

**Request for Review and/or Approval**  
**on UNR154 (WLTP)**

**(1) new series of amendment**

**(2) single series structure**

prepared by

the European Commission, United Kingdom, Japan and  
the International Organization of Motor Vehicle Manufacturer

# 1. Informal Documents for 04(/05) series of amendment

to align the regional regulations (Euro7 in EU, Betten125 in Japan) and to promote better-effort harmonization,

## Request GRPE to review on new and/or updated requirements and to provide the guidance for the next actions

### Cover Page

### Summary Page

### Concrete text proposals per item

Submitted by the expert of European Commission, Japan, Korea, Sweden, Switzerland, United Kingdom and the International Organization of Motor Vehicle Manufacturer<sup>e1</sup>

Informal document GRPE-92-XXe<sup>e2</sup>  
92nd GRPE, 26-28 March 2025<sup>e3</sup>

#### I. Proposal Summary<sup>e4</sup>

	Main	Proposed amendments	Applicable to Level	Text
Anti-tampering <sup>e5</sup>		Please take a look at GRPR-92-ZZe <sup>e6</sup>	✓ <sup>e7</sup>	See a look at <sup>e8</sup>
Manipulations <sup>e5</sup>			✓ <sup>e7</sup>	
EVP <sup>e5</sup>			✓ <sup>e7</sup>	
Gear Shift <sup>e5</sup>			✓ <sup>e7</sup>	
EV range at low temperature <sup>e5</sup>			✓ <sup>e7</sup>	
OBFCM <sup>e5</sup>	6.3.9 <sup>e9</sup> Appendix 5 <sup>e10</sup>	update Level 1A and <sup>e11</sup> apply Level 1B including all powertrains <sup>e12</sup>	✓ <sup>e7</sup>	3 ~ 15 <sup>e13</sup>
OVC-FCHV <sup>e5</sup>	Annex B8 <sup>e14</sup> Table A6.1, A8.9a, A8.9b <sup>e15</sup>	apply also Level 1B <sup>e16</sup>	✓ <sup>e7</sup>	16 ~ 27 <sup>e17</sup>
(NOVC-FCHV) range test <sup>e5</sup>	Annex B8 and Appendix 1 <sup>e18</sup> Table A6.1, A8.12 <sup>e19</sup>	newly developed the range test for OVC and NOVC-FCHV <sup>e20</sup>	tbc <sup>e21</sup>	28 ~ 37 <sup>e22</sup>
OVC-HEV family definition <sup>e5</sup>	6.3.2.2 <sup>e23</sup> Annex B8 <sup>e24</sup>	Level 1B parameter has no impact of # of CD cycle <sup>e25</sup>	✓ <sup>e7</sup>	38 ~ 43 <sup>e26</sup>
Indulgent system <sup>e5</sup>	Appendix 6 <sup>e27</sup>	avoid mis-interpretation <sup>e28</sup>	tbc <sup>e21</sup>	44 ~ 49 <sup>e29</sup>
HEVs test cycle classification <sup>e5</sup>	3.7.1 / 6.3.3.2 <sup>e30</sup> Annex B1 2.3.2 <sup>e31</sup> Annex B4 Table A4.3 A4.7 <sup>e32</sup> Annex B8 1.4 / 3.4 <sup>e33</sup>	apply cycle classification for also PEV based on system power defined by newly developed UNR177 <sup>e34</sup>	tbc <sup>e21</sup>	50 ~ 54 <sup>e35</sup>
Trace tolerance <sup>e5</sup>	2.6.8.3.1.2 <sup>e36</sup>	avoid mis-interpretation <sup>e28</sup>	✓ <sup>e7</sup>	55 <sup>e37</sup>
Mechanical robot driving <sup>e5</sup>	Annex B8 3.4.1 <sup>e38</sup>	allow usage of robot drive to reduce test driver physical load as an option <sup>e39</sup>	✓ <sup>e7</sup>	56 ~ 57 <sup>e40</sup>
Run-in procedure <sup>e5</sup>	Annex B4 4.2.1.8.1 <sup>e41</sup>	allow less distance run-in for EVs to reduce the testing burden as an option (already incorporated into GRPE 2025/4 and 5) <sup>e42</sup>	✓ <sup>e7</sup>	38 ~ 43 <sup>e43</sup>
OVC-HEV FC formula <sup>e5</sup>				
Interpolation for (NOVC-FCHV) <sup>e5</sup>				38 ~ 43 <sup>e44</sup>
Interpolation for PER <sup>e5</sup>				
DF determination <sup>e5</sup>	Annex C4 7 <sup>e45</sup>	add unit for FN <sup>e46</sup>	✓ <sup>e7</sup>	58 <sup>e47</sup>
Interpolation family definition <sup>e5</sup>	6.3.2.4 <sup>e48</sup>	Consistent terminology between Level 1 and 2 <sup>e49</sup>	✓ <sup>e7</sup>	59 <sup>e50</sup>
OBD text <sup>e5</sup>	6.8.2 <sup>e51</sup> Table 4A_4B <sup>e52</sup>	correct wrong requirement and make clear description	✓ <sup>e7</sup>	60 ~ 61 <sup>e53</sup>

