

# EU-Commission JRC Contribution to EVE IWG: *In-vehicle battery durability e-HDVs*

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Electric Vehicles and the Environment (EVE)

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# HDVs vehicle categories: what about the different regions?

GVW lbs	GVW kg	USA vehicle class	USA weight class	GVW tonnes	EU vehicle group	vehicle category	UN categories	EU euro7 MPR	vehicle category	UN categories	EU euro7 MPR		GVW tonnes	JPN Truck group	JPN Tractor group	JPN Route Bus group	JPN Bus group
6000	2,722	1				N1 < 3.5t	Category 2 not exceeding 3.855 tonnes	MPR UN GTR 22	M1 and M2 < 3.5t	Category 1-1 and Category 1-2 not exceeding 3.855 tonnes	MPR UN GTR 22 (M2 all covered by HDV GTR)	UN GTR 22					
				3.5													
8500	3,856	2		3.8					3.5t < M2 < 5t	Category 1-2 vehicle not exceeding 5 tonnes	MPR		3.5-7.5	T1/T2/T3/T4	TT1		B1
10000	4,536	3	Light HDV	5	0	3.5t < N2 < 12t	Category 2 vehicles not exceeding 16 tonnes	MPR1	5t < M3 < 7.5t	Category 1-2 vehicle exceeding 5 tonnes but not exceeding 7.5 tonnes	MPR3						
14000	6,350	4		7	0												
16000	7,257	5		7.4	1s							UN GTR HDV				BR1	B2
				7.5	1								8	T5			
19500	8,845	6	Medium HDV	10	2								10	T6		BR2	B3
26000	11,793	7		12	3	12t < N3 < 16t							12	T7		BR3	B4
33000	14,969	8											14	T8		BR4	B5
													16	T9			B6
60000	27,216	8	Heavy HDV	>16	4,5,9,10,11,12,16	N3 > 16t	Category 2 vehicles exceeding 16 tonnes	MPR2	M3 > 7.5t	Category 1-2 vehicle exceeding 7.5 tonnes	MPR4		20	T10		BR5	B7
													20 <	T11	TT2		

# MPR Metrics proposal: optional annex & different metrics (years, km, En-th in monitoring)

<b>MPRs Metrics</b> (Years, km whichever comes first)	
<b>Category 2</b> vehicles not exceeding 16 tonnes (GVW)	
6y, 150 000km	
8y, 300 000km	
8y, 400 000km	
10y, 300 000km	
10y, 375 000km	
15y, 250 000km	

<b>MPRs Metrics</b> (Years, km whichever comes first)	
<b>Category 2</b> vehicles exceeding 16 tonnes (GVW)	
6y, 150 000km	
8y, 600 000 km	
10y, 700 000 km	
12y, 700 000km	
15y, 875 000km	

# MPR Metrics proposal: optional annex & different metrics (years, km, En-th in monitoring)

MPRs Metrics	
Category 1-2 vehicle not exceeding 5 tonnes	
6y, 150 000km	
8y, 160 000km	
8y, 300 000km	
10y, 200 000km	

MPRs Metrics	
Category 1-2 vehicle exceeding 5 tonnes but not exceeding 7.5 tonnes	
6y, 150 000km	
8y, 300 000km	
8y, 500 000km	
10y, 375 000km	
15y, 240 000km	

MPRs Metrics	
Category 1-2 vehicle exceeding 7.5 tonnes	
6y, 150 000km	
8y, 600 000 km	
10y, 300 000km	
10y, 700 000km	
12y, 700 000km	
15y, 875 000km	

# Thank you

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# Euro 7 proposal

- Part B: Verification of Battery Durability

## ANNEX II EURO 7 MINIMUM PERFORMANCE REQUIREMENTS FOR BATTERY DURABILITY

Table 3: Euro 7 Minimum performance requirements (MPR) for battery durability for M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub>, N<sub>3</sub> vehicles

Battery Energy based MPR	Vehicles in main lifetime*	Vehicles in additional lifetime*
OVC-HEV		
PEV		

\*As specified in Annex IV

### ANNEX IV

#### LIFETIME REQUIREMENTS






Table 1: Lifetime of vehicles, engines and pollution control systems

Lifetime of vehicles, engines and replacement pollution control devices	M <sub>1</sub> , N <sub>1</sub> and M <sub>2</sub>	N <sub>2</sub> , N <sub>3</sub> <16t, M <sub>3</sub> <7.5t:	N <sub>3</sub> >16t, M <sub>3</sub> >7.5t
Main lifetime	Up to 160 000 km or 8 years, whichever comes first	300 000 km or 8 years, whichever comes first	700 000 km or <b>12</b> years, whichever comes first
Additional lifetime	After main lifetime and up to 200 000 km or 10 years, whichever comes first	After main lifetime and up to 375 000 km <b>or 10 years, whichever comes first</b>	After main lifetime and up to 875 000 km <b>or 15 years, whichever comes first</b>

