

Authorization to develop Phase 2 of UN GTR No. 15 (Worldwide harmonized Light vehicle Test Procedures (WLTP))

I. Background

1. The Informal Working Group (IWG) on Worldwide harmonized Light vehicles Test Procedures (WLTP) was set up in 2009. The original schedule and scope were described in ECE/TRANS/WP.29/AC.3/26 and Add.1. These documents outline WLTP activities and timeframe of each activity is divided into three phases (Phase 1 to Phase 3). The IWG submitted the global technical regulation (gtr) on WLTP and it was adopted by the Working Party on Pollution and Energy (GRPE) as well as established by the World Forum for Harmonization of Vehicle Regulations (WP.29) and the Executive Committee of the 1998 Agreement (AC.3) in March 2014.
2. After the establishment in the Global Registry as gtr No. 15 in March 2014, ECE/TRANS/WP.29/AC.3/39 on the authorization to further develop the work on Phase 1b was adopted to solve the remaining issues of WLTP Phase 1a.
3. WLTP Phase 1b activities were completed and amendments to gtr No. 15 were submitted in October 2015 to be considered at the GRPE January 2016 session.
4. At the same time there is a need to transpose gtr No. 15 on WLTP into new Regulations annexed to the 1958 Agreement. The intended way forward for this task has been discussed several times at GRPE and it is described e.g. in informal document GRPE-72-18.

II. Proposal

5. An extension of the mandate for the WLTP IWG, sponsored by the European Union and Japan, shall tackle the development of the remaining issues. Phase 2 activities should be started immediately after the endorsement of this authorization by WP.29 and AC.3 at their November 2015 sessions.
6. Scope of work in Phase 2 should cover:
 - (a) Original items described in ECE/TRANS/WP.29/AC.3/26 and Add. 1 shall be kept;
 - (b) The remaining issues from WLTP Phase 1b;
 - (c) Durability for internal combustion engine vehicles and electric vehicles;
 - (d) Evaporative emissions;
 - (e) Low ambient temperature emissions;
 - (f) Test procedure for the determination of additional CO₂ emissions and fuel consumption from mobile air conditioning systems;
 - (g) On-board diagnostics requirements;
 - (h) Development of criteria for ex-post assessing of road load parameters (see WLTP-12-29-rev1e);
 - (i) Other items.

7. In addition, the IWG on WLTP shall work for the transposition of gtr No. 15 on WLTP into new Regulations annexed to the 1958 Agreement.

III. Timeline

8. The work of the IWG on WLTP Phase 2 should be completed by 2019. Phase 2 will be divided into Phases 2a (until June 2017) and 2b (until the end of 2019). The transposition of gtr No. 15 on WLTP into new Regulations annexed to the 1958 Agreement should ideally be finalized by the end of 2017 but the work may continue until the end of 2019 without a formal modification of this mandate, if needed due to circumstances.

9. A prolongation and extension of the mandate of the IWG on WLTP should be considered by GRPE in due time.

Final report on the development of Amendment 3 to UN GTR No. 19 on the Evaporative emission test procedure for the Worldwide harmonized Light vehicles Test Procedure (WLTP EVAP)

I. Introduction

1. During the seventy-fourth session of the Working Party on Pollution and Energy (GRPE) in January 2017, the Evaporative emission test procedure for the Worldwide harmonized Light vehicles Test Procedures (WLTP EVAP) Task Force (TF) submitted a working document and an informal document for the consideration of GRPE.

2. The working document ECE/TRANS/WP.29/GRPE/2017/3 (Proposal for a new UN Global Technical Regulation on Evaporative emission test procedure for the Worldwide harmonized Light vehicles Test Procedures), UN GTR No. 19, contained the new proposed test procedure to measure evaporative emission from non-sealed fuel tank systems.

3. Non-sealed fuel tank systems are mostly used in conventional vehicles with an internal combustion engine. Since these vehicles have a high chance of purging the fuel vapours inside the fuel tank systems and the canister(s) into the internal combustion engines, the pressure inside the fuel tank generated by fuel vapours is well maintained at low level.