for more detail, please take a look at the GRPE-92-08 and 09

- 3.2. For OVC-HEVs<sup>e54</sup>
  - (a) Total fuel consumed (lifetime) (litres)<sup>e55</sup>
  - (b) Total fuel consumed in charge-depleting operation (lifetime) (litres)<sup>e56</sup>
  - (c) Total fuel consumed in driver-selectable charge-increase<sup>e57</sup> operation (lifetime) (litres)<sup>e58</sup>

#### 3.3. Calculation of the Usable amount of hydrogen (UAH)<sup>e59</sup>

The usable amount of hydrogen is calculated by using the following equation:<sup>e60</sup>  

$$UAH = V \times (\rho[P_{SWP}, T15] - \rho[P_{LL}, T15]) / 1000<sup>e61</sup>$$
 where:<sup>e62</sup>  
 UAH is the temperature of the hydrogen tank(s) at the end of the test procedure shall be employed for calculation of the  
 V is the volume of hydrogen tank(s)  
 ρ[P<sub>SWP</sub>, T15] is the density of hydrogen at the test pressure and temperature  
 ρ[P<sub>LL</sub>, T15] is the density of hydrogen at the ambient pressure and temperature  
 Nominal gas density of hydrogen is determined by the following equation.<sup>e63</sup>  

$$\rho(p, T) = \frac{p}{RT} \cdot Z(p, T)<sup>e64</sup>$$
 where:<sup>e65</sup>  
 ρ[p, T] is the gas density at the given pressure and temperature, g/m<sup>3</sup>  
 p is the pressure of the hydrogen tank at the end of the constant speed segment, MPa<sup>e66</sup>  
 T is the hydrogen gas temperature of the hydrogen tank, 283,15 K at the end of the constant speed segment.<sup>e67</sup>  
 R is the gas constant, 8,314472x 10<sup>-4</sup>in m<sup>3</sup> MPa K<sup>-1</sup> mol<sup>-1</sup><sup>e68</sup>  
 M is the molar mass of hydrogen, 2,01588, g/mol;<sup>e69</sup>  
 Z(p, T) is the compressibility factor.<sup>e70</sup>

since the series structure is under the discussion, provide the modified texts per item, not the whole text (some of items are not ready for the concrete text yet)

- (d) Total distance travelled in driver-selectable charge-increase operation (lifetime) (kilometres)<sup>e71</sup>
- (e) Engine fuel rate (grams/second)<sup>e72</sup>
- (f) Engine fuel rate (litres/hour)<sup>e73</sup>
- (g) Vehicle fuel rate (grams/second)<sup>e74</sup>
- (h) Vehicle speed (kilometres/hour)<sup>e75</sup>
- (i) Total grid energy into the battery (lifetime) (kWh)<sup>e76</sup>
- (j) Energy consumption rate per second (Wh/s)<sup>e77</sup>
- (k) Battery SOCE (%)<sup>e78</sup>
- (l) Battery SOCR (%)<sup>e79</sup>
- 3.3. For PEVs, applicable Level 1B only<sup>e80</sup>
  - (a) Total distance travelled (lifetime) (kilometres)<sup>e81</sup>
  - (b) Vehicle speed (kilometres/hour)<sup>e82</sup>
  - (c) Total grid energy into the battery (lifetime) (kWh)<sup>e83</sup>
  - (d) Energy consumption rate per second (Wh/s)<sup>e84</sup>
  - (e) Battery SOCE (%)<sup>e85</sup>
  - (f) Battery SOCR (%)<sup>e86</sup>
- 3.5. For OVC-FCHVs, applicable Level 1B only<sup>e87</sup>
  - (a) Total fuel consumed (lifetime) (kg)<sup>e88</sup>
  - (b) Total distance travelled (lifetime) (km)<sup>e89</sup>
  - (c) Vehicle fuel consumption rate per second (g/s)<sup>e90</sup>
  - (d) Vehicle speed (km/h)<sup>e91</sup>

