Test report

Measurement results and short comments

Emission measurement on one (1) passenger cars of M1 type gasoline, Euro 5 – with two (2) type of gasoline fuel (MK1 and MK2)

A report for the Swedish Transport Administration

2014-09-01
Report no. 147066

Ecotraffic

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1. Abstract

In this study tests on chassis dynamometer with two types of fuels have been carried out on a Euro 5 gasoline passenger car. The objective of the work was to investigate if there is any difference in emission levels by using Swedish MK1 gasoline or MK2.

MK2 (16.2%) contain more olefins compared with MK1 (11.7 %).

All tests were carried out during July 2014 at TÜV NORD's emission laboratory in Essen, Germany. Beside regulated emissions also several unregulated components were measured in this study. All un-regulated components were analyzed by IVL in Göteborg, Sweden.

The main conclusions of these tests are:

- These tests do not show any significant differences with respect to fuel consumption and exhaust emissions
- This applies to both regulated and unregulated components
- For both fuels, the emissions were higher at the start of the cold ambient temperature compared with start in normal ambient temperatures
- After the catalyst has reached full function were all emission components relatively low. Hydrocarbons and carbon monoxide was in practice very close to zero after the catalyst reach full function. For start at -7 C this time was about 60 second and for start at 22 C about 30 seconds.

Project information (in Swedish)

Beställare	Trafikverket	**Beställningsnummer**	TRV2011/48682 A
Beställningsdatum	2013-10-24	**Slutdatum enligt beställning**	2013-12-20
Ansvarig hos beställare	Magnus Lindgren	**Projektnummer**	7066
Ansvarig hos Ecotraffic	Lars Eriksson	**Rapportering**	Testrapport (engelska)
Avvikelser	Försenad*	**Provningsplats**	TUV NORD - Essen
Rapport språkgranskad	Nej	**Rapport godkänd av**	
Rapportnummer	147066	**Rapporteringsdatum**	2014
Författare	Lars Eriksson, Peter Ahlvik		

*rapporten försenad av flera olika anledningar. Främst för att det var svårt att få fram testbränsle. Detta gjorde att provningen som var planerad under våreni stället utfördes i juli.

Abbreviations, acronyms and glossary

CVS	Constant Volume Sampler/Sampling, a dilution device used for dilution of engine/vehicle exhaust for emission measurements.
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
FC	Fuel Consumption
NEDC	New European Driving Cycle
NO_X	Nitrogen oxides (NO + NO_2)
NO	Nitrogen oxide
NO_2	Nitrogen dioxide
PM	Particulate Matter
PN	Particle number
MK1	Swedish Environmental Class 1 Gasoline
MK2	Swedish Environmental Class 2 Gasoline

2. The assigment

Scope of work

Ecotraffic shall on behalf of Trafikverket carry out emission tests on one gasoline fuelled passenger car of M1 type, Euro 5 by using two types of gasoline fuels, MK1 and MK2 Both regulated and unregulated components shall be measured.

Used driving cycles shall be:

- 2*UDC at + 22°C
- 2*UDC at – 7°C

The study shall be reported as a technical test report.

Test sites

All tests have been carried out at TÜV NORD in Essen. All tests were performed during July 2014.

	Test Cell
Climatisation	-20°C - +35°C WEISS
Chassis Dynamometer	MAHA ECDM 48L 4x4
Control Unit	MAHA
CVS-Unit	MAHA-CVS
Analytical System for gaseous emissions (CO, CO_2, THC, NMHC, NO, NO_X)	MAHA-AMA D1
Particle Collector	MAHA-PTS
Particle Balance for particle mass	SARTORIUS SE2-F
Particle Counter	MAHA

Dynomometer settings

Identical values as in the type approval tests have been used

		Roller	Street
F0	N		62,93
F1	[N/(km/h)]		0,5931
F2	[N/(km/h)^2]		0,02628
Inertia	kg		1020

Fuel used

In this study, two fuels have been used, MK1 and MK2. The fuel specifications are described in chapter 6.

Type approval values

Deterioration factors are included in the values below.

CO mg/km	**THC** mg/km	**NMHC** mg/km	**NOX** mg/km	**THC+NOX** mg/km	**PM** mg/km	**PN #/km**
380.6			31,4			N.A

CO2 Urban g/km	**CO2** Extra Urban g/km	**CO2** Combined g/km	**FC** Urban liter/ 100 km	**FC** Extra Urban liter/100 km	**FC** Combined liter/100 km
95	136	110	4,1	5,8	4,7

Vehicle

One gasoline cars of euro 5 class have been used in this study.

Manufacture	Hyundai
Model	I10
Chassi no	MALAN51BABM906257
Gear Box	M5
Wheel/Tires	155/70R13 75T
Engine displacement	1086 cc
Power	50 kW
Odometer	Ca 40 000 km
Emission class	Euro 5
Year model	2011

Un-regulated emissions

Aldeydes, ketones and alkenes were analyzed by IVL in Göteborg. Samples were collected in adsorption pipes and in canisters. During analyzing of samples, air is pumped through an electrically cooled, sorbent packed, focusing trap. After sampling the trap is heated and the analyses are transported into a gas chromatograph (GC) with two separate column lines and two separate flame-ionisation detectors (FID). The analyze method is fully described in reference, Potter, A.(2005). Analysis Method for Ozone Precursor Volatile Organic Compounds, IVL Rapport U1121.

Driving Cycles

See also chapter 3 for more details.

2*UDC

In this study, the first part of European driving cycle (NEDC) is used. This part also known as UDC (Urban Driving Cycle) is a cycle that is commensurate with a typical run in a typical European town. The cycle consists of four identical parts with a total length of 13 minutes. Maximum speed is 50 km / h. The UDC was repeated 2 times, i.e. 8 repetitions, totaling 26 minutes. Before starting the vehicle should take the ambient temperature and the start will be preceded by 40 seconds idle

Test sequence

The tests were carried out in the order described in the table below. Marked with underline = also un-regulated components. Rest is regulated components.

Test no.	**Name**	**Driving Cycle**	Temperature
		Fuel = MK1	
1	1_MK1_UDC_22_	UDC (1) + UDC (2)	+ 22 C
2	2_MK1_UDC_22_	UDC (1) + UDC (2)	+ 22 C
3	1_MK1_UDC_-7_	UDC (1) + UDC (2)	-7 C
4	2_MK1_UDC_-7_	UDC (1) + UDC (2)	-7 C
		Fuel = MK2 *(change oil and filter)*	
5	1_MK2_UDC_22_	UDC (1) + UDC (2)	+ 22 C
6	2_MK2_UDC_22_	UDC (1) + UDC (2)	+ 22 C
7	1_MK2_UDC_-7_	UDC (1) + UDC (2)	-7 C
8	2_MK1_UDC_-7_	UDC (1) + UDC (2)	-7 C
9	Background	Zero / Blank test (background)	Air from dilution tunnel

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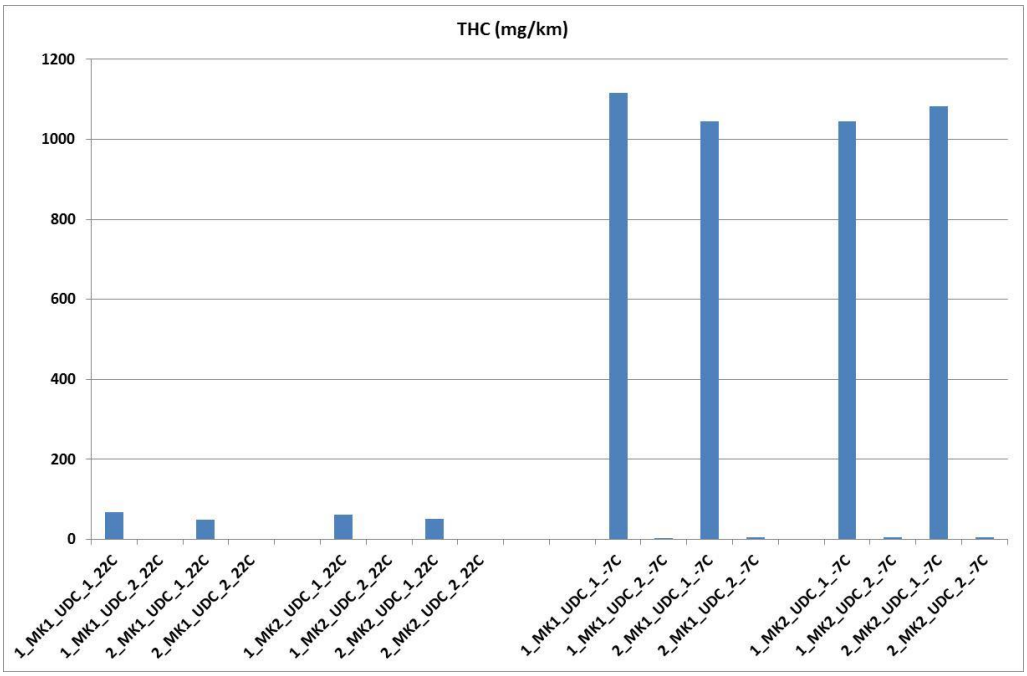
3. Results

Below results from the measurements of regulated components are showed and short comments are given for some of the components.

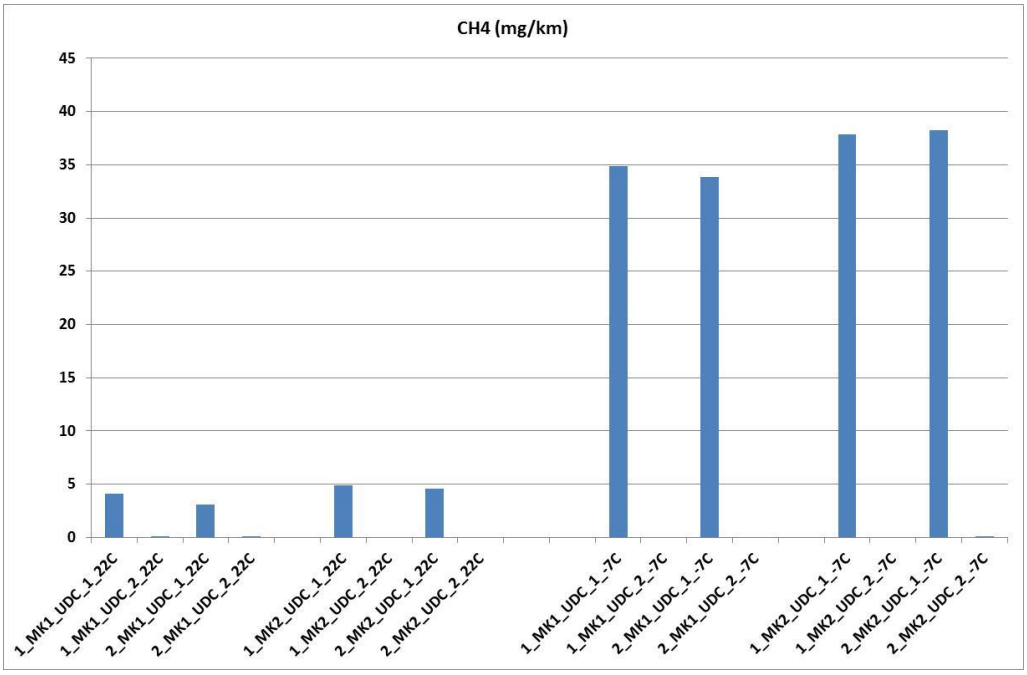
THC



The emissions of hydrocarbons show no differences between gasoline of MK1 and MK2. For both gasoline's the emissions are higher with start at lower ambient temperatures. Higher cold start emissions due to longer time to reach catalytic activity at lower temperatures, but after reaching catalytic activity the emission of THC is close to zero thereafter.

