes to adapt the vehicle categorisation by:**
  - distinguishing from the noise monitoring databank clusters of noise levels and connecting these to certain vehicle characteristics.
- **To:**
  - Reflect more accurately the current and (future) fleet running on the roads and the different usage made of the vehicles
  - Set appropriate limits for each category



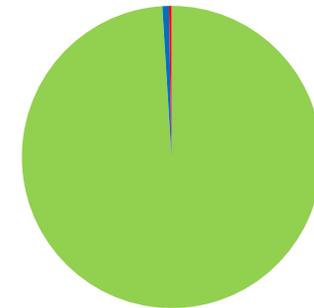
# Vehicle categorisation-Clusters of Noise

## Passenger cars

(Source GRB 53-04)

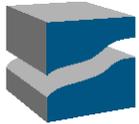


Passenger car registrations



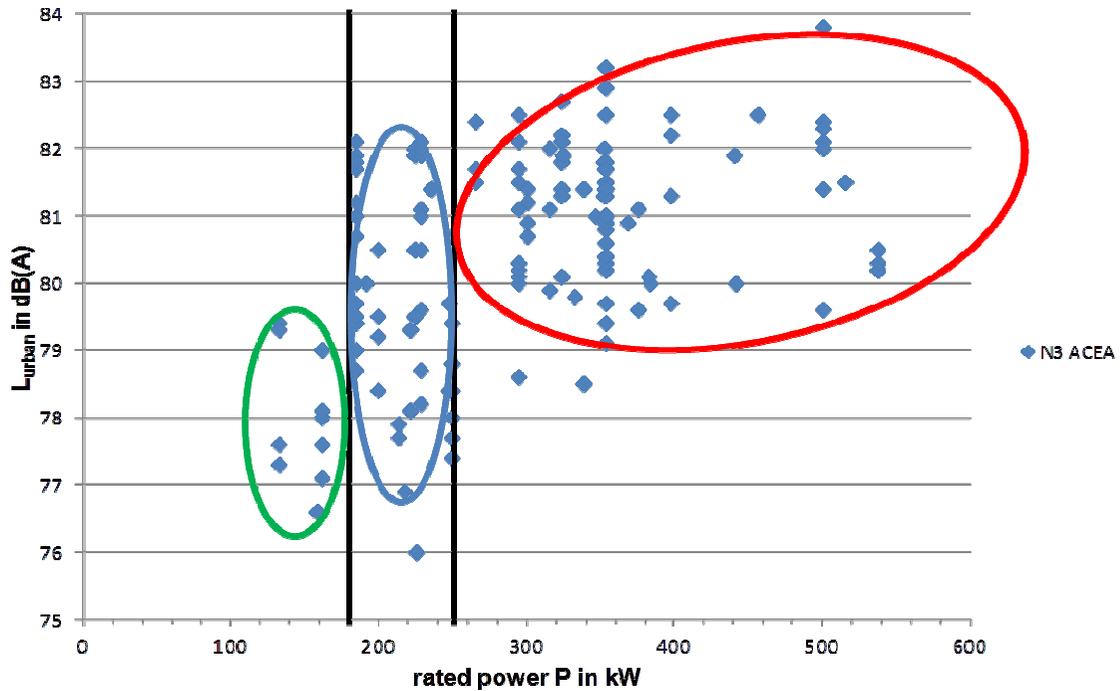
Source: AAA,  
EU27 in 2007





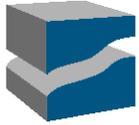
# Vehicle categorisation - Clusters of Noise Trucks

(Source GRB 53-04)



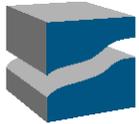
ACEA Monitoring Data Base (Corrected to Normal Tyres):  $dB(A) = f(P(kW))$



