

WLTP-DTP Subgroup Additional Pollutants

Progress report

Date: 22. Dec. 2010

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Additional pollutants subgroup - Members list

Chair:

Co-chair:

Mörsch	Oliver	Daimler
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
Engelejringer	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
Witt	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.
4. Drafting of legislation text.

started

in progress
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
(planned) Date: 7/8 March 2011
- 5th Meeting:** Face to face meeting at JRC/Ispra
(planned) June 2011 (TBD)

Pollutants to be addressed

NO₂

NH₃

N₂O

Ethanol

Aldehydes (Formaldehyde, Acetaldehyde)

General guidelines

- agree on performance criteria
 - LoD
 - cross interference
 - rise time
 - ...
- allow alternative methods
- base on existing legislation where suitable
- avoid raw measurement where possible

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Table of performance criteria

Pollutant	Range of emission level to be measured	sample from			Distribuion over phases			typical bag concentration 9 m ³ /min CVS Flow assumed					LoQ required (30 % of net conc.) LoD = 1/3 LoQ		ISO 16183	
		bag	diluted	raw	Cold start	stabi- lized	hot start	Cold start [ppm]	stabi- lized [ppm]	hot start [ppm]	back- ground [ppm]	relevant net conc. [ppm]	LoQ required [ppm]	LoD required [ppm]	rise time required [s]	transforma- tion time [s]
NO ₂	40 mg/km	(x)	x		33%	33%	33%	0,7	0,7	0,7	0,02	0,68	0,2	0,06	2,5	na
N ₂ O	10 mg/mi	x			?	?	?	0,6	0,6	0,6	0,3	0,3	0,1	0,03	na	na
NH ₃ (SCR systems)	10 ppm			x	20%	30%	40%	10	10	10	0	na	3	1	5	na
Ethanol (E85)	20 mg/km	x			100%	0%	0%	2	0,05	0,05	0,05	1,95	0,6	0,2	na	na
Aldehydes (E85)	8 mg/mi		x		100%	0%	0%	1	0,05	0,05	0,05	0,95	0,3	0,1	2,5	na

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Table of candidate methods for additional pollutants

Pollutant	Method	bag	diluted	raw	online	off line	LoD [ppm]	LoQ [ppm]	rise time [s]	inter-ference	Base	Robustness of measurement	Paper Nr.
NO2	CLD differential		x		x						ECE Reg. 83/EPA 1065.272	very good	WLTP-DTP-02-06e
	NDUV-RAS differential		x		x						ECE Reg. 83/EPA 1065.272	good	WLTP-DTP-02-06e
	QCL		x		x							not yet available	WLTP-DTP-AP-02-02
	FTIR		x		x							fair	
N2O	GC-ECD	x				x					EPA 1065.275	good	WLTP-AP-02-01 b
	NDIR	x			x						EPA 1065.275	poor	WLTP-AP-02-01 b
	QCL	x			x							not yet available	WLTP-DTP-AP-02-02
	FTIR	x			x						EPA 1065.275	poor	
	ring down cavity	x			x							?	
	Photo Acoustic	x			x						EPA 1065.275	poor	
NH3 (SCR systems)	LDS (in situ)			x	x						Commitology EUVI	fair	WLTP-DTP-02-07e
	LDS (extractive)			x	x						Commitology EUVI	fair	
	FTIR			x	x						Commitology EUVI	fair	WLTP-DTP-02-07e
	QCL			x	x							not yet available	WLTP-DTP-AP-02-02
Ethanol (E85)	Impinger + GC-FID		x			x					CARB NMOG Part C METHOD 1001 EPA 1065.805	good	
	Photo Acoustic	x			x						MSO 2000-08	good	
	QCL											not yet available	
	FTIR											?	
Aldehydes (E85)	Impinger/Cartridge + HPLC		x			x					CARB NMOG Part F METHOD 1004	good	WLTP-DTP-AP-02-06
	FTIR			x	x							poor	
	QCL		?		x							not yet available	

reference methods

LoD determined by use of traceable cal. gases

General: EPA 1065.205

Open Issues

- How can alternative methods be qualified/admitted
- How will the testing of additional pollutants in WLTP phase 2 be performed?

Next Steps

- Drafting of GTR for reference methods
 - NO₂ and NH₃ based on OICA proposals
 - N₂O, Ethanol and Aldehydes based on existing legislation
- Gathering of performance data for candidate methods

Tasks have been assigned within group and will be performed until next meeting in March.