### Proposal for new series of amendment to Regulation No. 154 (Worldwide harmonized Light vehicles Test Procedures (WLTP))<sup>e4</sup>

Submitted by the European Commission, Japan, Korea, Sweden, Switzerland, United Kingdom and the International Organization of Motor Vehicle Manufacturers<sup>e4</sup>

This document provides proposals for new series of UN Regulation No. 154 on uniform provisions concerning the approval of light duty passenger and commercial vehicles with regards to criteria emissions, emissions of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range (WLTP). The new series of amendments is required in order to align the Regulation with the latest regional requirements. The proposal also clarifies the provisions which may lead to multiple interpretations and corrects errors.<sup>e4</sup>

Separate Informal Document which focuses on new EU requirement is prepared by European Commission.<sup>e4</sup>

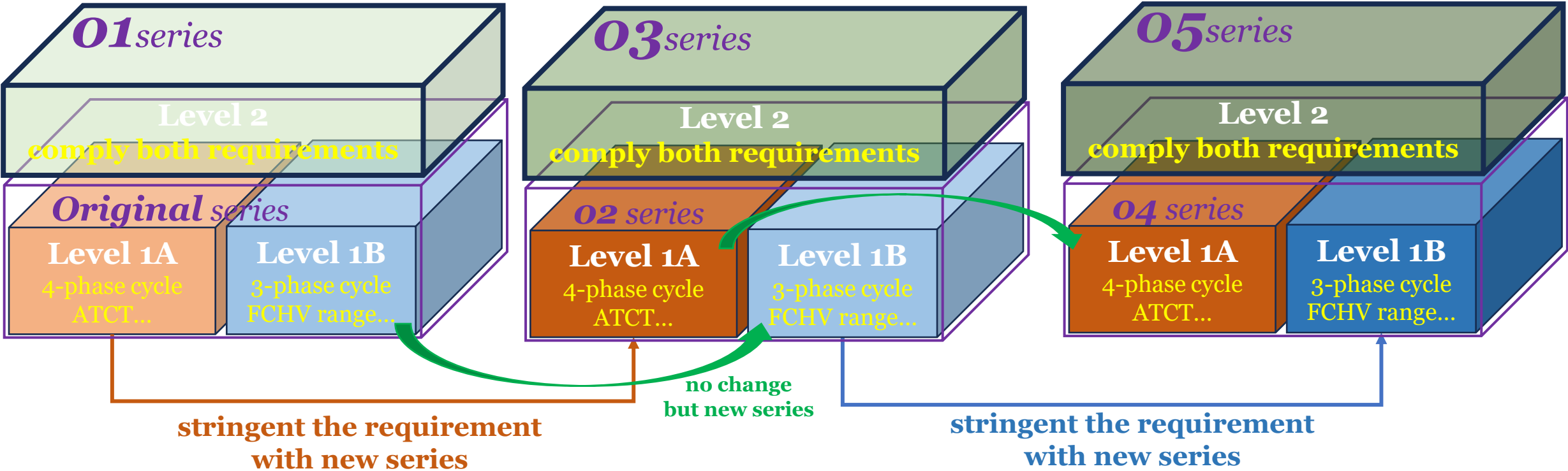
In addition, the structure change of this Regulation is under the discussion. Therefore, the consolidated version will be prepared after the decision during 92nd GRPE.<sup>e4</sup>

I. Proposal<sup>e4</sup>  
 Add new paragraph to the end of Section 3.4.1 in Annex B8<sup>e4</sup>  
 On request by the manufacturer and approved by the type approval authority the test can be operated by a virtual-on-mechanical robot. The robot shall be an external device that replicates a human driver. Using the same actuators as the human driver would use, that is the accelerator pedal and the brake pedal (and any other controls needed to operate the vehicle). The type approval authority shall request the manufacturer to demonstrate correlation that the robot acts as a human driver.<sup>e4</sup>

II. Justification<sup>e4</sup>  
 The procedure to determine the pure electric range and the electric energy consumption is presented in table A8.3 of Annex B8. The procedure is either to perform consecutive Type 1 test procedures, or a shortened Type 1 test procedure where two dynamic segments are combined with two constant speed segments.<sup>e4</sup>  
 The complete pure electric range demonstration is very time consuming (usually more, or lot more, than 6 hours), and one driver will not be able to run the complete procedure without taking one or more breaks. The test procedure as defined in section 3.4.4 of Annex B8 allows one or more shorter breaks during the test procedure. However, a mistake by the driver, does not manage to follow the vehicle speed trace or exceeding the maximum driver break time will

