Progress Report

DTP Subgroup

Lab Process Internal Combustion Engines

(LabProcICE)

Bern, 13.09.2011

Overview

1) State of the working progress
2) LabProcICE issues on DTP level
3) Work in progress items / proposals / open issues
4) Parameter setting LabProcICE for validation 2
5) Next steps

1.1) Meetings since June DTP 6

- several dates — Draft working team meetings
- 30. – 31.8.2011 — Brussels workshop

1.2) OIL, gtr draft, definitions

Open issues list

has been updated (LabProcICE-090)

GTR draft

has been updated, incl. Subgroup AP (LabProcICE-089)

Definitions

- overview definition term list (LabProcICE-049)
- detailed definition list (LabProcICE-050)

→ Review postponed

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Inertia classes

Objectives:

- grouping of vehicles with similar behavior but certain differences in weight to a class for testing.

- the class extension should be small enough for sufficient distinction of different characteristics (e. g. CO_2 emissions), but large enough for an effective type approval process.

(1) LabProcICE proposal: discrete inertia steps of 60 kg

Impact of 60 kg inertia steps on CO_2 : 1,3 to 2,7 g/km CO_2
(dependent of vehicle efficiency & test cycle, but independent of vehicle weight). This assessment was supported by ICCT at DTP6 meeting

(2) Updated **ICCT proposal** (LabProcICE-091):

step-less approach or **reduced inertia steps of 28.35 kg**

Open issues connected to inertia classes:

Vehicle weight (definition vehicle test mass)

- NL proposal (DTP-06-12, updated proposal)
- JAP proposal (LabProcICE-084)

LabProcICE supports that reference weight should not be related to maximum laden mass

family concepts (gtr and/or regional)

Test room and soak area temperature

LabProcICE: **setpoint of target value 298 K, tolerance of actual value ± 5K**

→ harmonisation with gtr 2 & 4, improved reproducibility

Concern by EU: not representative, tolerance too high

Impact on CO_2 results shown at DTP6:

- UBA / TUEV study (LabProcICE-038)
  → significant influence of soak temperature (22 / 28 °C) on emission results (Ø 3 - 5%)
- UTAC study (LabProcICE-070)
  → CO_2 impact is cycle dependent (FTP < NEDC)
  → no significant CO_2 impact of lower lab temperature (25 -> 22°C)
  → significant impact of 15 °C, but cost-effectiveness questionable
- studies of JRC (DTP-06-13) supported UTAC results, but different interpretation

Decision of DTP is pending → setpoint decision for validation 2 necessary!

Method for subtraction of pollutant mass in intake air

(LabProcICE-020)

Aim:

measure low pollutant mass with higher accuracy by considering the pollutant level that is contained in the combustion and intake air of the vehicle

Concerns by US EPA / Japan:

- increased complexity, without clear benefit
- impact on emission result → in conflict to current stringency of limit values
- conflict with US definition of exhaust emissions

Proposal for further steps:

This issue is put on hold until results of validation and correlation shows the clear need and effect of the proposed method. Then the subgroup will revise the proposal and prepare for decision of the contracting parties.

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RLD - Tyre Selection Criteria

Based on UK proposal (LabProcICE-064):

- selection based on 6 **rolling resistances classes** the tyres offered by the manufacturer on the production vehicle are belonging to.
- RR measured acc. to ECE-R117.
- Tyres in the worst rolling resistance classes shall be chosen for road load determination. If tyres from more than three rolling resistance classes are specified for the vehicle, tyres from the second worst rolling resistance class shall be chosen.

CO_2 impact? Re-definition of classes necessary?

→ ACEA input/proposal expected

RLD - vehicle selection criteria

General approach for WLTP:

→ Measure representative vehicle in a representative test

→ Precondition: proper definition & verification of representativity

Aim for vehicle selection:

→ Test a vehicle **representative** for future market

→ LabProcICE (T&E-) proposal:

Vehicle selection based on **expected sales volume**

draft proposal:

The exterior of the coast down test vehicle shall be representative for the average vehicle expected to be sold to the market. This is assured as follows:

- For vehicles sold with optional body parts which influence the aerodynamics (e.g. roof railings, spoilers etc.), every option shall be installed unless it can be made plausible that less than 50% of the customers will choose this option.
- For vehicles sold in different design trims upon selection of the customer (e.g. standard, luxury or sport trim), the trim that is expected to obtain the highest market share shall be installed.
- For the selected tyre the wheel rims with the highest estimated market share shall be used.