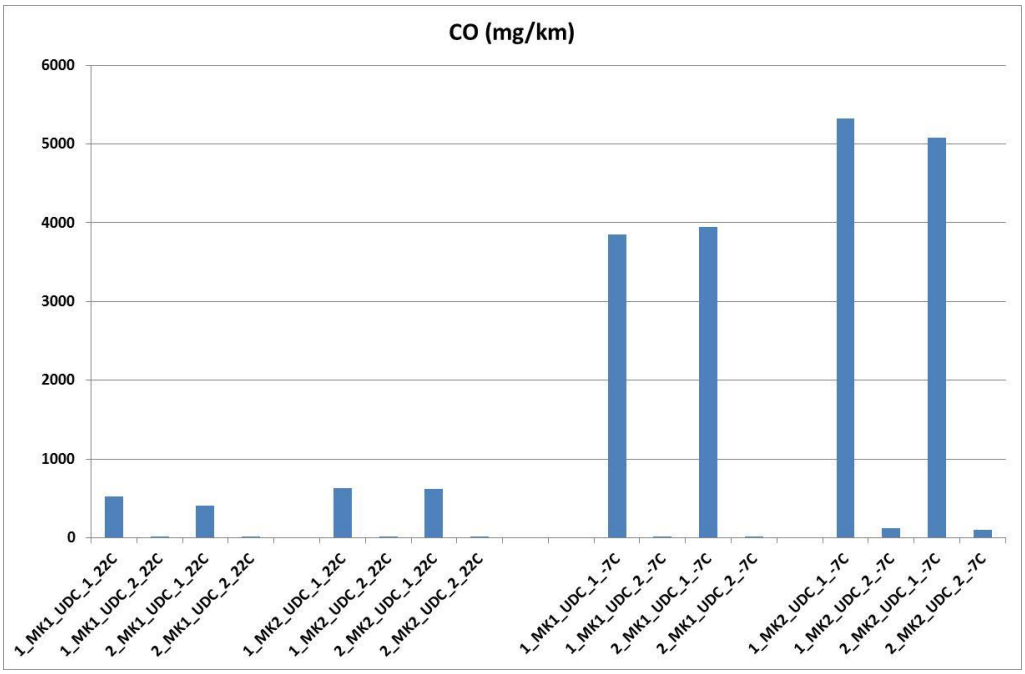
See also modal measurements of CO below. The time to reach full catalytic activity is about 30 second at 22 C and about 60 second at – 7 C.

CH4

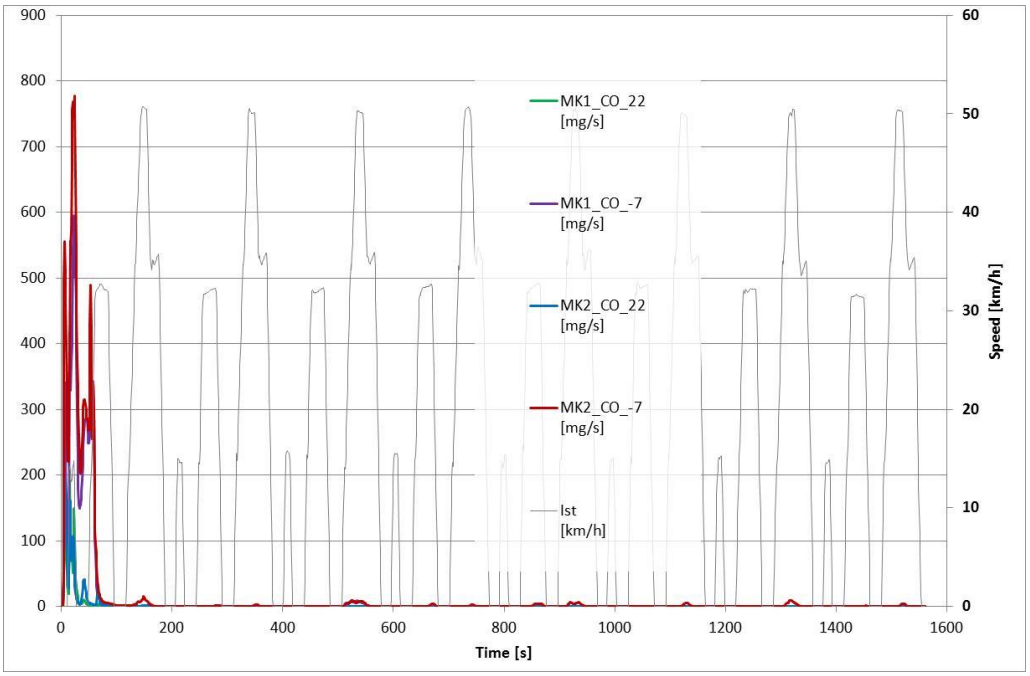


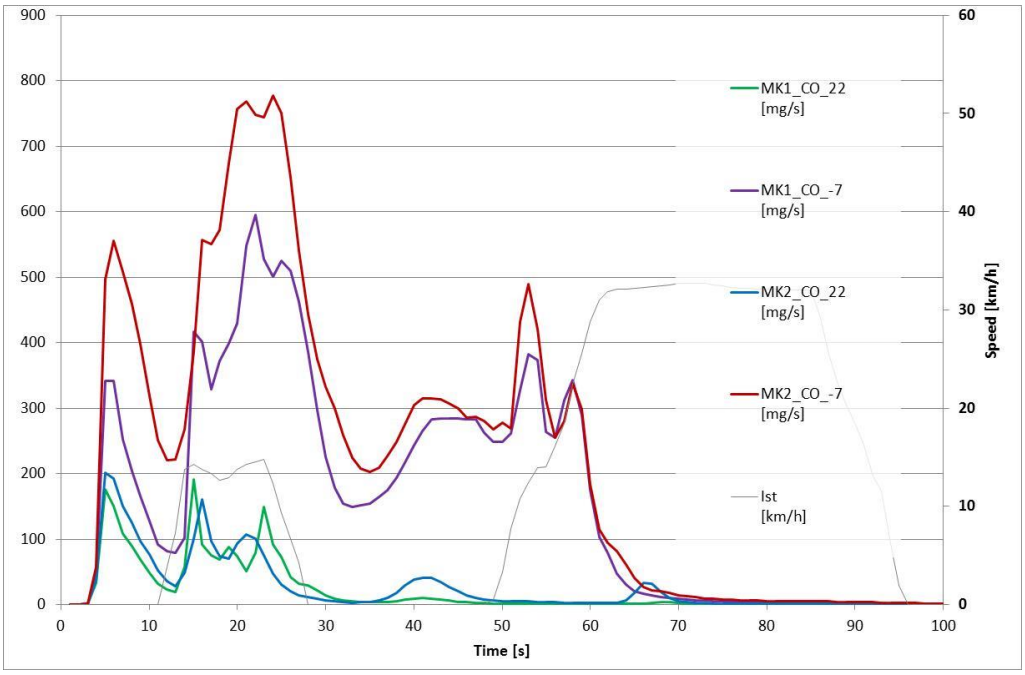
The emission of methane seems to be a little higher by using gasoline MK2 compared with MK1. But the differences are small and after reaching catalytic activity the emissions are close to zero for both MK1 and MK2. So the conclusion is that there are no differences in emission of methane with respect to the use of MK1 or MK2.

CO



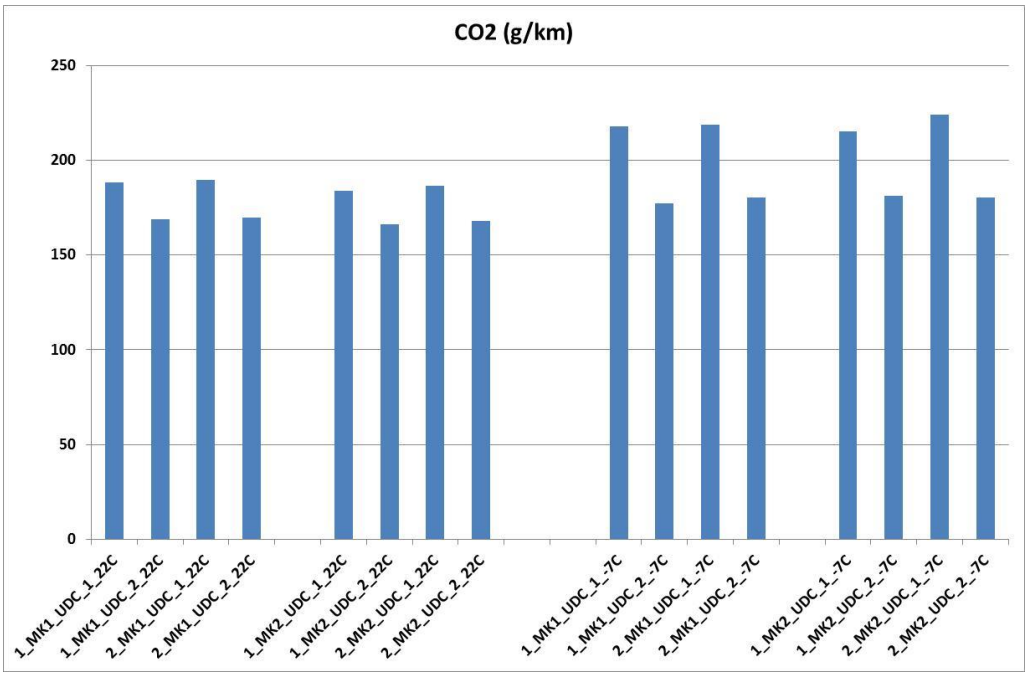
Use of MK2 seems to show higher CO emission compared with use of MK1. By comparing the graphs from the modal measurements (see below) MK1 and MK2 show similar behavior. After reaching full catalytic activity (about 30 second at 22 C and about 60 second at – 7 C) the CO emissions are close to zero for both fuels.





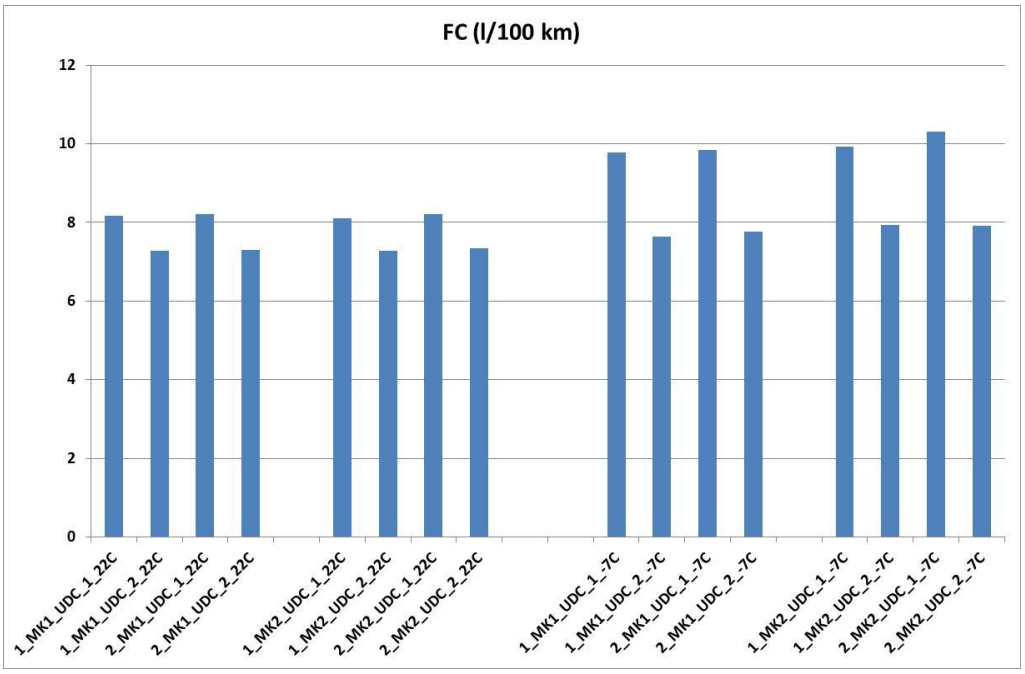
Above – Modal measurements of CO

CO_2



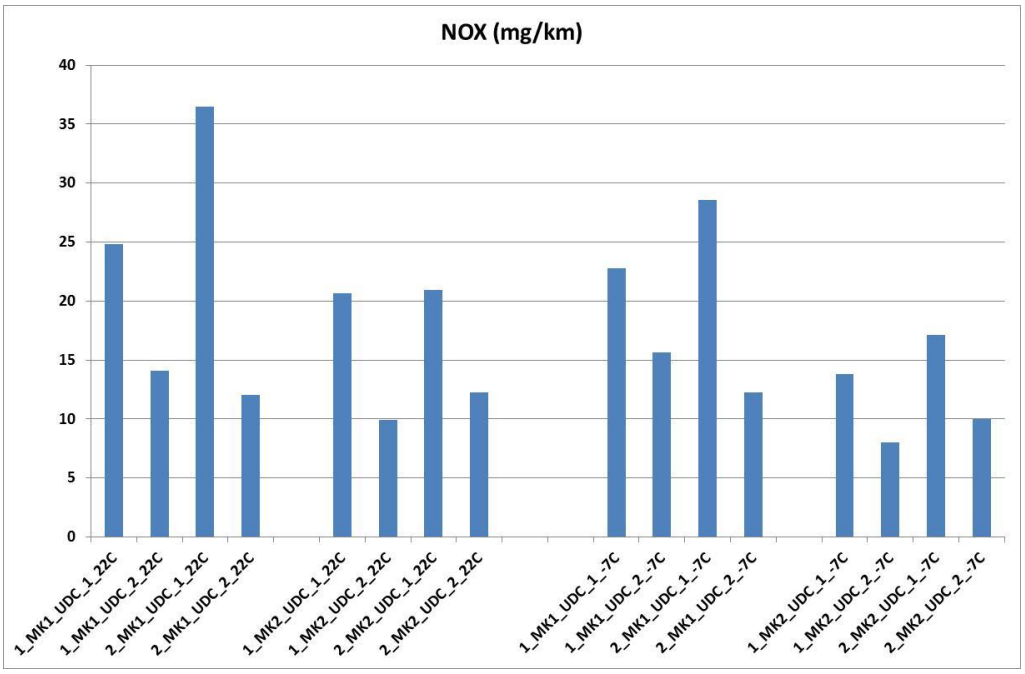
There are no significance differences in CO_2 emissions for the two fuels tested, MK1 and MK2

