



Progress Report

DTP Subgroup

Lab Process Internal Combustion Engines

(LabProcICE)

Geneva, 08.06.2011



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 January GRPE 2011

- 21. – 22.02.2011: Brussels workshop
- 25.03.2011: Tel/Web conference
- 14. – 15.4.2011 DTP5 in Zuerich
- several dates Draft working team meetings
- 18. – 19.5.2011 Brussels workshop



1.2) OIL, gtr draft, definitions

Open issues list

has been updated ([LabProclCE-074](#))

GTR draft

has been updated and consolidated with Subgroup AP ([LabProclCE-073](#))

Definitions

- overview definition term list

([LabProclCE-049](#)) → clarification of responsibilities

- detailed definition list

([LabProclCE-050](#)) → comparison of regional definitions



Overview

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



Inertia classes

Objectives:

- grouping of vehicles with similar behaviour 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. CO₂ emissions), but large enough for an effective type approval process.

LabProclCE proposal:

discrete inertia steps of 60 kg

Open question:

Impact of inertia steps on CO₂ results?



- ICCT study (LabProcICE-077, DTP-06-11):
higher relative impact at lower vehicle weights
→ proposal on **small step approach**
- OICA (LabProcICE-076):
evaluation of CO₂ impact
→ 60 kg steps mass results in 1,3 to 2,7 g/km CO₂
(dependent of vehicle efficiency & test cycle, but independent of vehicle weight)

Discussion connected to:

- definition **vehicle test mass** (NL proposal LabProcICE-069, DTP-06-12)
→ shall reflect a realistic loaded vehicle: intermediate load of [50%]
→ TM = unladen mass + [50%] (techn. perm. laden mass - unladen mass)
(note: not yet agreed, justification data needed)
- **family concepts** (gtr and/or regional)



Test room and soak area temperature

LabProclCE: **setpoint $25 \pm 5^{\circ}\text{C}$**

→ harmonisation with gtr 2 & 4, improved reproducibility

Concern by EU: not representative, tolerance too high

Open question: **impact on CO_2 results**

- UBA / TUEV study (LabProclCE-038)
→ significant influence of soak temperature ($22 / 28^{\circ}\text{C}$) on emission results (\emptyset 3 - 5%)
- UTAC study (LabProclCE-070)
→ CO_2 impact is cycle dependent (FTP < NEDC)
→ no significant CO_2 impact of lower lab temperature ($25 \rightarrow 22^{\circ}\text{C}$)
→ significant impact of 15°C , but cost-effectiveness questionable
- studies of JRC (DTP-06-13) and India (not yet available)



Method for subtraction of pollutant mass in intake air (LabProICE-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

Decision options:

- 1) Agree on LabProICE proposal.
- 2) Reject proposal.
- 3) Include it in the gtr as an optional method for contracting parties.



Overview

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



2.1) Road Load Determination

Tyre Selection Criteria

UK proposal ([LabProcICE-064](#)):

- selection based on the **rolling resistances classes** the tyres offered by the manufacturer on the production vehicle are belonging to
- 6 RR classes from ≤ 6.5 kg/tonne to > 12.0 kg/tonne
- 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.



to be reviewed:

- CO₂ impact of size of classes? Re-definition of classes necessary?
- alignment against reference laboratories in case the RRs for the offered range of tyres are not measured at a single laboratory
- feedback approach:

“Contracting Parties may verify whether the range of rolling resistance classes of tyres fitted to production vehicles correspond to the range specified for the purposes of road load determination. If the range of rolling resistance classes of tyres fitted to production vehicles is found to be worse than that specified for road load testing, the Contracting Party may require road load testing to be repeated”



RLD - vehicle selection criterias

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 by the following:

... optional body parts influencing the aerodynamics (e.g. roof railings, spoilers, wheel rims etc.)

→ every option to be installed (*customers use criteria: > 50%*)

... cases of multiple alternatives for a specific optional body part (e.g. different wheel rim designs)

→ alternative with highest expected market share (*incl. plausibility criteria*)

... criterias for wheel rims & design trims selection

(...)



(...)

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

Reservation on sales based approach by Japan

→ Counterproposal: **choose of worst case options**



RLD – tyre pressure

Proposal to improve representivity (already agreed by DTP):

“The front and rear tyres shall be inflated to the lower limit of the tyre pressure range for the selected tyre, as specified by the vehicle manufacturer.”

Open question:

feedback approach to be included in gtr or regional legislation?

