WLTP-DTP Subgroup Additional Pollutants

Progress report

Date: 13. April 2011

WLTP-DTP-AP, Oliver Mörsch

Additional pollutants subgroup - Members list

Chair:	**Mörsch**	**Oliver**	**Daimler**
Co-chair:	**Astorga-Iloren**	**Covadanga**	**JRC**
	Akard	Mike	Horiba
	Andersson	Jon	Riccardo
	AOYAMA	Yuichi	JASIC-contact
	Berg	Olle	Volvo Cars
	Bigi	Laura	PSA
	Born	Michael	BMW NA
	Bosteels	Dirk	AECC
	Charafeddine	Kamal	Porsche
	Dijkhuizen	Arjan	TME
	Engelejehringer	Kurt	AVL List GmbH
	Hill	Less	HORIBA
	Holmstrom	Maria	Saab
	Jemma	Carl	Riccardo
	Kirchner	Ulf	Ford Europe
	Laroo	Chris	USEPA
	Loo	Jeff	GM
	May	John	AECC
	Momique	Jean-Claude	PSA

Moriya	Hidenori	JAMA/Toyota
Nagy	Don	GM
Nyman	Bjorn	Saab
Petit	Alain	Renault
Park	Junhong	Korean Ministry of Environment
Ramacher	Bjoern	Volkswagen Group
Renders	Johan	EC
Sanchez	James	EPA
Sawada	Yutaka	JAMA
Schuster	Norbert	Ford Europe
Sherman	Mike	Ford
Silvis	Willian	AVL
Simon	Nakia	Chrysler
Steininger	Nikolaus	EC
Strobel	Karsten	GM Europe
Thiel	Wolfgang	BMW AG
Vavra	Christian	MAHA-AIP
Walker	Patrick	GM Europe
Meseth	Susanne	UBA
Yassine	Mahmoud	Chrysler

Additional pollutants subgroup – Terms of reference

The Additional Pollutants subgroup shall be responsible for the development of test procedures for pollutants not currently regulated such as NO2, NH3, N2O including measurement equipment and formulae for the measurement for light duty vehicles.

Scope of Activity

The subgroup will undertake the following tasks on the basis of procedures in existing legislation and expert knowledge within the group:

1. Agree on additional pollutants to be addressed. ✓
2. Identify appropriate measurement methods for each of the pollutants. ✓
3. Describe measurement and calibration procedures and calculations based on existing legislation and on output from lab procedure subgroup. in progress
4. Drafting of legislation text. in progress

Meeting schedule

First Meeting:	Telephone/Web Conference Date: 20th July 2010 16 participants
2nd Meeting:	Telephone/Web Conference Date: 20th July 2010 20 participants
3rd Meeting:	Face to face meeting at JRC/Ispra Date: 9/10 Dec. 2010 14 participants
4th Meeting:	Face to face meeting at BMW/Munich Date: 7/8 March 2011 18 participants
5th Meeting: (registration in progress)	Face to face meeting at JRC/Ispra 10/11 Mai 2011

Pollutants to be addressed

NO2

NH3

N2O

Ethanol

Aldehydes (Formaldehyde, Acetaldehyde)

Table of candidate methods for additional pollutants

Pollutant	Method	bag	diluted	raw	online	off line	LoD [ppm]	LoQ [ppm]	transformation time [s]	rise time [s]	interference	Base
NO2	CLD differential		x		x		0,3	0,9		1	< 2% H2O+CO2	ECE Reg. 83/EPA 1065.272
	NDUV-RAS direct		x		x		0,04	0,12		3	none	ECE Reg. 83/EPA 1065.272
	QCL direct		x		x		0,1	0,3	1	1	none	
	FTIR direct		x		x		0,9 (0,2 possi	2,7		1	managed	
N2O	GC-ECD	x				x	0,01	0,03	na	na	none	EPA 1065.275
	NDIR	x			x		0,1	0,3		5	multiple	EPA 1065.275
	QCL	x			x		0,01	0,03			none	
	FTIR	x			x		0,9 (0,2 possi	2,7		1	managed	EPA 1065.275
	ring down cavity	x			x		0,0003	0,001	2,5	1	none	in research
	Photo Acoustic	x			x						multiple	EPA 1065.275
NH3 (SCR systems)	LDS (in situ)			x	x						H2O, p, T, managed	Commitology EUVI
	LDS (extractive)			x	x		0,2	0,6	definition neccessary		H2O, managed	Commitology EUVI
	FTIR			x	x		0,3 (0,06 poss	0,9	definition neccessary		managed	Commitology EUVI
	QCL			x	x		0,1	0,3	definition neccessary		none	
Ethanol (E85)	Impinger + GC-FID		x			x	0,1 µg/ml -> 0,18?					CARB NMOG Part C METHOD 1001 EPA 1065.805
	Photo Acoustic	x			x		0,06				H2O, CO2, NH3, ROH managed	MSO 2000-08
	GC-FID from bag	x				x	0,18				none	
	QCL	x			x		not yet available					
	FTIR (bag)	x			x		1 (0,2 possible)				managed	
Aldehydes (E85)	Cartridge + HPLC		x			x	0,0075 µg/ml					CARB NMOG Part F METHOD 1004
	FTIR		x		x		0,3/0,9				managed	
	QCL		?		x		not yet available					

reference methods

LoD determined by use of traceable cal. gases

General: EPA 1065.205

Open Issues (I)

General:

- How can alternative methods be qualified/admitted?
- How will the testing of additional pollutants in WLTP phase 2 be performed?
- Traceability to national standards of cal gas for AP
- Define calibration, verification, linearization

Open Issues (II)

NO2:

- Allow calculation of NOx from NO + NO2
- Allow QCL and other technologies for NO and NO2

NH3:

- Temperature for NH3 sampling: 110 – 190 °C?
- Handling of lost sample in raw exhaust sample
  - Limit sample flow (10 l/min)
  - Return sample (no drying, heated return)
  - Additional cycle??
- NH3 sampling during engine off
- Calibration/Verification of in situ instruments

Open Issues (III)

GC-Methods (N2O, ETOH)

- Definition of Peak resolution for GC methods
- Definition of Columns
- use of thermal pre-concentrator
- Linearization/verification

ETOH

- Ethanol response factor of the FID

Aldehydes

- allow factors

Next Steps

- Contiue drafting of GTR for reference methods
- Resolve open issues

Tasks have been assigned within group