Worldwide Harmonised Test Procedure for Light Duty Vehicles

WLTP

EVE 2nd Session
13 of September
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Co-chair Subgroup EV
Objective WLTP

• Development of a worldwide harmonised test procedure for light duty vehicles
  – Pollutant emissions
  – CO₂ emissions
• Global Technical Regulation, GTR
• Three phases
  – Test procedure and driving cycle
  – Test procedures for low ambient temperature, high altitude and conformity
  – Reference fuel, emission limit and correlation with existing cycles
Road map WLTP

- Phase 1 ongoing
- DHC validation 1 discussion about cycle dynamics ongoing
- DTP validation phase 2 ongoing
- Confirmation test until May 2013
- Round Robin test until October 2013
- GTR adoption 162nd WP29 March 2014
- Phase 2 start January 2014
Organisation WLTP

- **DHC**
  - Data collection
  - Development of driving cycle
  - Validation phase 1
    - Low-power vehicle validation phase 1b
- **DTP**
  - Development of test procedures
  - Validation phase 2
- **Drafting coordinator**
  - Structure of GTR
  - Consolidating of GTR text
- **Validation task force**
  - Coordination of testing for validation phase 2
Organisation DTP

• Subgroups
  – Test procedures conventional vehicles
  – Test procedures electrified vehicles
  – PM/PN test procedures
  – Additional pollutants
  – Reference fuels
Subgroup EV

- Test procedures for EV in addition to test procedures for conventional vehicles
- Pollutant emissions for HEV
- $\text{CO}_2$ emissions and fuel consumption
- Electric range
- Energy consumption
Subgroup EV

• Evaluation of current regulations worldwide
  – US
  – Japan
  – EU/ECE

• Development of test procedures for EV
  – EV
  – OVC HEV
  – NOVC HEV
Subgroup EV

• Electrical vehicles operate in two modes
  – Charge depleting
  – Charge sustaining

• Testing of a EV takes several days
Sub group EV open issues

• A number of open issues will be solved by Sub group test procedures for conventional vehicles

• Utility factor

• Depending on results from validation phase 2
  – Criteria for test termination
  – End of charge criteria
  – Charging time
  – Detection of CS condition
  – Accuracy of measurement equipment
  – Calculations
Sub group EV open issues

- **Test flow (independent test for L/M/H/ExH)**
  - **Battery condition [Ah]**
  - **Test flow**
  - **Day 1**
    - **Confirm tire pressure**
    - **Prepare RCB measurement**
  - **Day 2 (EV: Day 1)**
    - **Confirm tire pressure**
    - **Prepare RCB measurement**
  - **Day 3 (EV: Day 2)**
    - **Confirm tire pressure**
    - **Prepare RCB measurement**

- **CO2/FC calculation (PL8/10)**
- **Performance of Watt-hour meter, Am-meter (PL3)**
- **Multi mode gear box (PL11)**
- **Termination condition for EV range (PL6/7)**
- **Charging voltage 100 / 200V (PL12)**
- **End of charge criteria (PL1)**
- **Order of CD/CS (PL4)**
- **Interruption condition (PL5)**
- **RCB break off criteria (PL2/9)**

- **◆ Test flow (independent test for L/M/H/ExH)**
  - **Discharge**
  - **Drain & Fill**
  - **Soak 6hr**
  - **Pre-con cycle**
  - **WLTC × 1**
  - **Full charge max. 12 hr**
  - **Prepare RCB measurement**
  - **Plug OFF**
  - **within 1hr**
  - **WLTC × n**
  - **Full charge**

- **Order of CD/CS (PL5)**
- **Interruption condition (PL5)**
- **RCB break off criteria (PL2/9)**

- **Termination condition for EV range (PL6/7)**
- **Performance of Watt-hour meter, Am-meter (PL3)**
- **Multi mode gear box (PL11)**
- **Termination condition for EV range (PL6/7)**

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Next meeting

• DTP/DHC in Ispra 24 – 26 of September
• Subgroup EV 13 – 14 of November?