4. From late 2016 to September 2017, thirteen meetings (including three face-to-face meetings and two drafting meetings) were held and the WLTP EVAP task force worked to include a test procedure covering the sealed fuel tank systems in UN GTR No. 19. These systems are expected to be used in the hybrid electric vehicles driven mainly by electric engines and in the future conventional vehicles.

5. Amendment 1 to UN GTR No. 19 complements the text of the UN GTR not only by adding descriptions of the test procedure for sealed fuel tank systems but also by adding other provisions related to non-sealed fuel tank systems which were raised along the discussions on sealed fuel tank systems.

6. From April to September 2018, four meetings (including one drafting meeting) were held and the WLTP EVAP Task Force worked to include the calibration requirements and intervals for test equipment, and the equation for the variable-volume enclosures in UN GTR No. 19. Also, improvements to clarify the requirements were made.

7. Amendment 2 to UN GTR No. 19 complements the calibration requirements and intervals for test equipment, and the equation for the variable-volume enclosures in UN GTR No. 19. Also, improvements to clarify the requirements were made.

8. In October 2019 further work has been undertaken to amend the scope to include all vehicles fuelled with petrol and to add a new Optional Annex for the CoP method. At this same timing, the previous cross-references to technical requirements in UN Regulation No.83 07 series have been replaced with the full text of those requirements.

9. The discussions of Amendment 3 were led by experts from Japan (Ms. Mayumi "Sophie" Morimoto) and the European Commission (Mr. Bart Thedinga and Mr. Iddo Riemersma). The drafting of the text was led by the expert from the European Commission (Rob Gardner).

Commented [MM1]: 7 to 9 were added from Amend2 Technical Report

II. Text improvements

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A. Objectives

10. After the adoption of the original UN GTR No. 19 and Amendments 1 and 2 to it, WLTP IWG started the transposition of UN GTR No. 15 and UN GTR No. 19 into UN regulation. During the discussion of transposition, there was need to modify the scope and to add procedures and requirements on Conformity of Production (CoP) as an Optional Annex. Also, the previous cross-references to technical requirements in UN Regulation No.83 07 series have been replaced with the full text of those requirements to align with UN regulation on WLTP.

11. Therefore, WLTP IWG decided to re-open EVAP task force once to discuss the procedure on Conformity of Production.

B. Topics discussed

12. The following points were discussed in the WLTP EVAP task force meeting. Some topics are also discussed in WLTP Transposition task force and WLTP CoP task force and agreed by WLTP EVAP task force members:

- (a) Modification of Scope
- (b) Modification of depressurisation puff loss overflow SHED measurement
- (c) CoP test procedure and requirements as Optional Annex
- (d) Replace cross-references to UN Regulation No.83 07 series with the full text of those requirements

C. Amendments introduced in UN GTR No. 19

1. Modification of Scope

1.1. *Modification from "positive ignition engines" to "engines fueled with petrol"*

13. GTR 19 Amendment 2 scope included only the positive ignition engines. Therefore even if the compression ignition engines which uses gasoline (petrol) are introduced, those are out of scope of GTR 19.

14. This was pointed out by Japan during WLTP Transposition task force. Considering the meaning of the evaporative emission test, both Japan and European Commission agreed to change the scope to apply GTR 19 test to include compression ignition engines using gasoline.

15. To clarify the meaning of "petrol", JRC (European Commission's Joint Research Centre) proposed to add footnote for clarification. No objections were raised by EVAP task force members.

1.2. *Addition of Contracting Party option for "mono-fuel gas vehicles"*

16. GTR 19 Amendment 2 scope excluded the mono-fuel gas vehicles, which is a mono-fuel vehicle that is designed primarily for permanent running on LPG or NG/biomethane or hydrogen, but may also have a petrol system for emergency purposes or starting only, where the nominal capacity of the petrol tank does not exceed 15 litres.