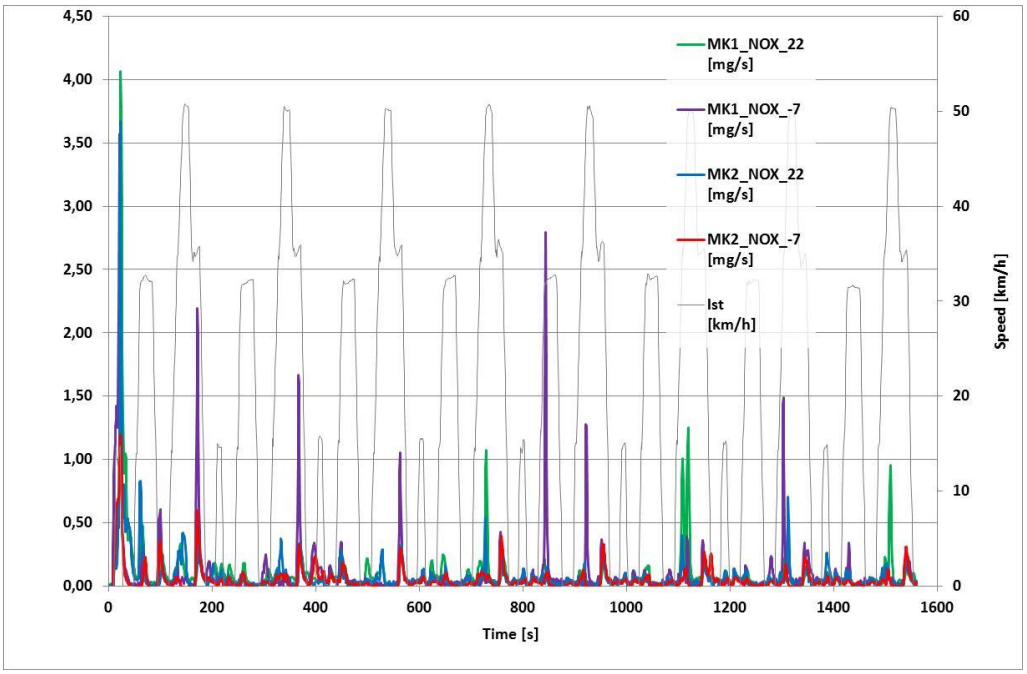
Fuel consumption

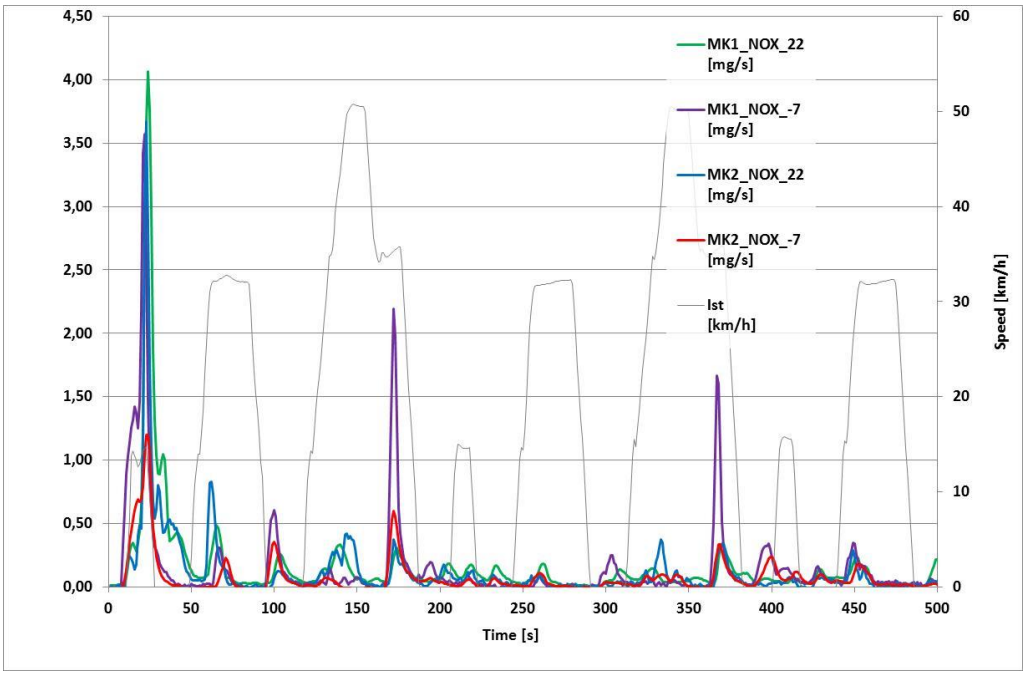


There are no significance differences in fuel consumption for the two fuels tested, MK1 and MK2

NO_X

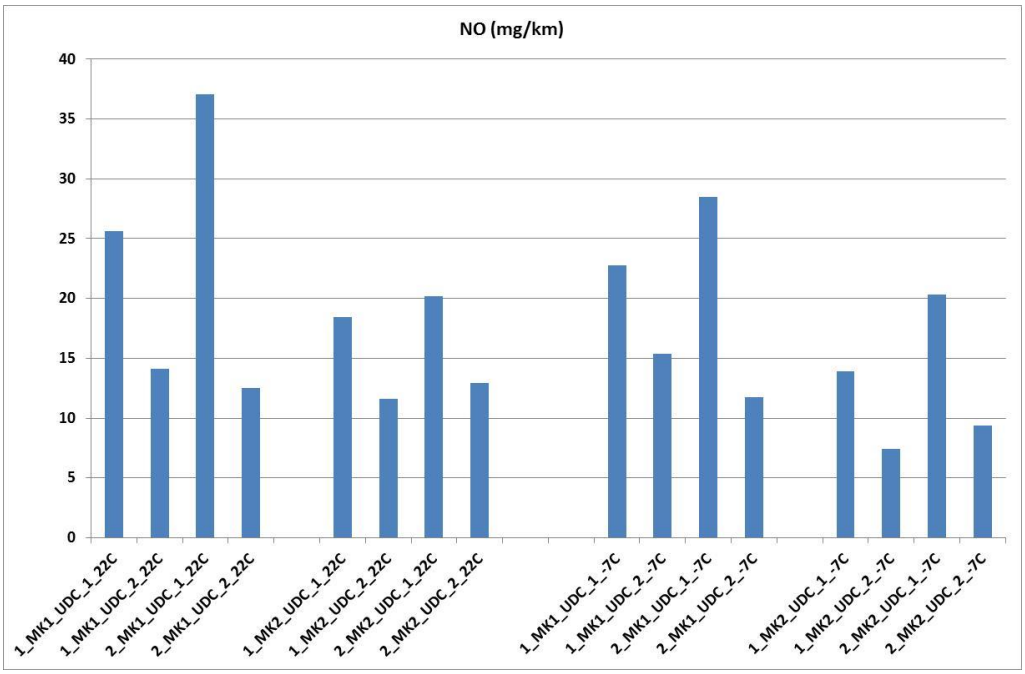

NOX (mg/km)
40
35
30
25
20
15
10
5
0
1_MK1_UDC_1_22C
1_MK1_UDC_2_22C
2_MK1_UDC_1_22C
2_MK1_UDC_2_22C
1_MK2_UDC_1_22C
1_MK2_UDC_2_22C
2_MK2_UDC_1_22C
2_MK2_UDC_2_22C
1_MK1_UDC_1_-7C
1_MK1_UDC_2_-7C
2_MK1_UDC_1_-7C
2_MK1_UDC_2_-7C
1_MK2_UDC_1_-7C
1_MK2_UDC_2_-7C
2_MK2_UDC_1_-7C
2_MK2_UDC_2_-7C





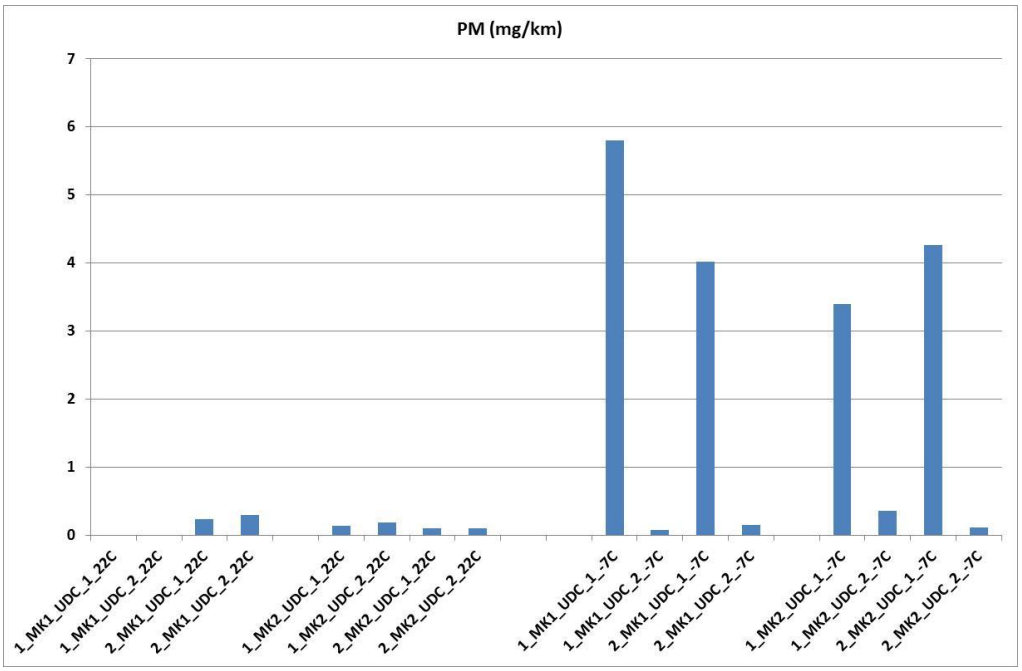
Above – Modal measurement of NO_X

NO



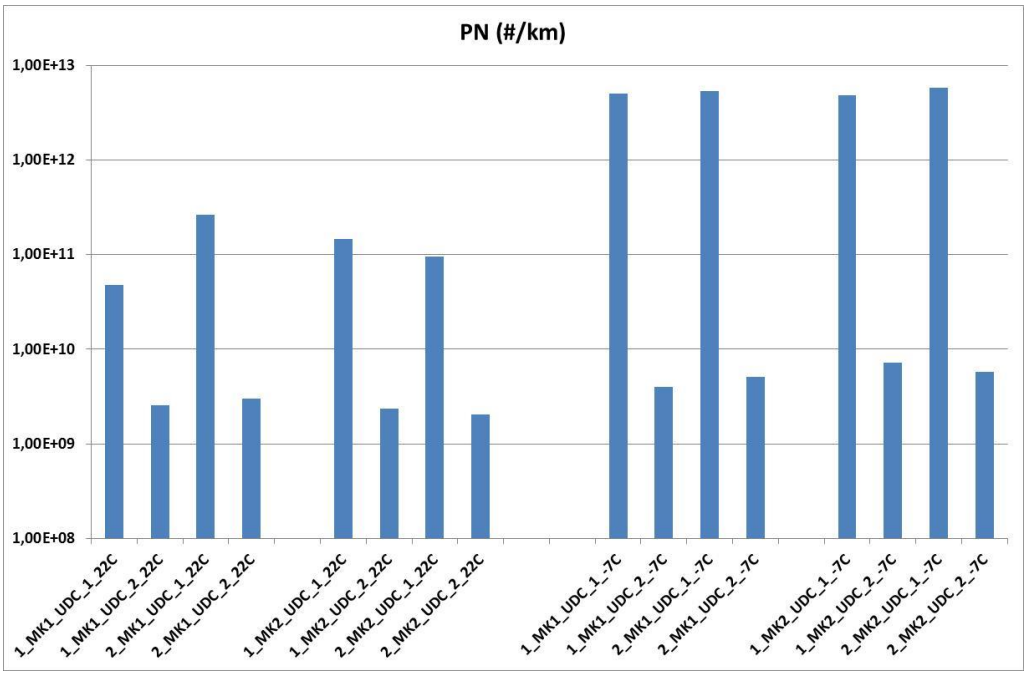
Interesting to note is that almost all NO_X consists of NO (for modern diesel vehicles NO_X consist mostly of NO_2). There are no significant differences between use of MK1 and MK2.