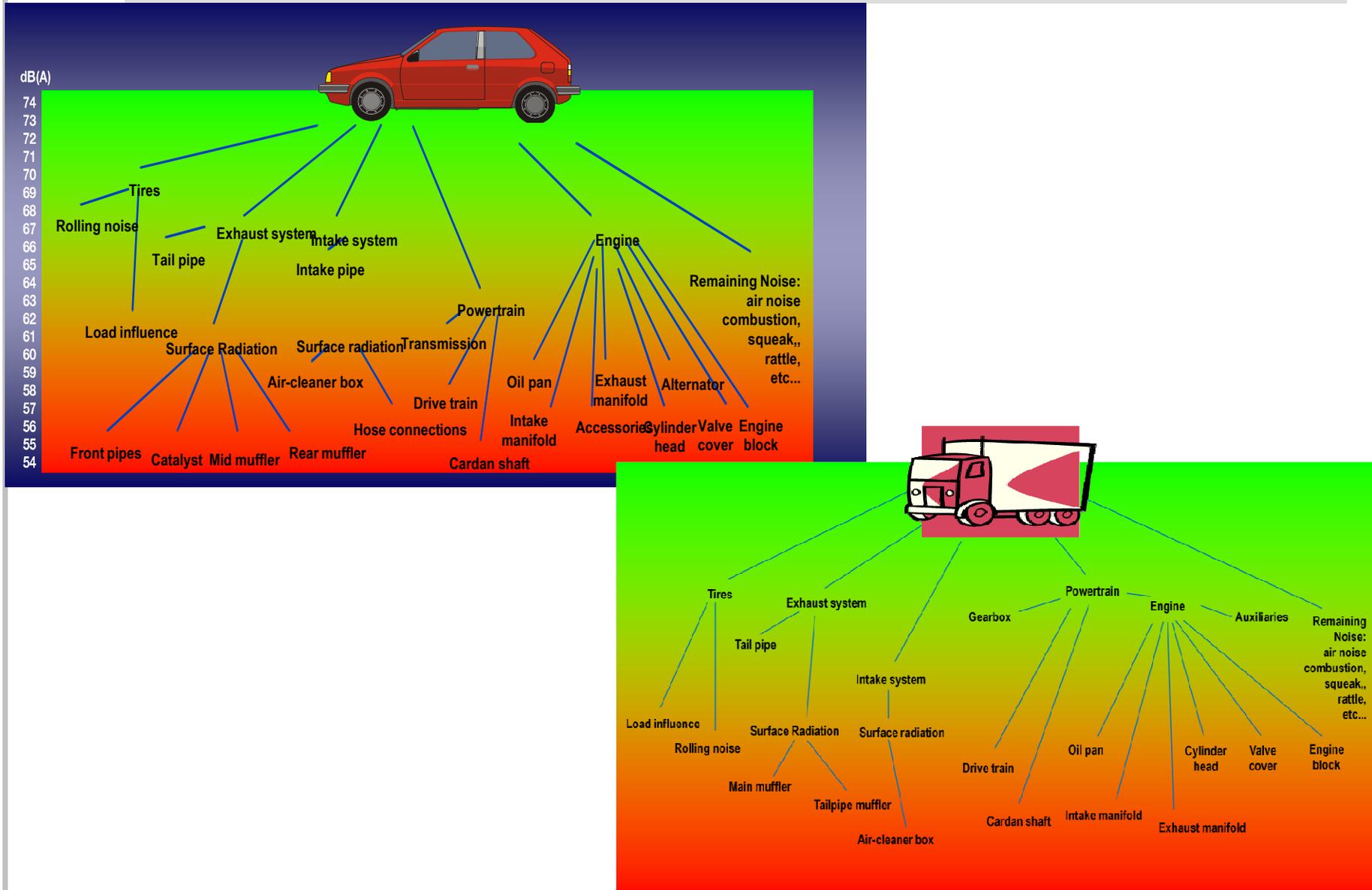


## Lead-time and Limits

- An engineer would probably tell you that any limit is reachable **BUT**
  - Substantial noise reduction requires a fundamental redesign of the vehicle
  - Other regulations (i.e. safety, emissions, fuel consumption) impact vehicle noise and must be compensated for in design
  - Lengthy research horizon needed for devising advanced acoustic solutions
- ⇒ **These constraints have an impact on the cost of reductions and lead-time necessary**