# Category M, N

Category	Description	Subcategory	Number of Persons	Mass Limit	
M	Transportation of Passengers Min. 4 wheel	M1	Up to 9 Persons	GVW ≤ 3,500 kg <sup>1)</sup>	
		M2	Over 9 Persons	GVW ≤ 5,000 kg	
		M3		GVW > 5,000 kg	
N	Transportation of Goods Min. 4 wheel	N1 CI 1	N.A.	Max GVW ≤ 3,500 kg	RM ≤ 1,305 kg
		N1 CI 2			1,305 kg < RM ≤ 1,760 kg
		N1 CI 4			1,760 kg < RM ≤ 3,500 kg
		N2		3,500 kg < GVW ≤ 12,000 kg	
		N3		12,000 kg > GVW	

# HDVs group for vehicles: what about the other regions?

Weight Class	2b	3	4	5	6	7	8
Example Vehicles							
GVWR (lb)	8,500 to 10,000	10,001 to 14,000	14,001 to 16,000	16,001 to 19,500	19,501 to 26,000	26,001 to 33,000	>33,000
Engine Regulatory Category	Light Heavy-Duty				Medium Heavy-duty		Heavy Heavy-Duty
Vehicle Regulatory Category	Heavy Duty Pickup & van		Vocational Trucks				Combination Trucks

Source: U.S. Environmental Protection Agency

MARKET SEGMENT	Weight Class
Heavy Duty Pickup & Van	Class 2B Class 3
Regional Haul Tractor Long Haul Tractor	Class 7 - 8 Class 8
Transit Bus School Bus Shuttle Bus	Class 8 Class 7 Class 3-5
Delivery Van Delivery Truck Service Van Service Truck Refuse Hauler	Class 3-5 Class 6-7 Class 3-5 Class 6-7 Class 8
Box Truck (freight) Box Truck (freight) Box Truck (freight)	Class 3-5 Class 6-7 Class 8
Stake Truck (construction) Stake Truck (construction) Dump Truck	Class 3-5 Class 6-7 Class 8

Vehicle Weight Classes and EPA Regulatory Categories, Medium- & Heavy-Duty Vehicles, Market structure, Environmental Impact, and EV Readiness, July 2021, MJB&A

M/HD Market Segments, Medium- & Heavy-Duty Vehicles, Market structure, Environmental Impact, and EV Readiness, July 2021, MJB&A



# HDVs group for vehicles: what about the other regions?

EVE-43-07e.pdf

## EPA Vehicle Classification

40 CFR §86.1803-01

**Gross vehicle weight rating (GVWR)** means the value specified by the manufacturer as the maximum design loaded weight of a single vehicle, consistent with good engineering judgment.

**LDV/T** means light-duty vehicles and light-duty trucks collectively, without regard to category.

**Light-duty vehicle** means a passenger car or passenger car derivative capable of seating 12 passengers or less

**Light-duty truck** means any motor vehicle rated at 8,500 pounds GVWR or less which has a curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is:

- (1) Designed primarily for purposes of transportation of property or is a derivation of such a vehicle; or
- (2) Designed primarily for transportation of persons and has a capacity of more than 12 persons; or
- (3) Available with special features enabling off-street or off-highway operation and use.

**Medium-duty passenger vehicle (MDPV)** means any heavy-duty vehicle (as defined in this subpart) with a gross vehicle weight rating (GVWR) of less than 10,000 pounds that is designed primarily for the transportation of persons. The MDPV definition does not include any vehicle which:

- (1) Is an “incomplete truck” as defined in this subpart; or
- (2) Has a seating capacity of more than 12 persons; or
- (3) Is designed for more than 9 persons in seating rearward of the driver’s seat; or
- (4) Is equipped with an open cargo area (for example, a pick-up truck box or bed) of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area for purposes of this definition.

**Heavy-duty vehicle** means any motor vehicle rated at more than 8,500 pounds GVWR or that has a vehicle curb weight of more than 6,000 pounds or that has a basic vehicle frontal area in excess of 45 square feet. Note that MDPVs are heavy-duty vehicles that are in many cases subject to requirements that apply for light-duty trucks

# HDVs group for vehicles: what about the other regions?

EVE-43-07e.pdf

## 1998 Agreement Vehicle Classification

(1958 classifications not addressed in the draft GTR)

“This UN GTR applies to PEV and OVC-HEV vehicles of categories 1-2 and 2, both having a technically permissible maximum laden mass not exceeding 3,500 kg, and to all vehicles of category 1-1”

- "Category 1 vehicle" means a power driven vehicle with four or more wheels designed and constructed primarily for the carriage of (a) person(s).
- “Category 1-1 vehicle" means a category 1 vehicle comprising not more than eight seating positions in addition to the driver’s seating position. A category 1-1 vehicle cannot have standing passengers
- "Category 1-2 vehicle" means a category 1 vehicle designed for the carriage of more than eight passengers, whether seated or standing, in addition to the driver and having a maximum mass not exceeding 5 tonnes
- "Category 2 vehicle" means a power driven vehicle with four or more wheels designed and constructed primarily for the carriage of goods