Particle mass (PM)



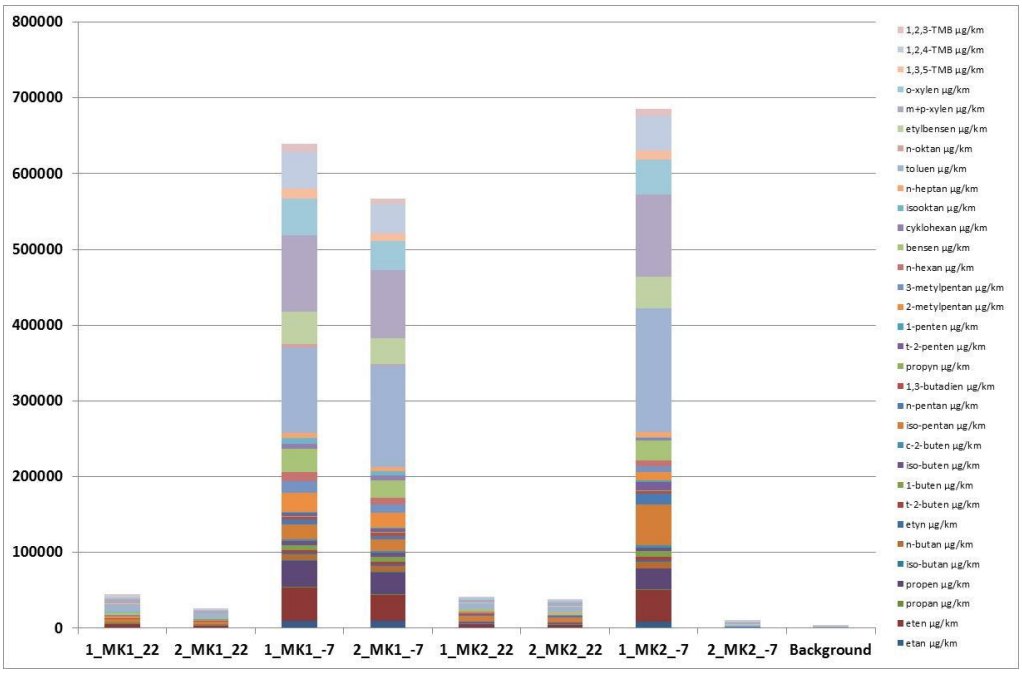
PM was measured by collecting particles on filter paper. These are very low weights (in absolute terms). This allows the measurement uncertainty is relatively large, so large that it is difficult to draw relevant conclusions from filter weight. A general conclusion is that there are very low PM emissions and that it is not any differences due to the use of fuel MK1 or MK2.

Particle number (PN)



There are no significant differences in emissions of number of particles between the two fuels used. The number of particles is higher with start at low ambient temperature but the behaviors are same for both fuels. After reaching full catalytic activity the number of particles is about (# 3-5 +E9 per km).

Un-regulated results – Alkenes and alkanes

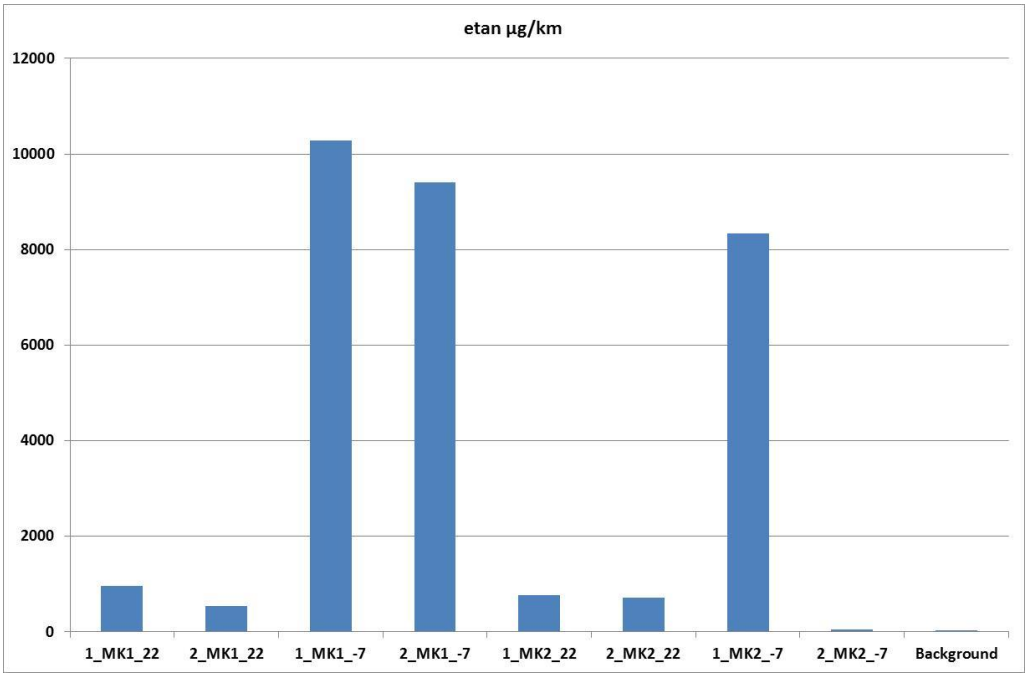


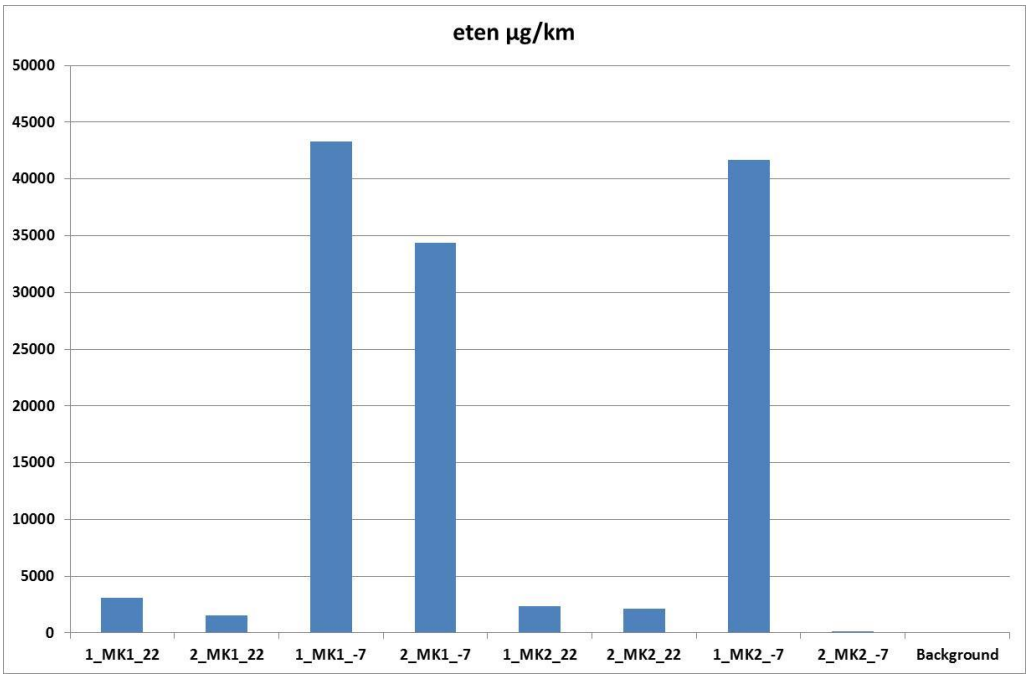
In the figure above the results from the unregulated emission of alkanes and alkenes measurements are shown. There repeated test at – 7 (2_MK2_-7) is not correct so this must be excluded. There are no significant differences with respect to the total amounts of unregulated components between the two fuels. Almost all of these unregulated components are emitted at start in low temperature and in the first minute after start. Thereafter the emissions are very close to zero for both fuels.

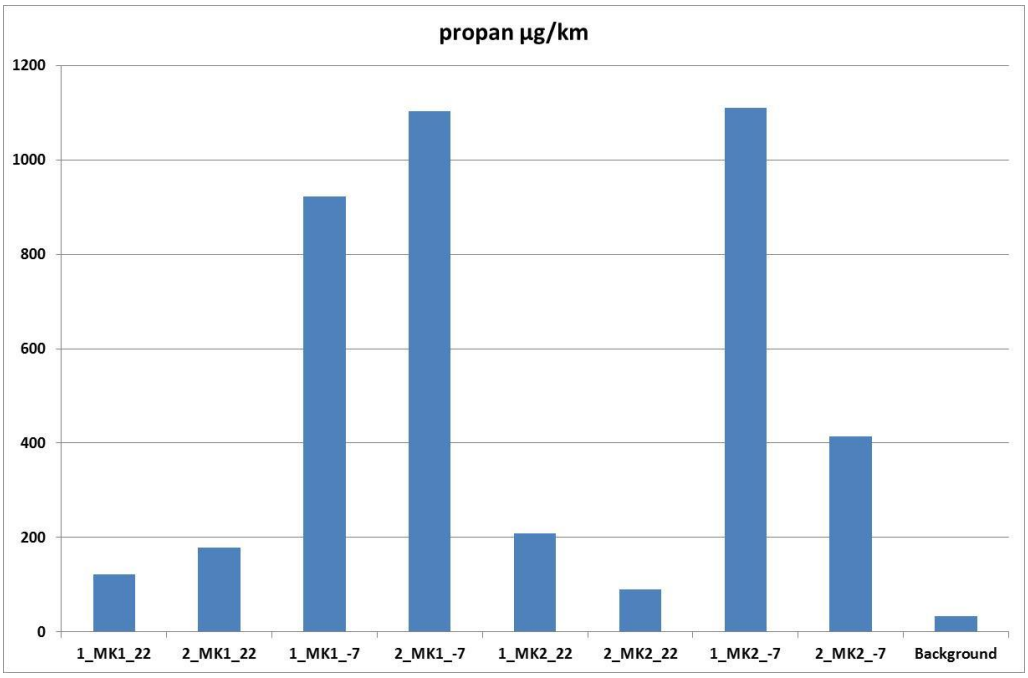
In the following pages the unregulated components are presented one by one.

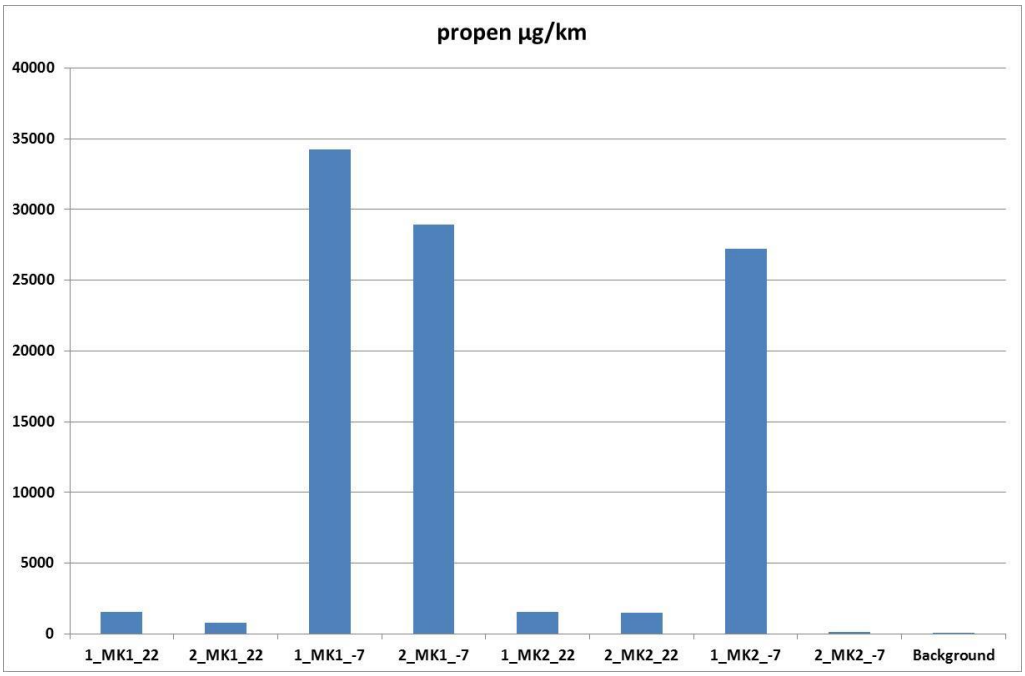
The table below summarizes the main results from the measurements of alkanes and alkenes. + indicates more of actual component and = indicate no differences. Important to note is that the levels are low. For details, see pages below.

