



WLTP Phase 2

Durability Task Force **Update**

Ispra, 17-20 April 2018
22nd WLTP IWG meeting

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- Next steps (revision of the Durability procedure)
- Discussion (including the Transposition project)

Summary of DTF activities since January 2018

Action 1

- Completion of JRC test campaign (4 vehicles)
 - ✓ Analysis of test results completed
- Completion of LAT test campaign (vehicle vs ETB)
 - ✓ Analysis of test results ongoing

Actions 2 & 3

- All available literature data has been analysed

Revision of Durability procedure ongoing

Summary of DTF activities since January 2018

The tests carried out by JRC have highlighted that the Standard Road Cycle is still valid and should be confirmed both for the whole vehicles ATS aging and for the accelerated ATS bench aging.

The analysis of the test results carried out by LAT will be used (if necessary) to better define the procedure for using the SRC for the accelerated bench aging.

Next steps (revision of the Durability procedure)

As reported at the 21st WLTP IWG meeting, the DTF has agreed that, on the basis of all available elements, information and constraints it is now only feasible to propose a light revision of the current Durability procedure (UNR 83).

The technical details will be presented before the next telco of the DTF (mid- May), in order to be discussed and agree in view of the GRPE session of June 2018.

Next steps (revision of the Durability procedure)

There are two main points to be covered:

1. Revision of the current procedures for gasoline vehicles (TWC, Standard Bench Cycle with BAT approach) and for diesel vehicles (DPF, Standard Diesel Bench Cycle with BAD approach);
2. Design of an accelerated bench aging plan to cover combinations of non-regenerative systems and regenerative systems.

Next steps (revision of the Durability procedure) (example of approach proposed for point 1)

- 2.3.1. Vehicles with positive ignition engines
- 2.3.1.1. The following bench ageing procedure shall be applicable for positive ignition vehicles including hybrid vehicles which use a catalyst as the principle after-treatment emission control device.
- The bench ageing procedure requires the installation of the catalyst-plus-oxygen sensor system on a catalyst ageing bench.
- Ageing on the bench shall be conducted by following the SBC for the period of time calculated from the Bench Ageing Time (BAT) equation. The BAT equation requires, as input, catalyst time-at-temperature data measured on the SRC, described in Appendix 3 of this annex.
- 2.3.1.2. SBC. Standard catalyst bench ageing shall be conducted following the SBC. The SBC shall be run for the period of time calculated from the BAT equation. The SBC is described in Appendix 1 to this annex.
- 2.3.1.3. Catalyst time-at-temperature data. Catalyst temperature shall be measured during at least two full cycles of the SRC cycle as described in Appendix 3 to this annex.

Next steps (revision of the Durability procedure) (example of approach proposed for point 1)

2.3.1.4. The Bench Ageing Time (BAT) shall be calculated using the BAT equation as follows:

t_e for a temperature bin = $t_h e^{((R/T_r)-(R/T_v))}$

Total t_e = Sum of t_e over all the temperature groups

Bench Ageing Time = A (Total t_e)

Where:

A = 1.1 This value adjusts the catalyst ageing time to account for deterioration from sources other than thermal ageing of the catalyst.

R = Catalyst thermal reactivity = 17,500

(current procedure)

Next steps (revision of the Durability procedure) (example of approach proposed for point 1)

2.3.1.4. The Bench Ageing Time (BAT) shall be calculated using the BAT equation as follows:

t_e for a temperature bin = $t_h e^{((R/T_r)-(R/T_v))}$

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R = Catalyst thermal reactivity = 17,500

(proposed procedure)

The revision might involve the parameter "A" and/or "R" and/or the test fuel (ex. additivated with lube oil)

Next steps (revision of the Durability procedure)

- Concerning point 2 the initial idea is to follow the scheme proposed for the accelerated aging procedure for replacement of pollution control devices on heavy duty vehicles
- Technical feasibility and time required have to be assessed in the light of the planned inclusion of the new durability procedure in the Transposition project.

Discussion (including the Transposition project)

- The current plan of the DTF is to agree on the possible modifications to the procedure before the June session of the GRPE.
- On this basis an informal document (in the form of a new Annex to GTR 15) could be prepared before the end of 2018, for submission at GRPE in January 2019.
- This should be compatible with the development of the Transposition project.



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QUESTIONS?