“When the vehicle is taken into production, the type approval authority may verify if the applied tyre types, dimensions and pressures as well as the weight of the production vehicle are in accordance with those of the vehicle submitted for the road load test. If any differences are found, it is upon decision of the type approval authority to require the road load to be re-established.”



RLD – vehicle coast down mode

Definition:

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.

Proposal to be reviewed:

The vehicle coast down mode is **mandatory [if the determination of dyno settings cannot meet the specified error criterias] due to non-reproducible parasitic losses.**

If a vehicle is equipped with a vehicle coast down mode, it shall only be engaged for coast down, both on the road and on the chassis dynamometer. The vehicle coast down mode shall not act as a defeat device.



2.2) Lab Procedure

Battery SoC

TUEV Nord study ([LabProcICE-056rev1](#))

→ significant impact of the starter battery on the CO₂ emissions

Agreed:

conditioning test cycle before emission testing **with fully charged battery** + battery shall not be charged again before the official testing.

Open issues:

- How to take the SoC into account in a feasible and (cost) efficient way?
- Monitoring of charge current during test or SoC at the end?
- Correction of emission result?
- Transposition of method similar to R101 method for not external chargeable hybrid-electric vehicles possible?



Dyno operation mode

Justification:

The vehicle must be prepared in order to insure correct and safe vehicle operation on chassis dynamometer (e.g. deactivation of ABS/PSM system).

Proposal:

A “dyno operation mode”, if any, shall be activated by using a manufacturer's instruction (e.g. using vehicle steering buttons in a special “pressing order”, by using the manufacturer work shop tester, or fuse removal).

Activation or not of the mode shall be recorded in the test report.

“Dyno operation mode” shall not activate, modulate, delay or deactivate the operation of any part, that affects the emissions and fuel consumption under the test conditions.”

UK/NL concerns:

Need for improvements to ensure transparency of the mode to avoid cycle beating / abuse and ensure correct application in ISC?!



NL proposal (LabProcICE-068)

→ vehicle settings / standard and optional equipment

General Handling of Auxiliaries

Definition:

“Auxiliaries” are additional equipment/devices not required for vehicle operation (e.g. MAC, radio, seat heating etc.)

Proposals:

- **Auxiliaries** shall be **deactivated** during testing on dyno
- **Non-auxiliary devices** (e.g. steering pump) shall be **activated** unless deactivation is necessary to ensure safe operation on the dyno (e.g. ABS)
- If an auxiliary device is considered to have a significant realworld impact on CO₂ (e.g. MAC) a **separate evaluation procedure** could be established by CPs



Multimode gear boxes / GSI

Emissions testing proposal:

Compliance with emissions standards in all modes

- Test agreed worst case
(reservation by NL : test all modes)

GSI → considered as mode of a multimode gearbox

CO₂ / 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
(reservation by NL & Japan: test & average all modes)

MTs with GSI → considered as multimode

ATs with a manual mode → test as AT, independent of GSI



Cooling fan specifications

new proposals in deviation of GRPE decision (ECE-R83):

- characteristics:

area (at least 0.3 m²) and width (at least 0.8 m)

- max. speed requirement:

“The blower speed shall be within the operating range of 10 km/h to at least 100 km/h or to the maximum speed of the test cycle being used”

→ to be reviewed after WLTC

- reference to subsequent testing deleted



Type III test

proposal:

- Test procedure excluded from gtr harmonization
- only requirement for proper design of crankcase ventilation included

justification:

- Design requirement is already applied in US and Japan
- Not so much difficulties with current technology
- appropriate approach with regard to cost/benefit



2.3) Measurement / Equipment

Calibration gases

True concentration of a calibration gas shall be within **+/- 1 per cent**



Overview

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



3) LabProcICE parameter setting for validation 2

List of relevant tolerances and required setpoints

→ [WLTP-DTP-LabProcICE-075](#)



Overview

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



- Small teams (LabProc, ME, RLD) will continue work on draft gtr / OIL / definitions
- Next face-to-face workshop:
planned in July 2011
- Additional Tel/web conferences
- Finalization of parameter setting & preparation of DTP-7 in September



Thanks for your attention.

LabProICE contact:

Béatrice Lopez de Rodas - [beatrice.lopez\(at\)utac.com](mailto:beatrice.lopez@utac.com)

Konrad Kolesa - [konrad.kolesa\(at\)audi.de](mailto:konrad.kolesa@audi.de)

Stephan Redmann – [stephan.redmann\(at\)bmvbs.bund.de](mailto:stephan.redmann@bmvbs.bund.de)