17. Japan had concern that no evaporative emission test will be done for those vehicles that they requested to include them into the scope. However, some gas vehicle manufacturers were against the proposal by Japan. This is because the small petrol tank is only intended for starting or for emergency purposes when gas fuels are emptied. They said that gasoline (petrol) is rarely replenished with fresh petrol. However, Japan requested to comply with GTR 19 even the vehicle only have small emergency tank, as long as it is fuelled with gasoline (petrol).

18. Therefore, Contracting Party option was added to keep exclusion of mono-fuel gas vehicles from the scope as an option for some Contracting Parties.

2. Modification of depressurisation puff loss overflow SHED measurement

19. After the Working Document for GTR 19 Amendment 3 was submitted, WLTP EVAP task force received contact from Austria.

20. GTR 19 Amendment 2 requires the vehicles with sealed fuel tank systems to measure depuressurisation puff loss overflow, which are the hydrocarbons escaping from canister when the tank is depressurised. It allows to measure them with 2 different methods. One is to use an additional carbon canister and weight with scale. Another is to use SHED (Sealed Housing Evaporative Determination).

21. If the SHED is used for the measurement, it shall be done one minute after the depressurisation of the sealed fuel tank system. Austria raised concern that one minute is not enough time for mixing the air inside the SHED for a vehicle which has the canister far inside the vehicle. The one minute was originally taken from ORVR method in US EPA regulation, however, it is the test method for puff loss from fuel cap.

22. Austria proposed to use five minutes as an alternative although they had no data that waiting five minutes was sufficient.

23. As inside the SHED will be kept 35°C until the measurement is finished, the longer the mixing take the greater the risk of measuring the hydrocarbons other than depressurisation puff loss overflow.

24. Following e-mail exchange within EVAP task force members, it was confirmed and decided to change one minute to five minutes for now, since it is identified that one minute is not enough for mixing. If there will be a data in the future to show five minutes is not sufficient for finish mixing, another discussion will be undertaken to change the length of mixing.

3. CoP test procedure and requirements as Optional Annex

25. While UN regulation on WLTP was in development, a CoP test procedure became required. Since CoP method will be included in UN regulation on WLTP (with evaporative emission test written in GTR19), it was decided to include them also in GTR 19.

26. The CoP tests are not done by the manufacturer in some countries and therefore the CoP test procedure and requirements are included as an Optional Annex.

3.1. Frequency of test

27. European Commission requested to test one vehicle in EVAP CoP family per a year. Japan supported the proposal. No objection were raised by WLTP EVAP task force members.

3.2. *Test method*

28. Not like the certification test, the conformity of production tests are done using the vehicles to be sold after the test. Since GTR 19 test need canister ageing and vehicle baking, it will make the vehicle after the test most likely not suitable to be sold as "a new vehicle".

29. At first, Japan proposed to use quality check during the production as same as most safety UN regulations. However, European Commission was against the proposals and requested test.

30. Since UN Regulation No.83 07 series had simplified test methods (leak test, vent test, and purge test) to confirm evaporative emission test, European Commission proposed to use these methods as first conformity check.

31. The use of simplified test methods as first conformity check was supported by Japan and auto industries with slight updates for new technology like the sealed fuel tank systems.

32. The option to use the vehicle which have completed a minimum mileage of 20,000 km up to maximum of 30,000 km were added. The minimum mileage of 20,000 km was decided because it is almost equal to aged canister to BWC 300. The maximum mileage of 30,000 km was decided because over this mileage shall be deemed as In Service Conformity vehicles in European regions.

3.3. *Period until pass/fail decision*

33. The technical service proposed to add the period to decide pass/fail of CoP test. The proposal was to 24 months after the initial failed test has been detected. During those 24 months, the manufacture need to finish maximum 5 vehicle test from same CoP family with GTR 19 method. Therefore, WLTP EVAP task force members confirmed and supported 24 months are needed to reach to the decision.

4. **Replace cross-references to UN Regulation No.83 07 series with the full text of those requirements**

34. While UN regulation on WLTP was developed, the cross-references to UN Regulation No.83 07 series were replaced with the full text of those requirements. To align texts of GTR 19 and UN regulations on WLTP, TF leader decided to replace them also in GTR 19.