# 2. Single Series Structure (1)

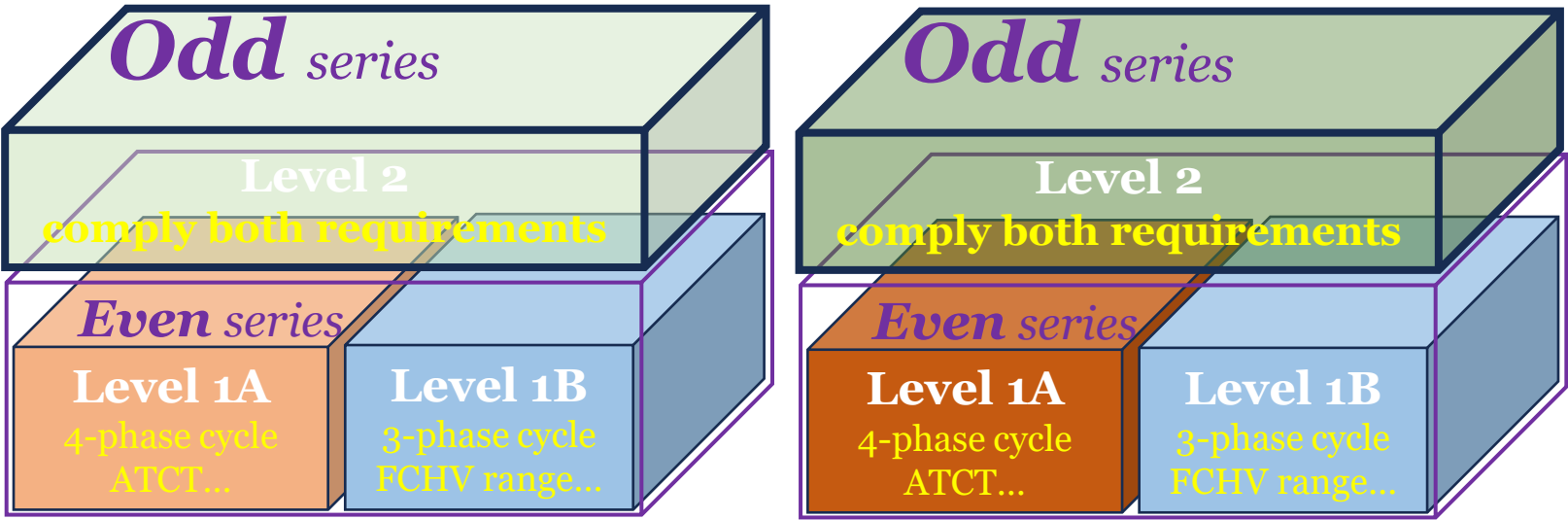
## Current structure (since 2020)



Original and even series have two(2) different requirements (Level 1A/1B) and Odd series (the latest one) requires to comply with both requirements (Level 2), means the highest level of stringency in the context paragraph 2. of Article 1 of the 1958 Agreement

# 2. Single Series Structure (2)

## What's happened since 2020 ?



(1) have experienced one “series of amendment” and several “new supplement”  
→ whenever the text needs to be modified, both “Even” and “Odd” series need to be done simultaneously (non-relevant level may remain unchanged)