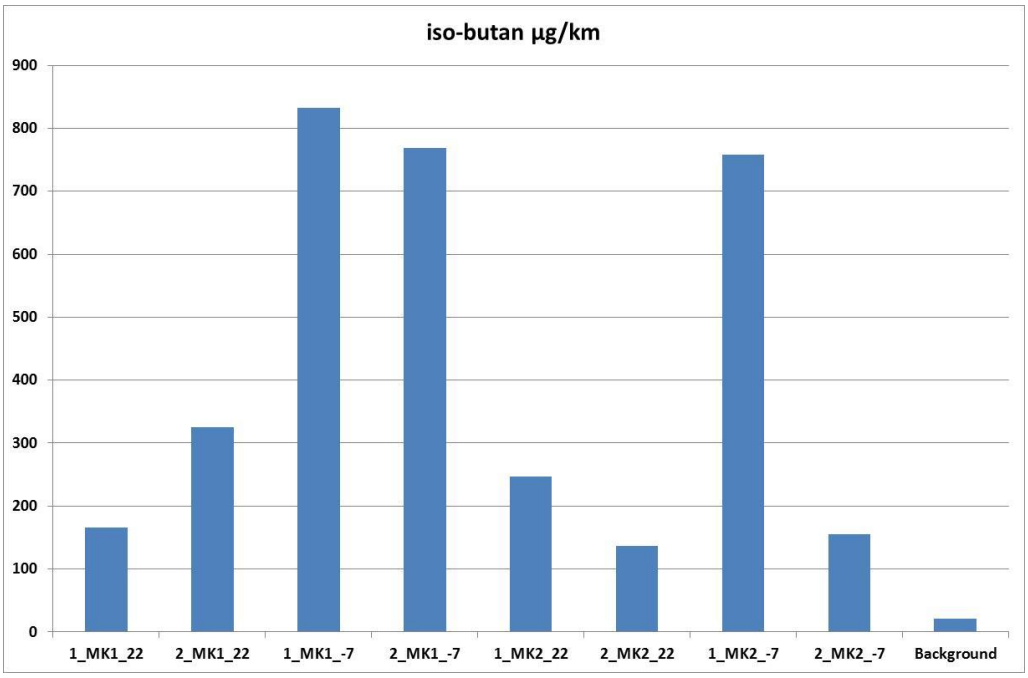
		MK1	MK2
Alkane	etane	+	
Alkane	propane	=	
Alkane	iso-butane	+	
Alkane	n-butane	=	
Alkane	iso-pentane		+
Alkane	n-pentane		+
Alkane	2-metylpentane	+	
Alkane	3-metylpentane	+	
Alkane	n-hexane	+	
Alkane	cyklohexane	+	
Alkane	isooktane	+	
Alkane	n-heptane	=	
Alkane	n-oktane	?	
Alkyne	etyne		+
Alkyne	propyne	=	
Aromatic	bensene	=	
Aromatic	toluene		+
Aromatic	etylbensene	=	
Aromatic	m+p-xylene	=	
Aromatic	o-xylene	=	
Aromatic	1,3,5-TMB	=	
Aromatic	1,2,4-TMB	=	
Aromatic	1,2,3-TMB	=	
Olefin (alkene)	etene	=	
Olefin (alkene)	propen	+	
Olefin (alkene)	t-2-butene		+
Olefin (alkene)	1-butene		+
Olefin (alkene)	iso-butene	+	
Olefin (alkene)	c-2-butene		+
Olefin (alkene)	1,3-butadiene	=	
Olefin (alkene)	1-penten		+
Olefin (alkene)	t-2-pentene		+

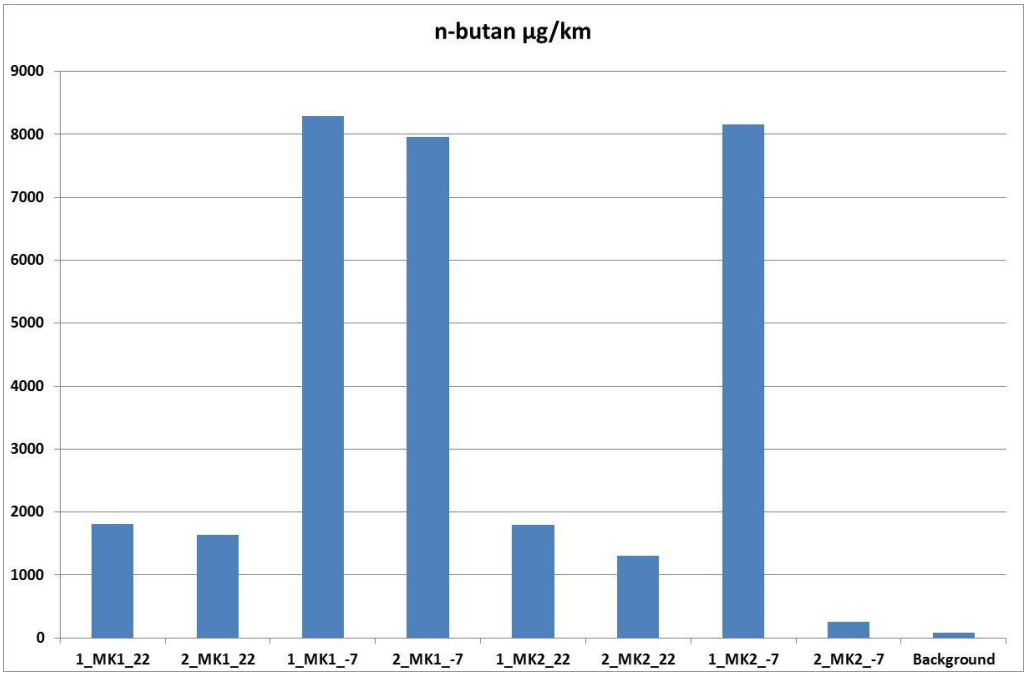

etan µg/km
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

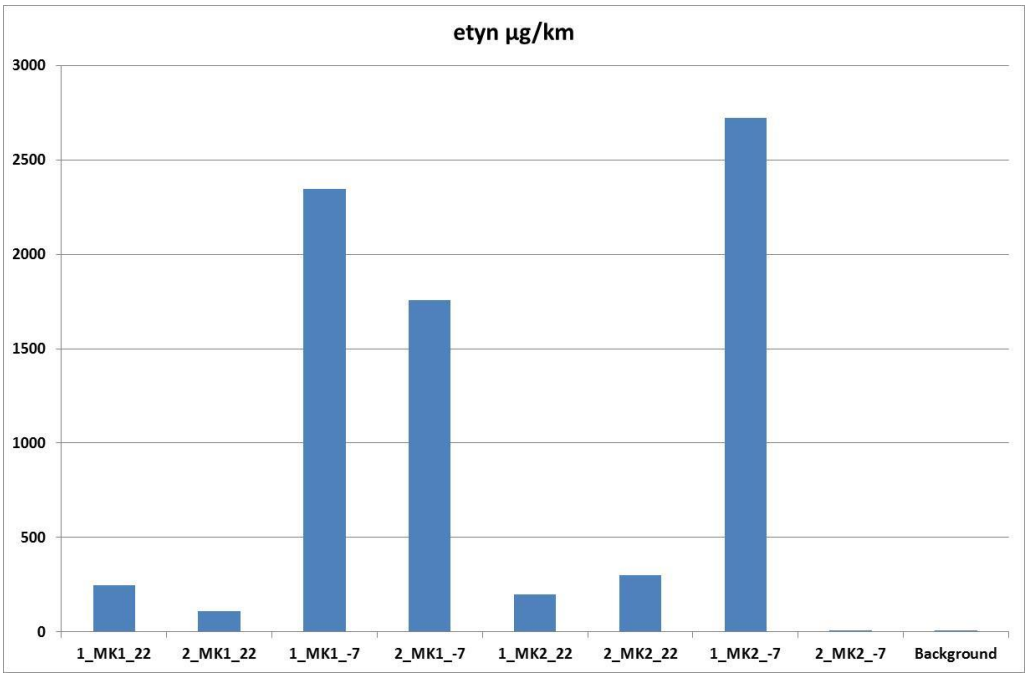

eten µg/km
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

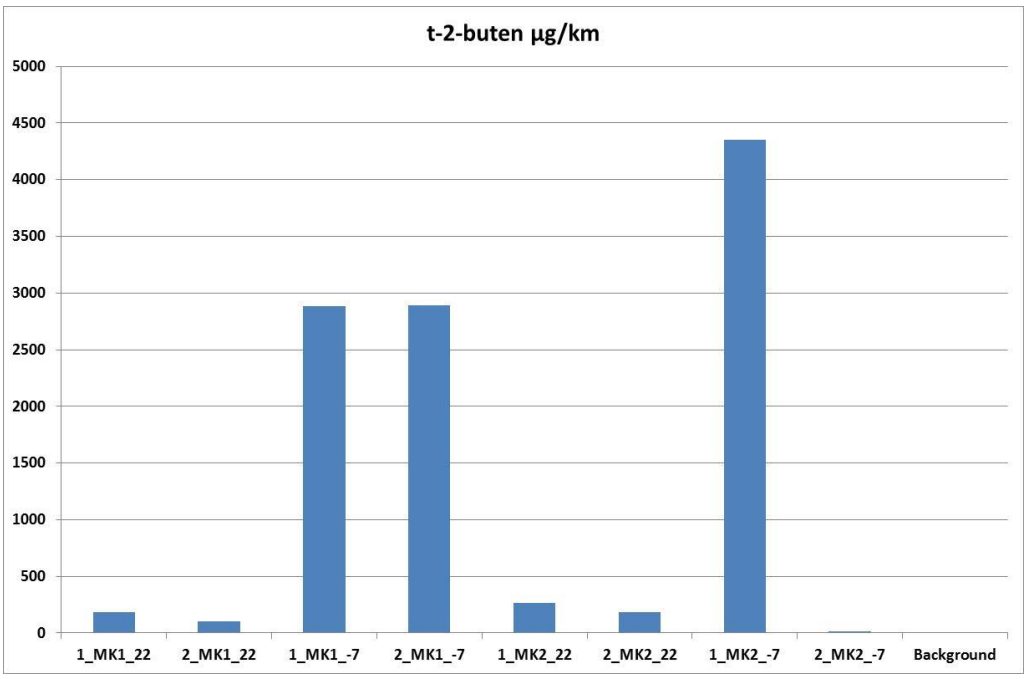

propan µg/km
1200
1000
800
600
400
200
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

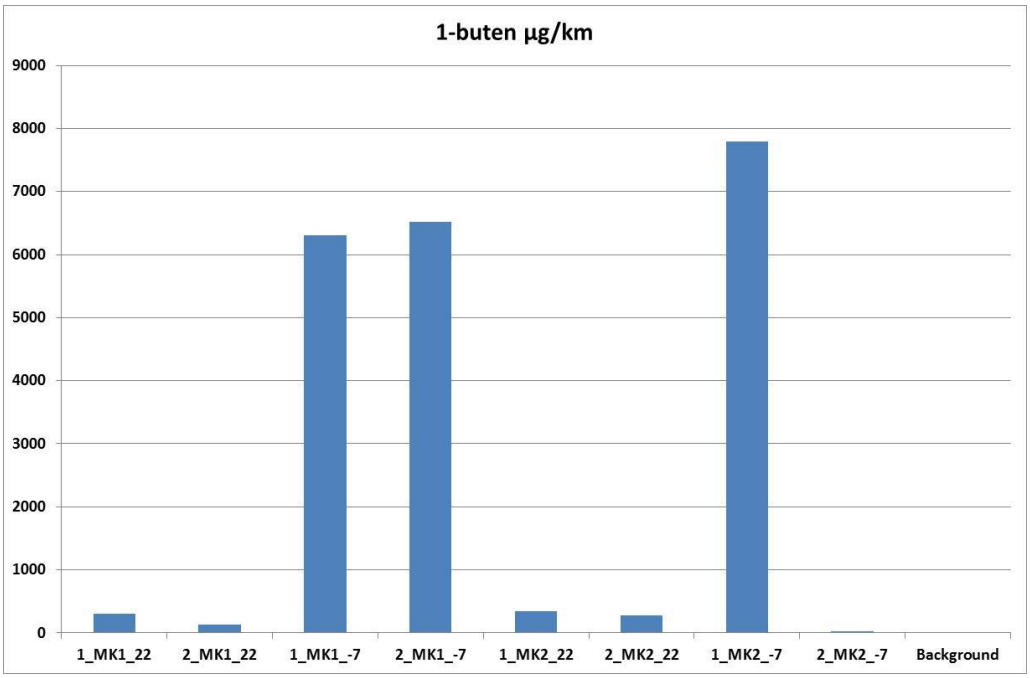

propen µg/km
40000
35000
30000
25000
20000
15000
10000
5000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