The manufacturer's selection of trim and options should be substantiated by marketing figures and -if applicable- sales numbers of the predecessor vehicle model.

(a) Sales volume based approach

→ Aerodynamic options and trim are fitted if they exceed 50% of the sales volume

→ Representativity should be ensured by expected sales numbers

Disadvantages:

- Different interpretation by manufacturers
- Different interpretation by Type Approval Authority
- No means of verification before or after

(b) Worst case criteria - proposal by Japan, LabProcICE-082

Japanese concern:

change in sales fraction may lead to specification change without vehicle design change, e. g. in conflict with tax incentive systems?

→ Without sufficient definition/verification worst case is the only alternative

→ For vehicle family with large variations in aerodynamic options/trims manufacturer may decide to split to be more representative

Disadvantages:

Not representative / increased type approval burden to ensure representativity

(c) certification issue?

RLD – vehicle coast down mode

Definition (adopted):

Vehicle coast down mode means a special mode of operation for which **drivetrain components are mechanically and/or electrically decoupled from the wheels** for the purpose of an accurate road load determination.

Requirement is still to be reviewed – Questions:

The vehicle coast down mode is **mandatory or not and in which cases? What are the criteria?**

Further Steps:

Evaluate technical needs and effects together with subgroup EV considering new techniques

Revise criteria for application of coast down mode

LabProc - Monitoring of Battery SoC

The energy content of all batteries has to be considered for determination of CO_2 and energy consumption in the test cycle.

Agreed by DTP6:

conditioning test cycle before emission testing with fully charged battery

+ battery shall not be charged again before the official testing.

Proposals (based on LabProcICE-056rev2 /-081):

- approach based on method in R101 for not external chargeable hybrid-electric vehicles
- Monitoring of energy difference during test
- Comparison with energy of consumed fuel during test
- Correction of CO_2 value if energy difference exceeds certain threshold

Open issues:

Threshold criteria: 1% (TUEV Nord) or 2% (ACEA)?

→ What is feasible? Cost/benefit ratio? Tolerances of Ammeter?

→ Further data to be provided e.g. by validation phase 2 measurements

LabProc - Multimode gear boxes / GSI

Definition: Mode means a distinct way to operate a vehicle which can be chosen by the driver (e.g. automatic mode, manual mode)

GSI → not considered as a mode of a multimode gearbox (latest EU regulation)
→ certification issue

Emissions testing proposal: Compliance with emissions standards in all modes
→ Test agreed worst case (reservation by NL : **test all modes)**

CO_2 / FE testing proposal:

Single default mode → **test default mode**

No default mode or multi default modes
→ test agreed best and worst case modes, average results of both modes (reservations by NL & Japan: **test & average all modes**)

Japanese proposal incl. special provisions for semi-AT see LabProcICE-083

DTP decision needed until start of correlation!

LabProc - preconditioning cycle

Basic policy with precon design objectives for lab procedure and measurement equipment was established

→ a proposal will be develop based on these objectives and DHC outcome

LabProc - definition of modes

DHC proposal needs to be coordinated with DTP to ensure compliance with lab procedures

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3) LabProcICE parameter setting for validation 2

List of required setpoints and relevant tolerances

→ WLTP-DTP-07-03

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- Small teams (LabProc, ME, RLD) will continue work on draft gtr / OIL / definitions
- Next face-to-face workshop:
  planned in November 2011
- Additional Tel/web conferences
- Evaluation of new test procedure during Validation Phase 2

Thanks for your attention.

LabProcICE contact:

Béatrice Lopez de Rodas - beatrice.lopez(at)utac.com

Konrad Kolesa - konrad.kolesa(at)audi.de

Stephan Redmann – stephan.redmann(at)bmvbs.bund.de