



OICA WG HDBD

on 58th EVE IWG November 22nd 2022
Short update on MPR and Family Criteria



Scope and application: example for vehicle classes based on N and M

Draft

Vehicle category	Description
N1	Definition follows
M2	Vehicles used for the carriage of passengers , comprising more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding 5 tonnes . (e.g. Bus)
M3	Vehicles used for the carriage of passengers , comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 tonnes . (e.g. Bus)
N2	Vehicles used for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes . (e.g. Truck)
N3	Vehicles used for the carriage of goods and having a maximum mass exceeding 12 tonnes . (e.g. Truck)

UN-ECE: Vehicle categories
Consolidated Resolution on the Construction of Vehicles (R.E.3) Revision 6



Pros and Cons of different minimum performance requirements

Draft

Years	Equ. full cycles	Mileage	Operation hours	Energy throughput
<ul style="list-style-type: none">• Independent from battery energy• Established in pass car GTR• Related to calendric years• Natural end of life definition	<ul style="list-style-type: none">• Independent from installed battery energy• V2X considered• High energy consumption (per km and time) not considered• Amount of energy of cells limited	<ul style="list-style-type: none">• Independent from battery energy• Amount of energy of cells not limited• Established in pass car GTR• Range differs a lot within vehicle category• V2X not included, virtual mileage has to be implemented• Energy consumption neglected at all	<ul style="list-style-type: none">• Independent from battery energy• Amount of energy density of cells not limited• V2X considered• High energy consumption (per km and time) not considered	<ul style="list-style-type: none">• Amount of energy of cells not limited• V2X considered• High energy consumption (per km and time) not considered• Dependent on installed battery energy

@N2 - minimum performance requirements

Draft

Years	Equ. full cycles	Energy throughput	Operation hours	Range
<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Y years	<ul style="list-style-type: none">• \geq WW % of type approved at BoL UBE up to Z cycles			<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Y km

@N3 - minimum performance requirements

Draft

Years	Equ. full cycles	Energy throughput	Operation hours	Range
<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Y years	<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to W cycles			<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Z km

@M2, M3 - minimum performance requirements

Draft

Years	Equ. full cycles	Energy throughput	Operation hours	Range
<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Y years	<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Y cycles			<ul style="list-style-type: none">• \geq XX % of type approved at BoL UBE up to Y km



Example: Passenger car GTR batt. durability

- Warranty analysis US EPA & TEMA model → MPR values and test timing
- OEMs can declare DPR (declared performance requirement) instead of MPR
- Two part in-use verification process, with Part A verifying the accuracy of the monitors and Part B verifying the battery durability against MPR.
 - Part A:
 - Testing of min. 3 vehicles → evaluates the average of the ratios of measured/on-board-indicated SOCE/SOCR from a series of vehicles tested.
 - Pass or additional test → deviation of $A = 1 + \text{tolerance}$ (5% granted for single test)
 - Small number of vehicles → Avoid abnormal use by vehicle survey (Annex 1)
 - Part B:
 - remote collection of the on-board SOCE/SOCR values to verify battery durability
 - Abnormal use:
 - make the overall pass decision dependent on more than or equal to 90 per cent of monitor values read from the vehicle sample being above the MPR.
 - 5 per cent of the values taken from smaller durability families that consist of less than 500 vehicles may be excluded from the verification sample in Part B with appropriate reasoning.
 - Families: Monitor Family (Part A) – 1 test for similar monitors for different regions

Family definition: reference test, test A, test B

- Part A (verification of Monitors)
 - No need for changes for HDV

- Part B (Verification of Battery Durability)
 - Only vehicles that are substantially similar with respect to the following elements may be part of the same battery durability family;
 - Type of battery chemistry;
 - Battery Control Unit BCU (with relevant functions for battery monitoring, estimations, and controls)
 - Or BMS
 - Operational strategy influencing the battery durability
 - At the request of the OEM, additional family criteria may be aligned with type approval authority

What is key of Option B? delivery of a representative data sample to evaluating MPR against compliance