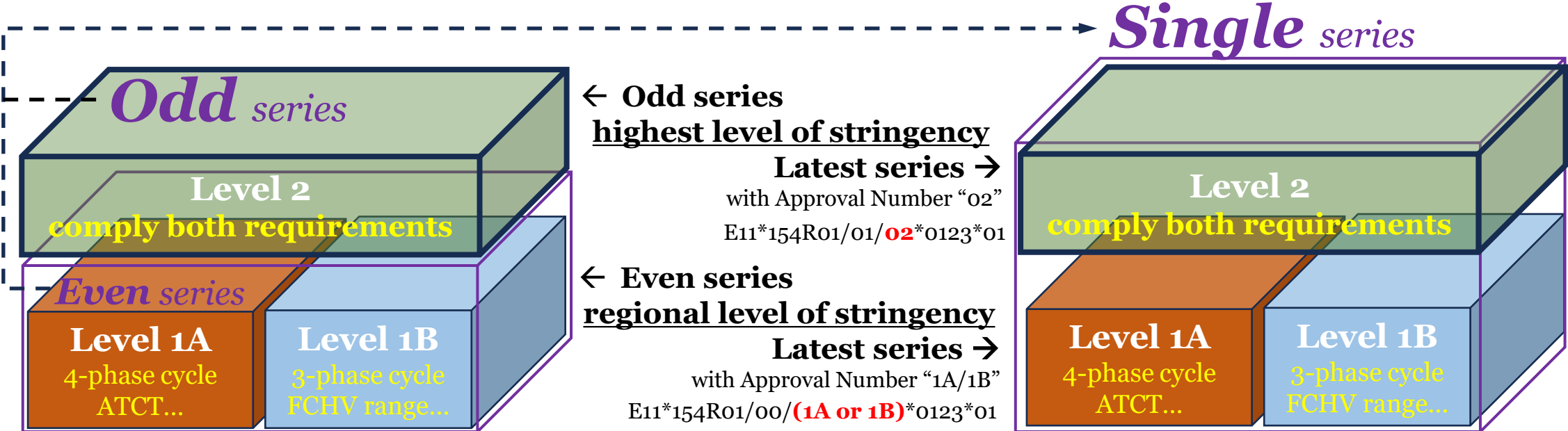
(2) IWVTA provision takes in place  
→ further study on IWVTA text and have learned that OK to have different levels of stringency with clear indication which level is the highest in UNR154

Article 1  
2. .... This UN Regulation shall set the scope, administrative procedures, and technical requirements that can include different levels of stringency in one version of the said UN Regulation.

# 2. Single Series Structure (3)

## What can we do for next ?

merge Even/Odd series into **SINGLE** series keeping the spirit of 1958 agreement



Add the following paragraph under new special provisions  
 "Level 2 of this Series of amendments shall be considered to be the "highest level of stringency" in the context paragraph 2. of Article 1 of the 1958 Agreement.  
 Contracting Parties may issue approvals to either Level 1A, Level 1B or Level 2 of this Series of Amendments or to those levels in any earlier version of this Regulation in which they are described in the context of paragraph 4 of Article 12 of the 1958 Agreement."

# 2. Single Series Structure (4)

## What does “single series” look like ?

→ So far, no critical concern is observed  
(all member are keen to be involved in the text development)

	Current Structure	
<p><b>1. Scope</b> ← <b>EVEN series</b></p> <p>This Regulation provides requirements for two levels of approval. One level requires testing using a 4-phase WLTC (low, medium, high and extra-high as defined in Annex B1) – this is called Level 1A. The second level requires testing using a 3-phase WLTC cycle (low, medium and high as defined in Annex B1) – this is called Level 1B.</p> <p>Where the requirements in this Regulation apply to either Level 1A or Level 1B only the Regulatory text uses "Level 1A only" or "Level 1B only" to denote the start of the level specific requirements.</p> <p>1.1. Scope for Level 1A;</p> <p>This Regulation applies to the type approval of vehicles of categories M<sub>1</sub>, M<sub>2</sub>, N<sub>1</sub> and N<sub>2</sub> with a reference mass not exceeding 2,610 kg with regard to the WLTP Type 1 test for emissions of gaseous compounds, particulate matter, particle number and to emissions of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range and to the Type 4 test on evaporative emissions.</p> <p>In addition, this Regulation lays down rules for verifying the durability of pollution control devices and On-Board Diagnostic (OBD) systems.</p> <p>At the manufacturer's request, type approval granted under this Regulation may be extended from vehicles mentioned above to M<sub>1</sub>, M<sub>2</sub>, N<sub>1</sub> and N<sub>2</sub> vehicles with a reference mass not exceeding 2,840 kg and which meet the conditions laid down in this Regulation.</p> <p>1.2. Scope for Level 1B;</p> <p>This Regulation applies to the type approval of vehicles of categories M<sub>2</sub> and N<sub>1</sub> with a technical permissible maximum laden mass not exceeding 3,500 kg and to all vehicles of category M<sub>1</sub> with regard to the WLTP Type 1 test for emissions of gaseous compounds, particulate matter, particle number and to emissions of carbon dioxide and fuel efficiency and/or the measurement of electric energy consumption and electric range and to the Type 4 test on evaporative emissions.</p> <p>In addition, this Regulation lays down rules for verifying the durability of pollution control devices and On-Board Diagnostic (OBD) systems.</p> <p>OVC-FCHVs are out of the scope of Level 1B of this Regulation.</p>	<p><b>1. Scope</b> ← <b>ODD series</b></p> <p>This Regulation applies to the type approval of vehicles of categories M<sub>1</sub> with a reference mass not exceeding 2,610 kg and vehicles of categories M<sub>2</sub> and N<sub>1</sub> with a reference mass not exceeding 2,610 kg and a technical permissible maximum laden mass not exceeding 3,500 kg with regard to the WLTP Type 1 test for emissions of gaseous compounds, particulate matter, particle number and to emissions of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range and to the Type 4 test on evaporative emissions.</p> <p>In addition, this Regulation lays down rules for verifying the durability of pollution control devices and On-Board Diagnostic (OBD) systems.</p> <p>At the manufacturer's request, type approval granted under this Regulation may be extended from vehicles mentioned above to vehicles of categories M<sub>1</sub> with a reference mass not exceeding 2,840 kg and vehicles of categories M<sub>2</sub> and N<sub>1</sub> with a reference mass not exceeding 2,840 kg and a technical permissible maximum laden mass not exceeding 3,500 kg and which meet the conditions laid down in this Regulation.</p> <p>OVC-FCHVs are out of the scope of this Regulation.</p>	