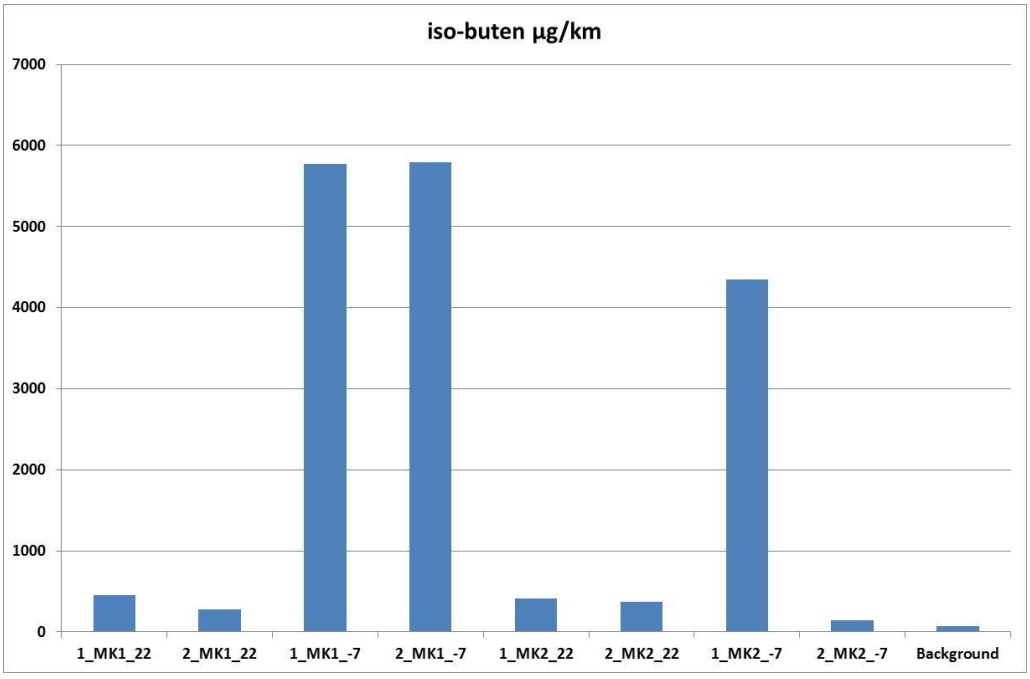

iso-butan µg/km
900
800
700
600
500
400
300
200
100
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

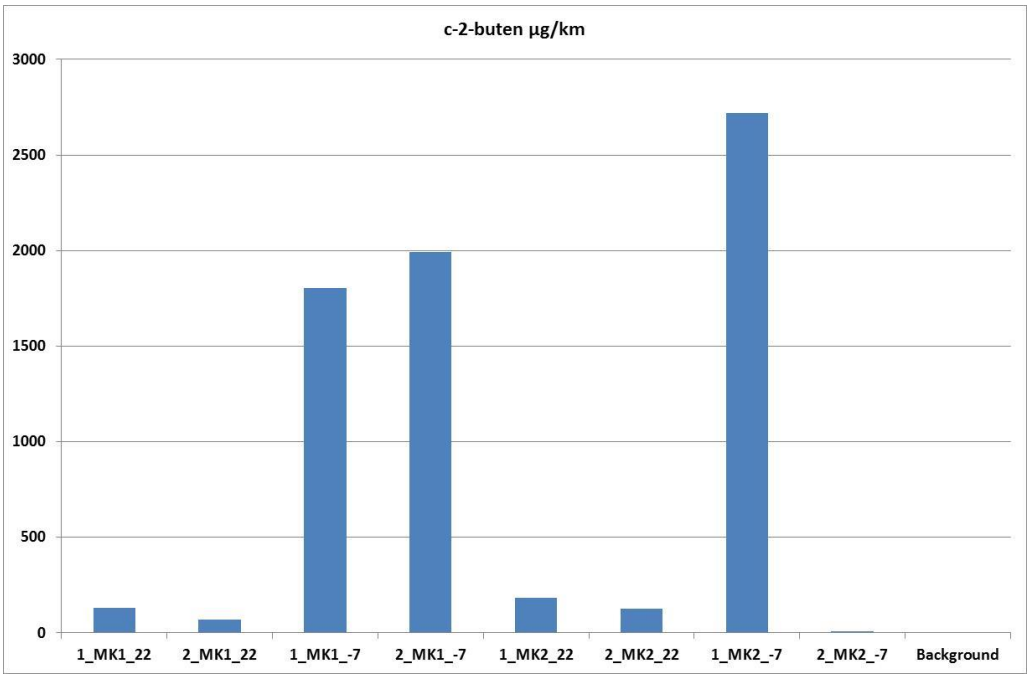

n-butan µg/km
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

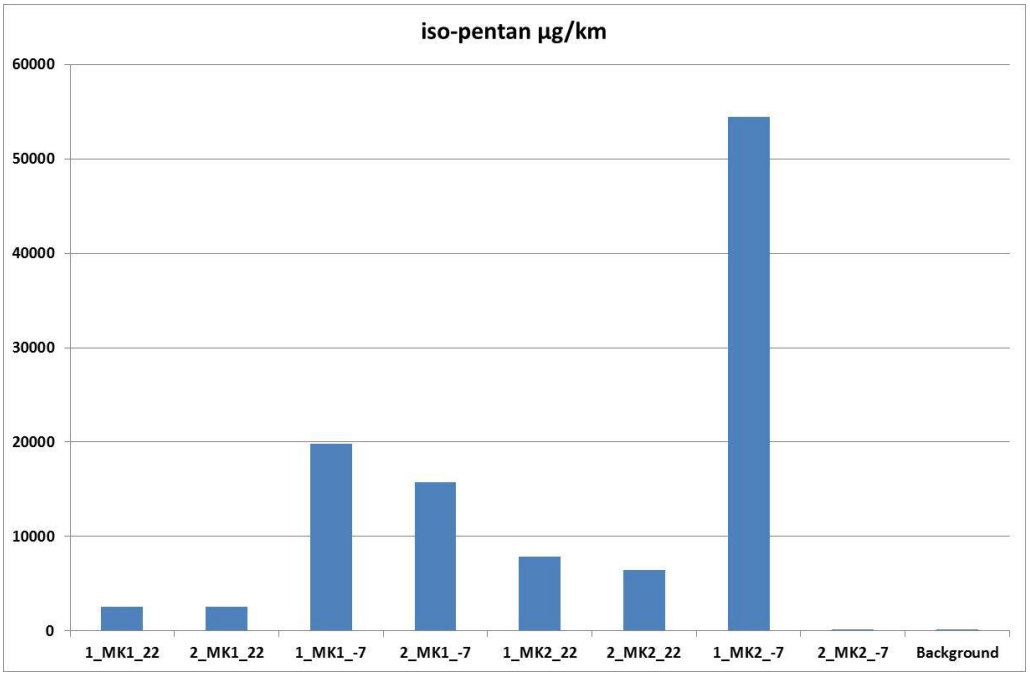

etyn µg/km
3000
2500
2000
1500
1000
500
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

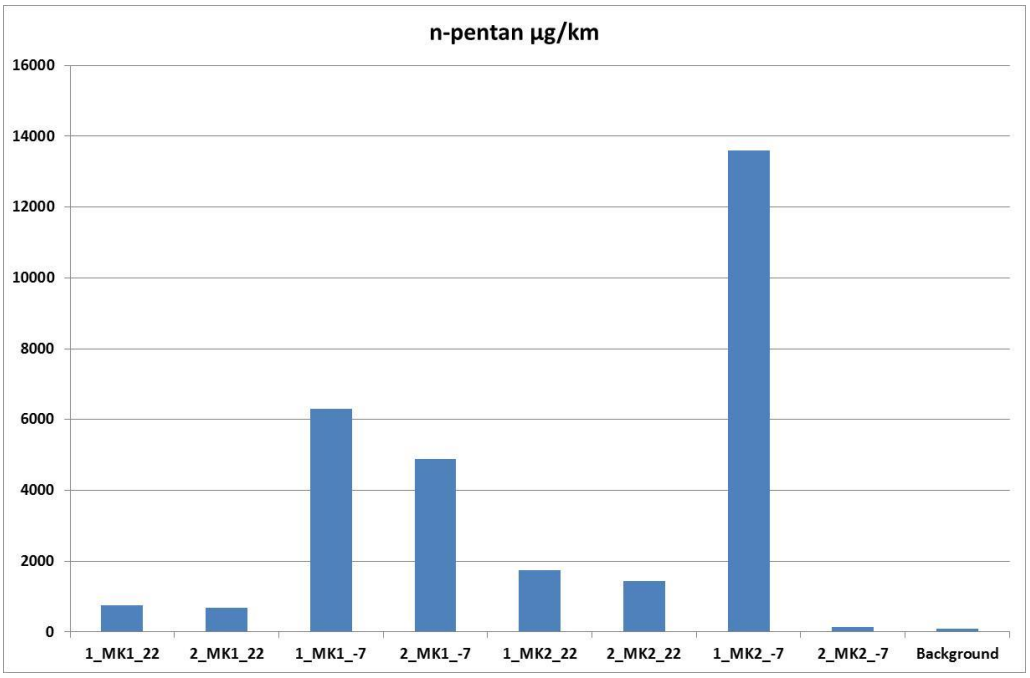

t-2-buten µg/km
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

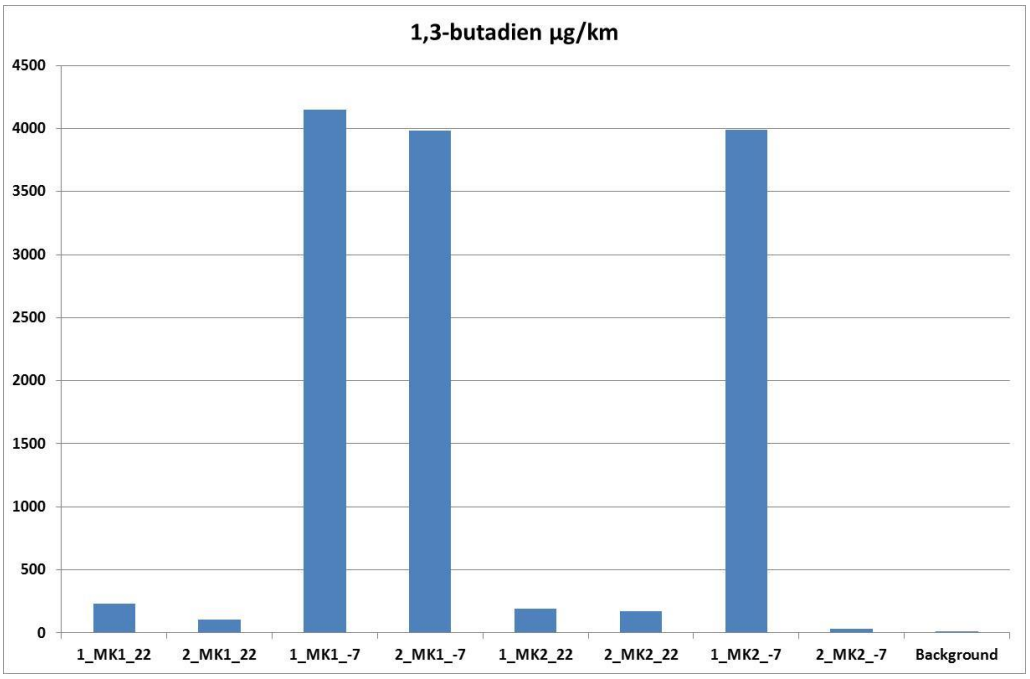

1-buten µg/km
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

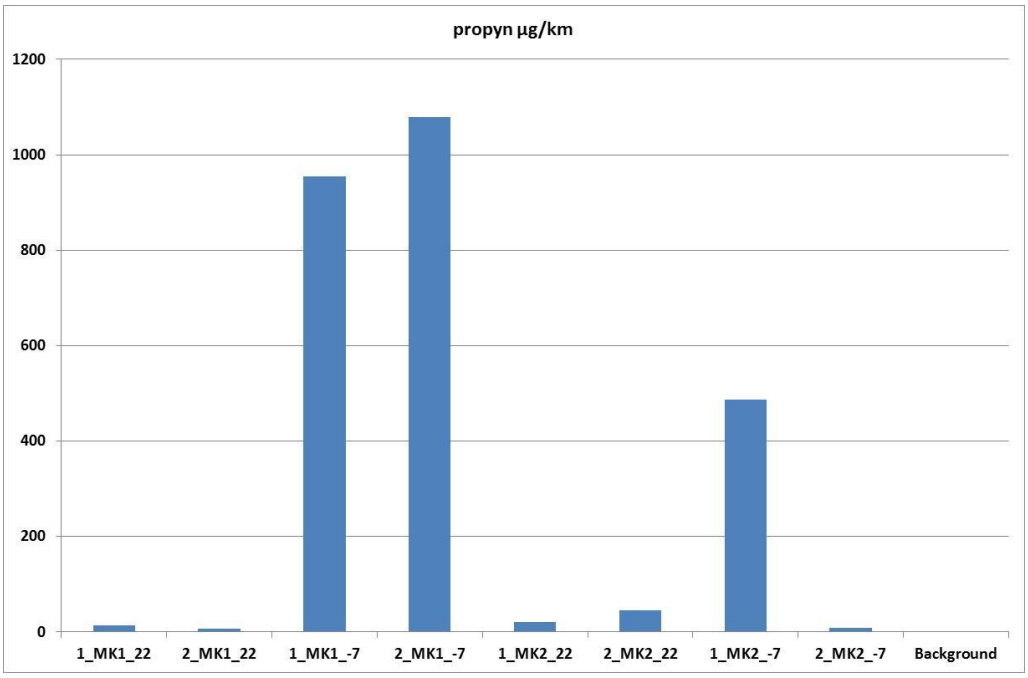

iso-buten µg/km
7000
6000
5000
4000
3000
2000
1000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