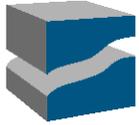
# Vehicle sources of noise





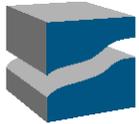
## First step

- **One year after publication: a first step with limits ranging from 72 db (A) for M1 to 82 db (A) for the heaviest N3 vehicles**
- **The limits are derived from the monitoring data bank and are set at such a level that about 10 % of the vehicles will be affected;**
- **The limits proposed by the Commission 2 years after publication would on the other hand affect 50 to 80% of the fleet of each OEM, generating engineering difficulties and too high a cost!**



## Second step

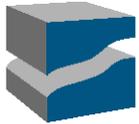
- **6 year after publication: a second step with limits ranging from 70 db (A) for M1 to 81 db (A) for the heaviest N3 vehicles**
- **This step will require fundamental redesign of the vehicle and for some vehicles possibly some advanced acoustic solutions**
- **Hence the 5 year lead-time required to remain cost-effective**



# Limits values

## Passenger Cars, Buses and Coaches

Vehicle Category	Description of vehicle category	Limit values expressed in dB(A) [decibels (A)]					
		Limit values for Type-approval of new vehicle types		Limit values for Type-approval of new vehicle types		Limit values for registration, sale and entry into service of new vehicles	
		Phase 1 valid from (1 year after publication)		Phase 2 valid from (6 years after publication)		Phase 3 valid from (8 years after publication)	
		General	Off-road	General	Off-road	General	Off-road
<b>M</b>	<b>Vehicles used for the carriage of passengers</b>						
M1	no of seats $\leq 9$ ; $\leq 125$ kW/ton	72	74***	70	73***	70	73***
M1	no of seats $\leq 9$ ; $125\text{kW/ton} <$ power to mass ratio $\leq 150\text{kW/ton}$	73	75***	71	74***	71	74***
M1	no of seats $\leq 9$ ; power to mass ratio $> 150\text{kW/ton}$	75		74		74	
M2	no of seats $> 9$ ; mass $\leq 2.5$ tons	72	72	70	70	70	70
M2	no of seats $> 9$ ; $2.5$ tons $<$ mass $\leq 3,5$ tons	74	75	72	73	72	73
M2	no of seats $> 9$ ; $3,5$ tons $<$ mass $\leq 5$ tons; rated engine power $< 150\text{kW}$	76	77	75	76	75	76
M2	no of seats $> 9$ ; $3,5$ tons $<$ mass $\leq 5$ tons; rated engine power $\geq 150\text{kW}$	77	78	76	77	76	77
M3	no of seats $> 9$ ; mass $> 5$ tons; rated engine power $\leq 180\text{kW}$	76	77	75	76	75	76
M3	no of seats $> 9$ ; mass $> 5$ tons; $180$ kW $<$ rated engine power $\leq 250\text{kW}$	79	80	78	79	78	79
M3	no of seats $> 9$ ; mass $> 5$ tons; rated engine power $> 250\text{kW}$	80	81	79	80	79	80



# Limits values

## Light and Heavy Commercial Vehicles

Vehicle Category	Description of vehicle category	Limit values expressed in dB(A) [decibels (A)]					
		Limit values for Type-approval of new vehicles types		Limit values for Type-approval of new vehicle types		Limit values for registration, sale and entry into service of new vehicles	
		Phase 1 valid from (1 year after publication)		Phase 2 valid from (6 years after publication)		Phase 3 valid from (8 years after publication)	
		General	Off-road	General	Off-road	General	Off-road
<b>N</b>	<b>Vehicles used for the carriage of goods</b>						
N1	mass ≤ 2.5 tons	72	74	70	72	70	72
N1	2.5 tons < mass ≤ 3,5 tons	74	75	72	73	72	73
N2	3,5 tons < mass ≤ 12 tons; rated engine power < 150kW	77	78	76	77	76	77
N2	3,5 tons < mass ≤ 12 tons; rated engine power ≥ 150kW	78	79	77	78	77	78
N3	mass > 12 tons; rated engine power ≤ 180kW	79	80	78	79	78	79
N3	mass > 12 tons; 180 < rated engine power ≤ 250kW	81	82	80	81	80	81
N3	mass > 12 tons; rated engine power > 250 kW	82	83	81	82	81	82