### SINGLE series

1. **Scope**

This Regulation provides requirements for two-three levels of approval. One level requires testing using a 4-phase WLTC (low, medium, high and extra-high as defined in Annex B1) – this is called Level 1A. The A second level requires testing using a 3-phase WLTC cycle (low, medium and high as defined in Annex B1) – this is called Level 1B. The third level is a harmonised set of requirements and is called Level 2.

Where the requirements in this Regulation apply to either Level 1A, ~~or~~ Level 1B or Level 2 only the Regulatory text uses "Level 1A only", ~~or~~ "Level 1B only" or "Level 2 only" to denote the start of the level specific requirements.

  - 1.1. Scope for Level 1A;
 

This Regulation applies to the type approval of vehicles of categories M<sub>1</sub>, ~~M<sub>2</sub>~~, and N<sub>1</sub> ~~and N<sub>2</sub>~~ with a reference mass not exceeding 2,610 kg with regard to the WLTP Type 1 test for emissions of gaseous compounds, particulate matter, particle number and to emissions of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range and to the Type 4 test on evaporative emissions.

In addition, this Regulation lays down rules for verifying the durability of pollution control devices and On-Board Diagnostic (OBD) systems.

At the manufacturer's request, type approval granted under this Regulation may be extended granted to from vehicles mentioned above to M<sub>1</sub>, ~~M<sub>2</sub>~~, N<sub>1</sub> and N<sub>2</sub> vehicles between 3.5 and 5 tonnes maximum mass originating from a type of vehicle of category N<sub>1</sub> with a reference mass not exceeding 2,840 kg and which meet the conditions laid down in this Regulation.
  - 1.2. Scope for Level 1B;
 

This Regulation applies to the type approval of vehicles of categories M<sub>2</sub> and N<sub>1</sub> with a technical permissible maximum laden mass not exceeding 3,500 kg and to all vehicles of category M<sub>1</sub> with regard to the WLTP Type 1 test for emissions of gaseous compounds, particulate matter, particle number and to emissions of carbon dioxide and fuel efficiency and/or the measurement of electric energy consumption and electric range and to the Type 4 test on evaporative emissions.

In addition, this Regulation lays down rules for verifying the durability of pollution control devices and On-Board Diagnostic (OBD) systems.

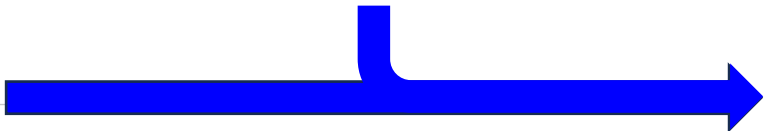
OVC-FCHVs are out of the scope of Level 1B of this Regulation.
  - 1.3. Scope for Level 2;

This Regulation applies to the type approval of vehicles of categories M<sub>1</sub> and N<sub>1</sub> with regard to the WLTP Type 1 test for emissions of gaseous compounds, particulate matter, particle number and to emissions of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range and to the Type 4 test on evaporative emissions.

In addition, this Regulation lays down rules for verifying the durability of pollution control devices and On-Board Diagnostic (OBD) systems.

At the manufacturer's request, type approval may be extended granted to N<sub>2</sub> vehicles between 3.5 and 5 tonnes maximum mass originating from a type of vehicle of category N<sub>1</sub> which meet the conditions laid down in this Regulation.

OVC-FCHVs are out of the scope of Level 2 of this Regulation.