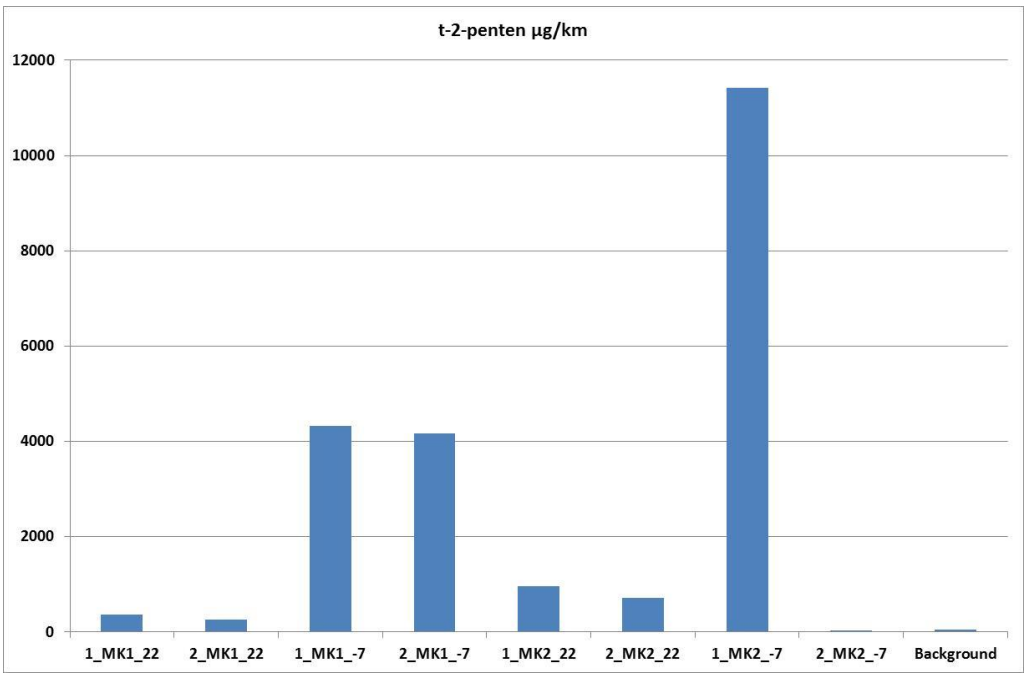

c-2-buten µg/km
3000
2500
2000
1500
1000
500
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

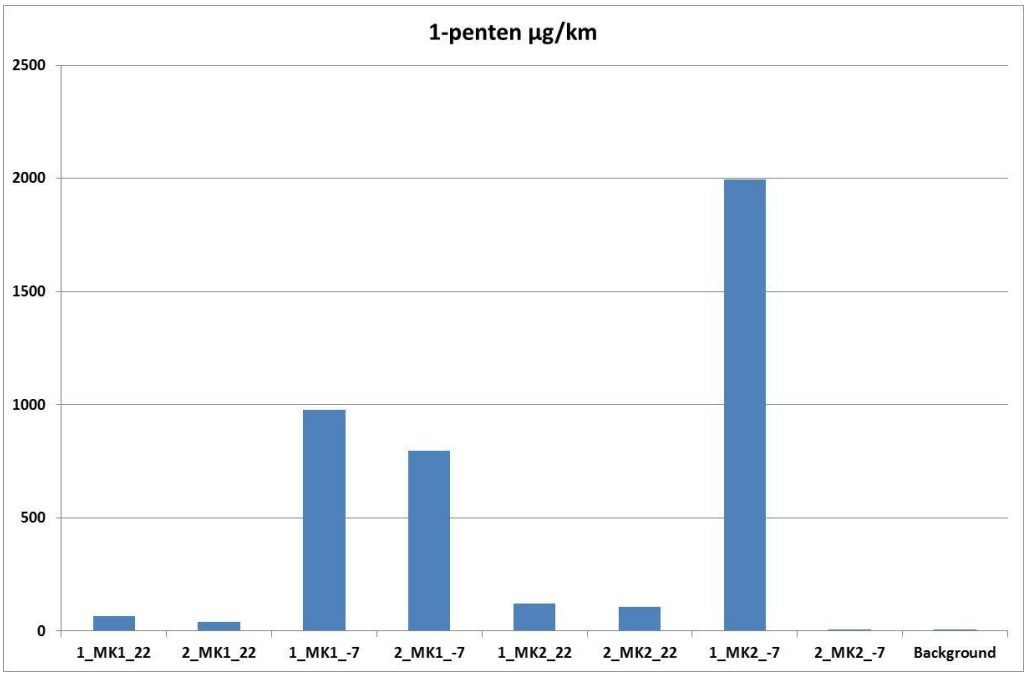

iso-pentan µg/km
60000
50000
40000
30000
20000
10000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

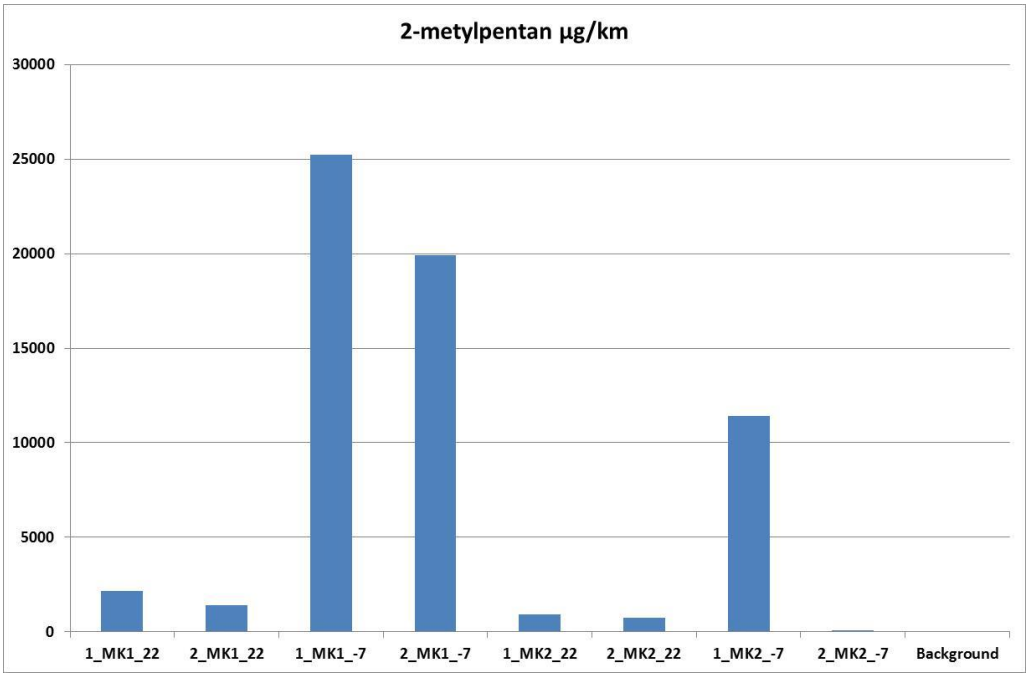

n-pentan µg/km
16000
14000
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

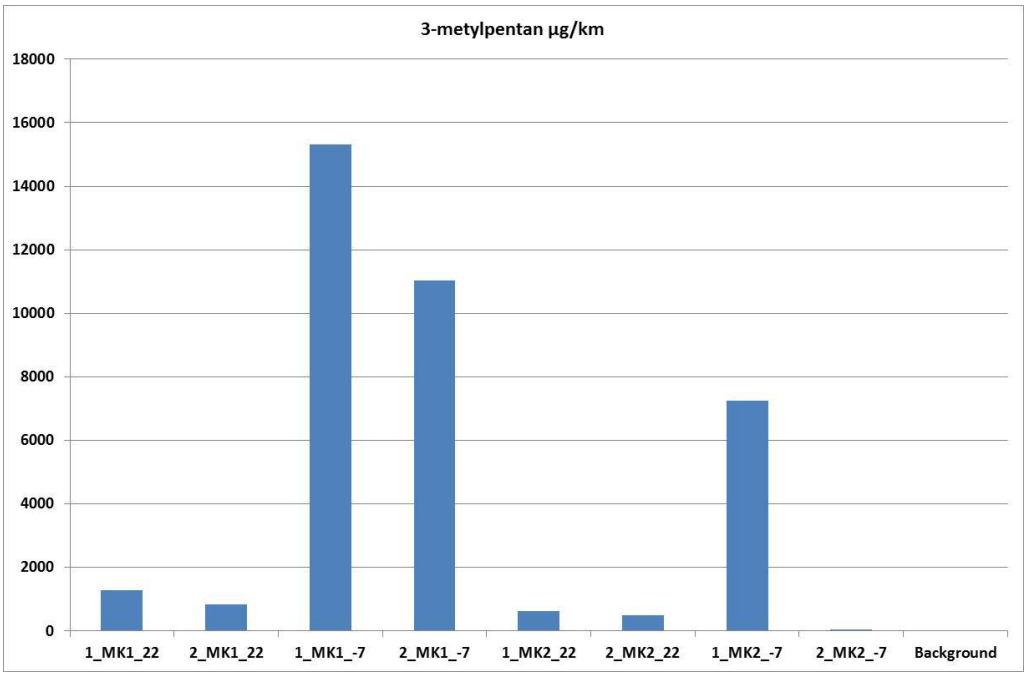

1,3-butadien µg/km
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

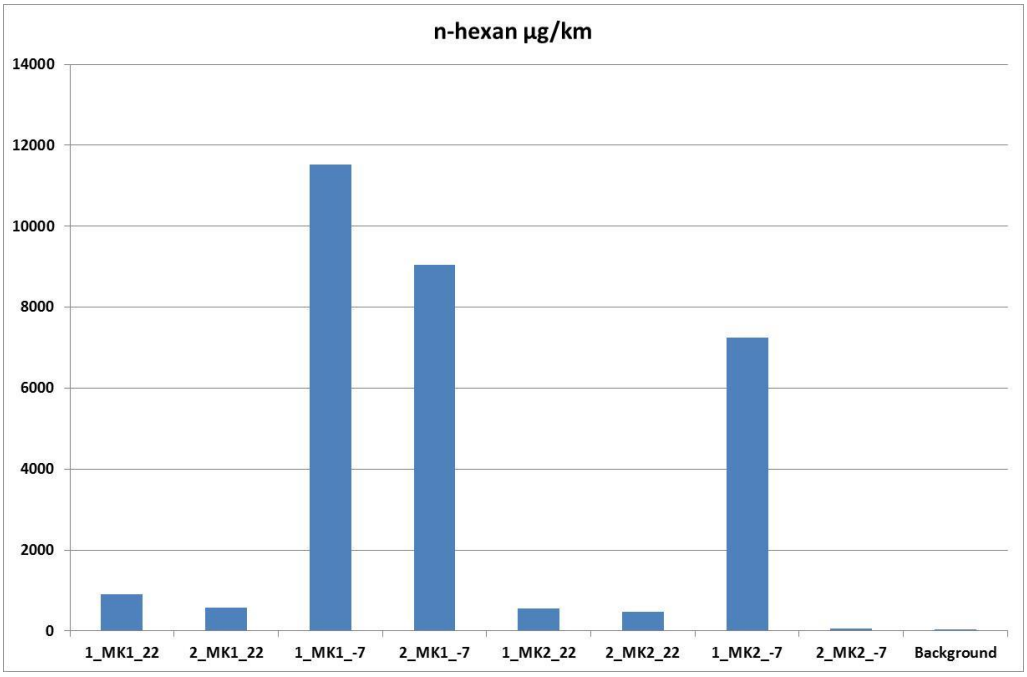

propyn µg/km
1200
1000
800
600
400
200
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

