

Second RDE LDV “Package” – Skeleton for the text
Informal EC working document

Introduction

This document is a skeleton of the intended “second RDE package”. The document identifies which sections-appendices of the RDE regulation have to be ammended to introduce the following elements:

Item 1: Conformity factors for the various pollutants have to be indroduced in section 2.1. The factor “ext” to divide the emissions measured under extended ambient conditions shall be specified in section 9.5

Item 2: Additional boundary conditions for the absence/excess of driving dynamics have to be introduced in section 5.3 (for the application, ex-post, before the application of the data evaluation methods?) and Appendix 9 (Methodological aspects, e.g definition of indicators, limit curves).

Item 3: Additional boundary conditions for the urban trip requirements have to be introduced in Section 6.8 (the average urban speed range and the stop percentages).

Item 4: Additional boundary conditions for the road profile requirements have to be introduced in Section 6.11 (this shall be checked ex-ante [before the test] and the methodology to check this may be specified or not).

Item 5: Factor for the extended conditions in section 9.5

Color codes

Current text to be ammended

Comments

Proposals for the ammendements

ANNEX

“ANNEX IIIA

VERIFYING REAL DRIVING EMISSIONS

1. INTRODUCTION, DEFINITIONS AND ABBREVIATIONS

Corrections or missing definitions, abbreviations shall be added here

2. GENERAL REQUIREMENTS

[Current Section 2.1] Throughout its normal life, the emissions of a vehicle type approved according to Regulation (EC) No 715/2007 as determined according to the requirements of this Annex and emitted at a RDE test performed in accordance to the requirements of this Annex, shall not be higher than the following not-to-exceed (NTE) values:

$$NTE_{pollutant} = CF_{pollutant} \times \text{EURO-6},$$

where EURO-6 is the applicable Euro 6 emission limit in Table 2 of Annex I to Regulation (EC) No 715/2007 and $CF_{pollutant}$ the conformity factor for the respective pollutant specified as follows:

Pollutant	Mass of oxides of nitrogen (NO _x)	Number of particles (PN)	Mass of carbon monoxide (CO) ⁽¹⁾	Mass of total hydrocarbons (THC)	Combined mass of total hydrocarbons and oxides of nitrogen (THC + NO _x)
$CF_{pollutant}$	tbd	tbd	!	!	!

CO emissions shall be measured and recorded at RDE tests..

Section 2.1 is ammended as follows:....

3. RDE TEST TO BE PERFORMED

Unchanged, a new text shall be developed for In-Service Conformity.

4. GENERAL REQUIRMENTS

Unchanged.

5. BOUNDARY CONDITIONS

[Current Section 5.3/5.4] The dynamic conditions encompass the effect of road grade, head wind and driving dynamics (accelerations, decelerations) and auxiliary systems upon energy consumption and emissions of the test vehicle. The verification of the normality of dynamic conditions shall be done after the test is completed, using the recorded PEMS data. The methods for verifying the normality of the dynamic conditions, are laid down in Appendices 5 and 6 of this Annex. Each method includes a reference for dynamic conditions, ranges around the reference and the minimum coverage requirements to achieve a valid test.

Adding additional trip dynamic verifications to section 5.x, referring to Appendix 9 for the methodology and boundaries.

Section 5.3 (or 5.4) is amended as follows:

The dynamic conditions encompass the effect of road grade, head wind and driving dynamics (accelerations, decelerations) and auxiliary systems upon energy consumption and emissions of the test vehicle. The verification of the normality of dynamic conditions shall be done after the test is completed, using the recorded PEMS data. This verification shall be conducted in 2 steps:

5.3.1 The overall excess or insufficiency of driving dynamics during the trip shall be checked using the methods described in Appendix 9 of this Annex.

5.3.2 If the trip results as valid following the verifications according to paragraph 5.3.1, the methods for verifying the normality of the dynamic conditions and laid down in Appendices 5 and 6 of this Annex must be applied. Each method includes a reference for dynamic conditions, ranges around the reference and the minimum coverage requirements to achieve a valid test.

6. TRIP REQUIREMENTS

[Current Section 6.8] The average speed (including stops) of the urban driving part of the trip should be between 15 and 30 km/h. Stop periods, defined as vehicle speed of less than 1 km/h, shall account for at least 10% of the time duration of urban operation. Urban operation shall contain several stop periods of 10s or longer. The inclusion of one excessively long stop period that individually comprises >80% of the total stop time of urban operation shall be avoided.

Contents of the amended section 6.8 shall be discussed. The following points must be agreed upon:

- Average urban speed range
- Maximum stop duration and/or stop percentage over the entire test

Section 6.8 is amended as follows...

[Current Section 6.11] The start and the end point shall not differ in their elevation above sea level by more than 100 m.

For the new road profile requirements: should we like to specify the methods and the tools (partial or complete map based approach, algorithm), we will need a new Appendix as well (Number 10).

Section 6.11 is amended as follows:

The start and the end point shall not differ in their elevation above sea level by more than 100 m. In addition, the proportional cumulative positive altitude gain shall be less than 1000m(/100km).

7. OPERATIONAL REQUIREMENTS

Do we want to add here additional vehicle operational requirements. For instance: gearshifting, rules for vehicle mode selection shall be added here. The rules for verifying the correct usage of the gearshift shall be described in detail in a separate (new) appendix.

8. LUBRICATING OIL, FUEL AND REAGENT

Unchanged.

9. EMISSIONS AND TRIP EVALUATION

[Current Section 9.5] If during a particular time interval the ambient conditions are extended according to point 5.2, the emissions during this particular time interval calculated according to Appendix 4 of this Annex shall be divided by a value ext before being evaluated for compliance with the requirements of this Annex.

Section 9.5 is ammended as follows:

If during a particular time interval the ambient conditions are extended according to point 5.2, the emissions during this particular time interval calculated according to Appendix 4 of this Annex shall be divided by a value [TO BE DECIDED] before being evaluated for compliance with the requirements of this Annex.

Appendix 9

Verification of overall trip dynamics

1. INTRODUCTION

This Appendix describes the calculation procedures to verify the overall trip dynamics, to determine the overall excess or absence of dynamics during urban, rural and motorway driving.

2. SYMBOLS

RPA Relative Positive Acceleration

PSPA 95th Percentile of the Speed per Acceleration Product

3. TRIP INDICATORS

3.1. Definitions

Relative Positive Acceleration

95th Percentile of the Speed per Acceleration Product

3.2. Calculation

Calculation procedures indicating how to calculate separately the urban, rural and motorway values of the indicators + the corresponding average speeds.

4. VERIFICATION OF TRIP VALIDITY

Definition of limit curves (top, bottom) = Minimum RPA and and Maximum PSPA versus average speed

5. NUMERICAL EXAMPLES