*the content of the scopes is open and shown only as an example.*

# 2. Single Series Structure (5)

## How does it work under the IWVTA provision ?

Choose the Regulation:

154 - Worldwide harmonized Light vehicles Test Procedure (WLTP Regulation) ▾

ECE Symb.	Country	Date of application	Type Approval Authority	Technical Services	IWVTA Status
E 1	Germany	22/01/2021	1/A	1/AB, 1/BM, 1/BQ, 1/BR, 1/CF, 1/CV, 1	IWVTA
E 2	France	22/01/2021	2/A	2/E, 2/M	IWVTA
E 3	Italy	22/01/2021	3/A	3/B(a), 3/B(b), 3/B(c), 3/B(d), 3/B(e), 3/	IWVTA
E 4	Netherlands	22/01/2021	4/A	4/A, 4/AB, 4/BM	IWVTA
E 5	Sweden	22/01/2021	5/A	5/E, 5/F, 5/L, 5/M, 5/N, 5/P, 5/T, 5/U, 5/	IWVTA
E 6	Belgium	22/01/2021	6/A(a), 6/A(c)	6/D	IWVTA
E 7	Hungary	22/01/2021	7/A	-	IWVTA
E 8	Czech Republic	22/01/2021	8/A	8/C	IWVTA
E 9	Spain	22/01/2021	9/A	9/E, 9/F	IWVTA
E 10	Serbia	22/01/2021	10/A	-	IWVTA
E 11	United Kingdom	22/01/2021	11/A	11/A, 11/AC	IWVTA
E 12	Austria	22/01/2021	12/A	-	IWVTA
E XY	abcdef	22222222	....	.....	L-IWVTA 02 series of amendments

### Both structures works well

	Current structure	Proposed structure
Odd series	Only one (1) stringency in single series.	One single series covers three (3) different stringencies with clear description. <i>“Level 2 shall be considered to be the highest level of stringency in the context paragraph 2. of Article 1 of the 1958 Agreement.”</i>
Earlier series	Two (2) different stringencies in single series.  Level 1A/1B can be distinguished in “Notes” (example) E43 : apply Level 1B	<i>Levels 1A and 1B shall be considered to be earlier versions of this Regulation in the context of paragraph 4 of Article 12 of the 1958 Agreement.”</i>  Level 1A/1B/2 can be distinguished in “Notes” (example) E43 : apply Level 1B



# 2. Single Series Structure (6)

## What is a profits/concerns for “single series” ?

	Current structure	Proposed structure
Profits	<ul style="list-style-type: none"> <li>➤ the latest series contains only highest level of stringency</li> </ul>	<ul style="list-style-type: none"> <li>➤ less administrative burden,</li> <li>➤ increased clarity of requirements,</li> <li>➤ reduced risk of inconsistencies or errors,</li> <li>➤ slim document (approx. half pages compared with current combined one)</li> </ul>
Concerns	<ul style="list-style-type: none"> <li>• administrative burden,</li> <li>• lack of clarity of requirements,</li> <li>• risk of inconsistencies or errors,</li> <li>• huge document (approx. 1,200 pages) combined even/odd series</li> </ul> <p><b>&lt;solution&gt;</b> just do it with time-consuming efforts by a bunch of colleagues</p>	<ul style="list-style-type: none"> <li>• the latest series contains three (3) different level of stringencies</li> </ul> <p><b>&lt;solution&gt;</b> clear description (<i>Level 2 shall be considered to be the highest level of stringency</i>) is added in the Regulation</p>



# 2. Single Series Structure (7)

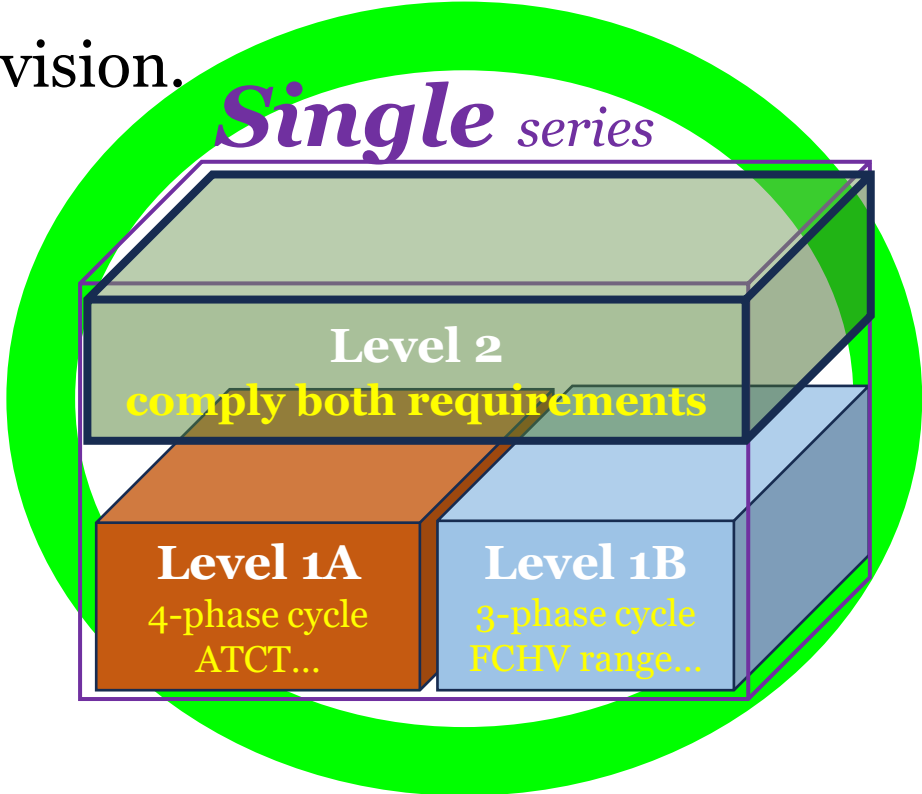
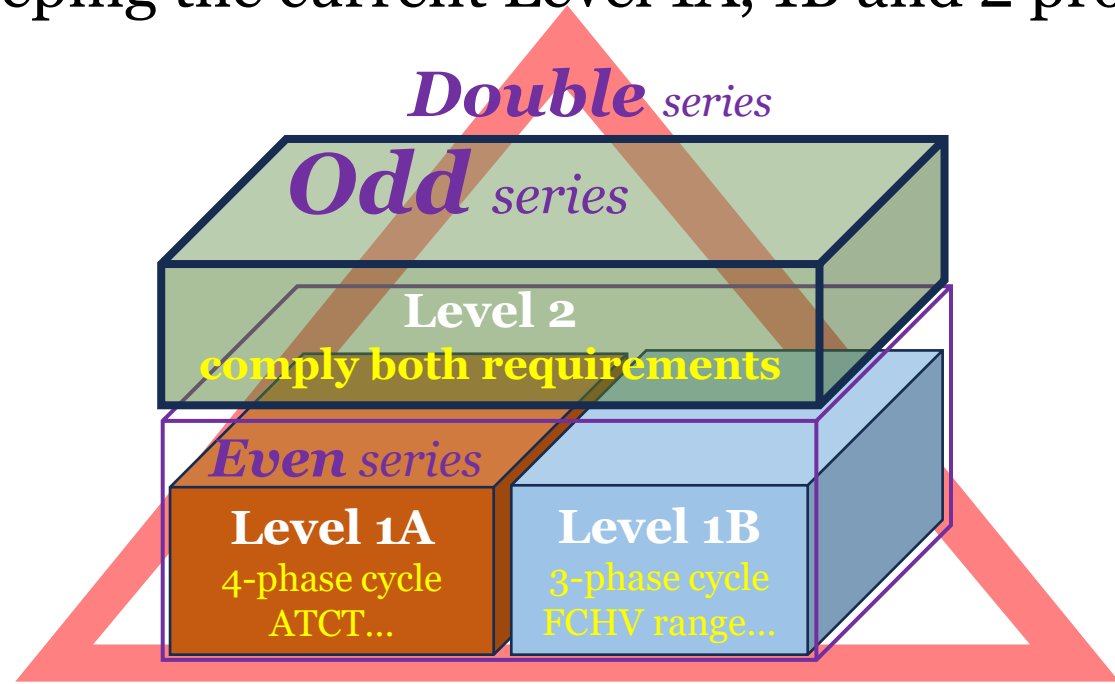
**Our\* recommendation**

\* : temporary set the Ad-hoc WLTP group for intensive discussion since last October

Considering the profits and concerns,

**we recommend to change the structure from “double” to “single”**

keeping the current Level 1A, 1B and 2 provision.



# 3. Next Actions

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## (1) New Series of Amendment

- ✓ Submit the Working Document by due date reflecting the comments and/or feedbacks from GRPE

## (2) Single Series Structure

- ✓ Upon the decision made by GRPE,

develop the baseline document (① or ②) for new series of amendment

① merge GRPE/2025/4, GRPE/2025/5 and GRPE/2025/11, if accepted

② GRPE/2025/4 (&11) for Level 1A/1B and GRPE/2025/5 (&11) for Level 2 respectively, if rejected