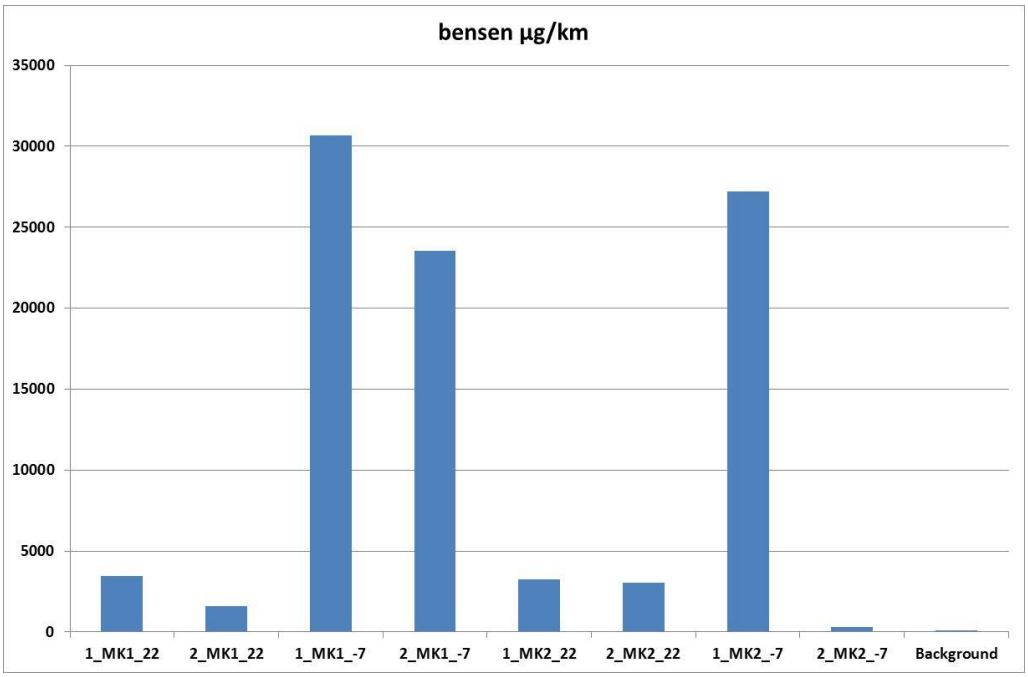

t-2-penten µg/km
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

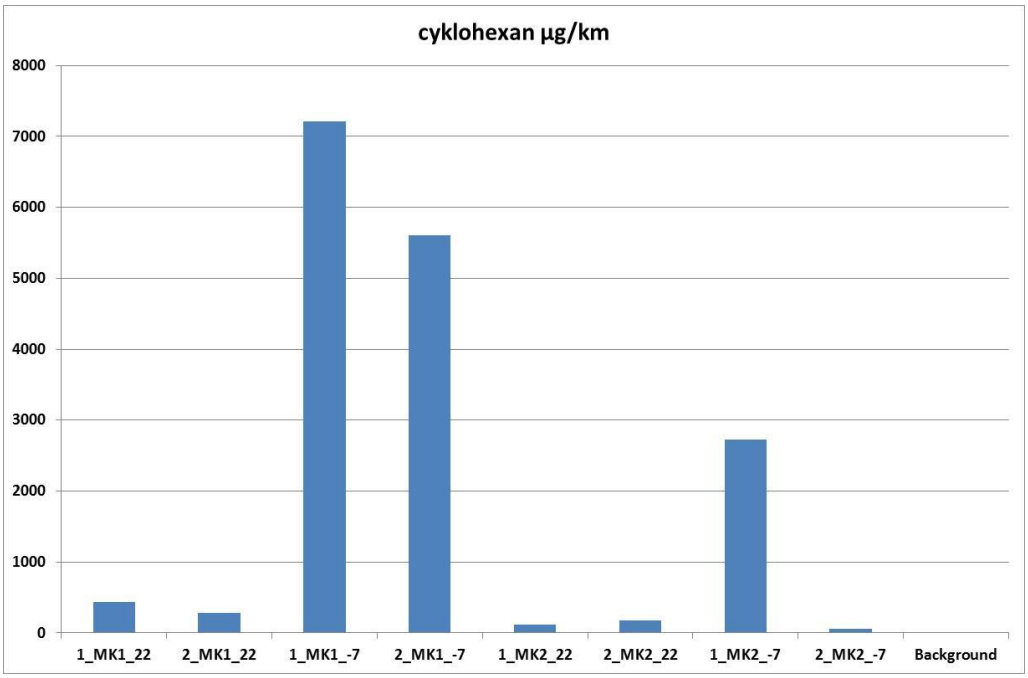

1-penten µg/km
2500
2000
1500
1000
500
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

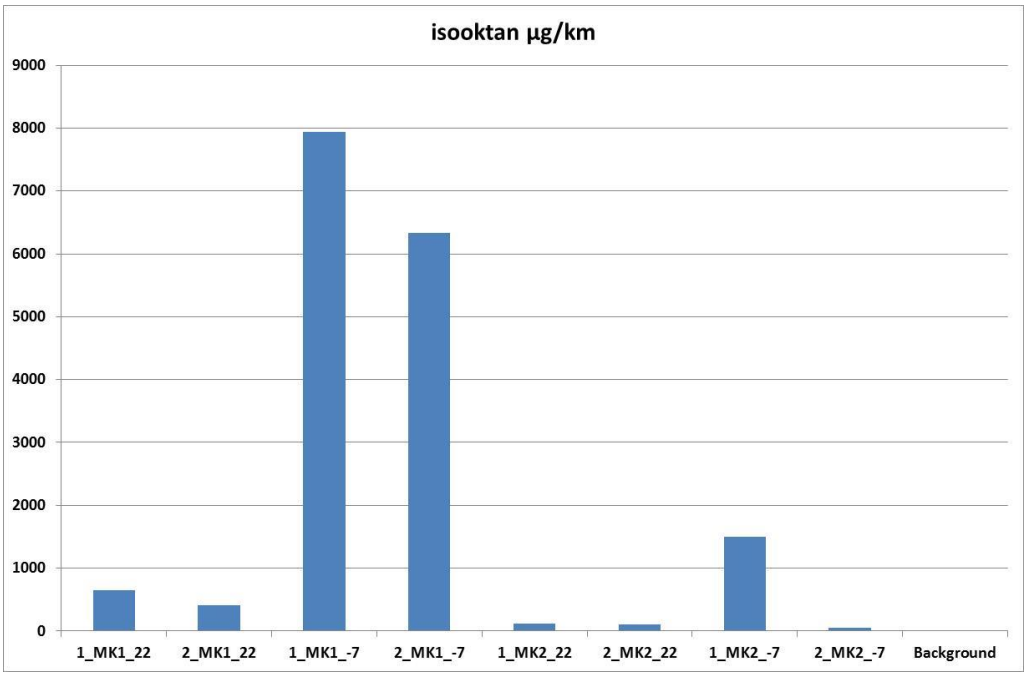

2-metylpentan µg/km
30000
25000
20000
15000
10000
5000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

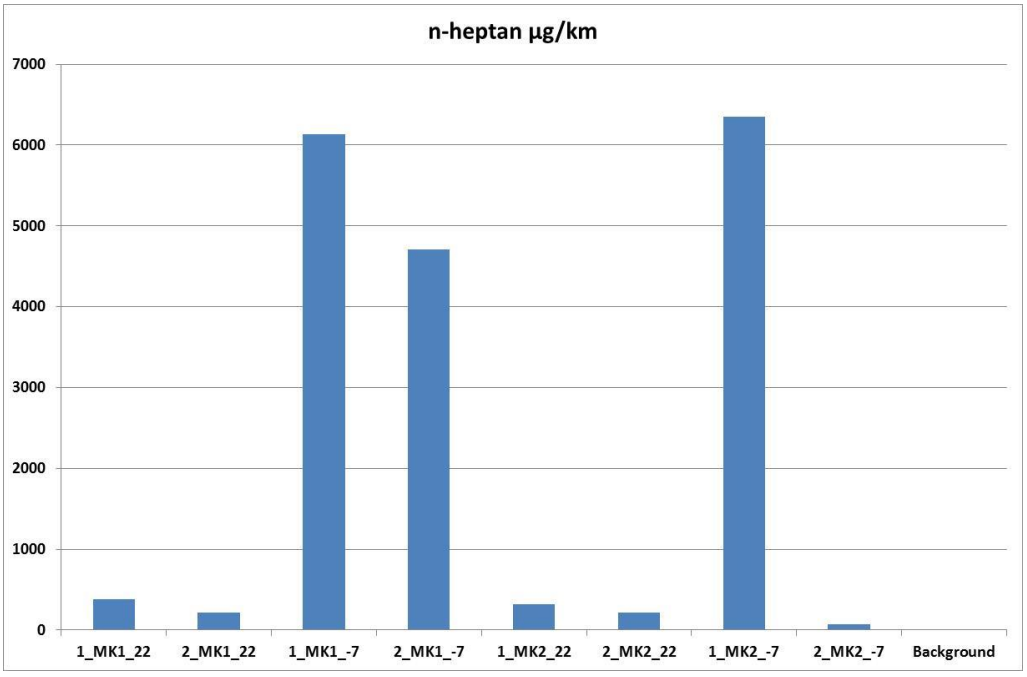

3-metylpentan µg/km
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

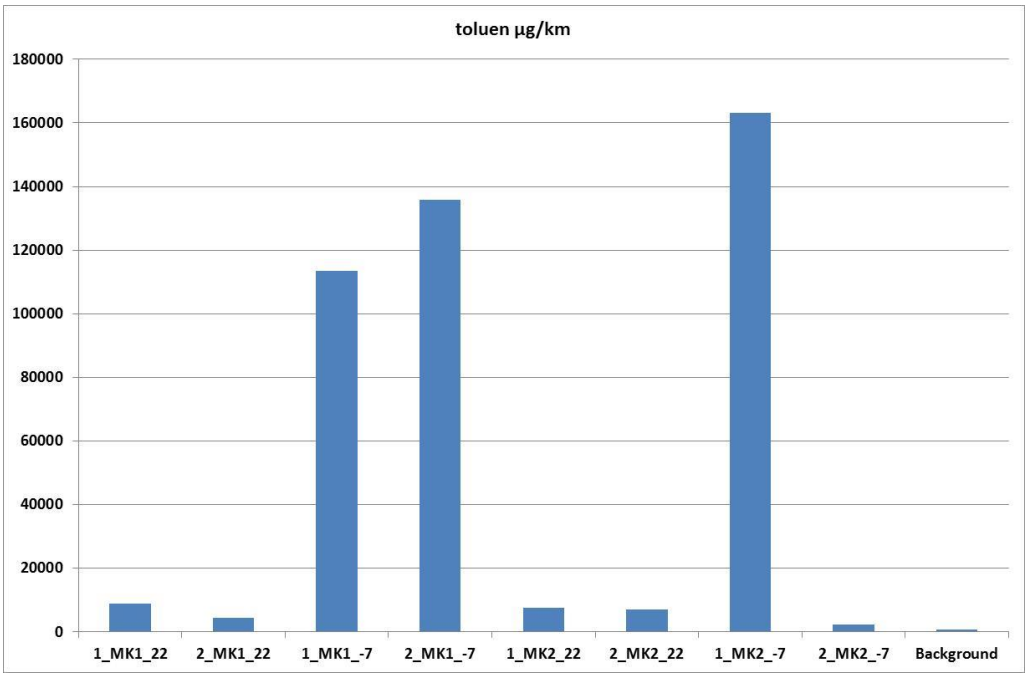

n-hexan µg/km
14000
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

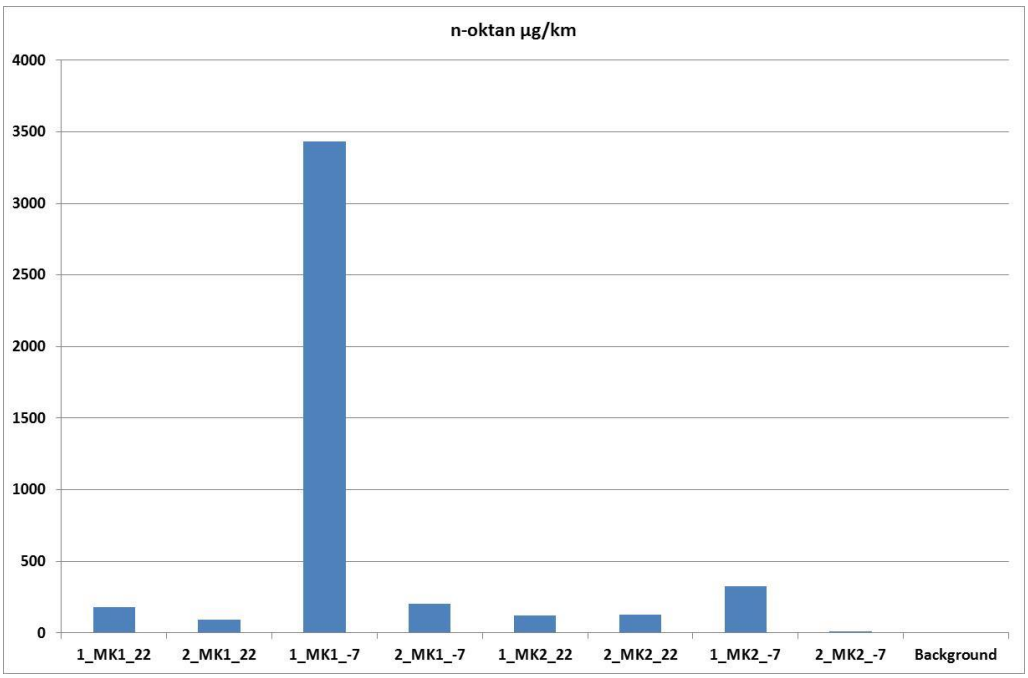

bensen µg/km
35000
30000
25000
20000
15000
10000
5000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

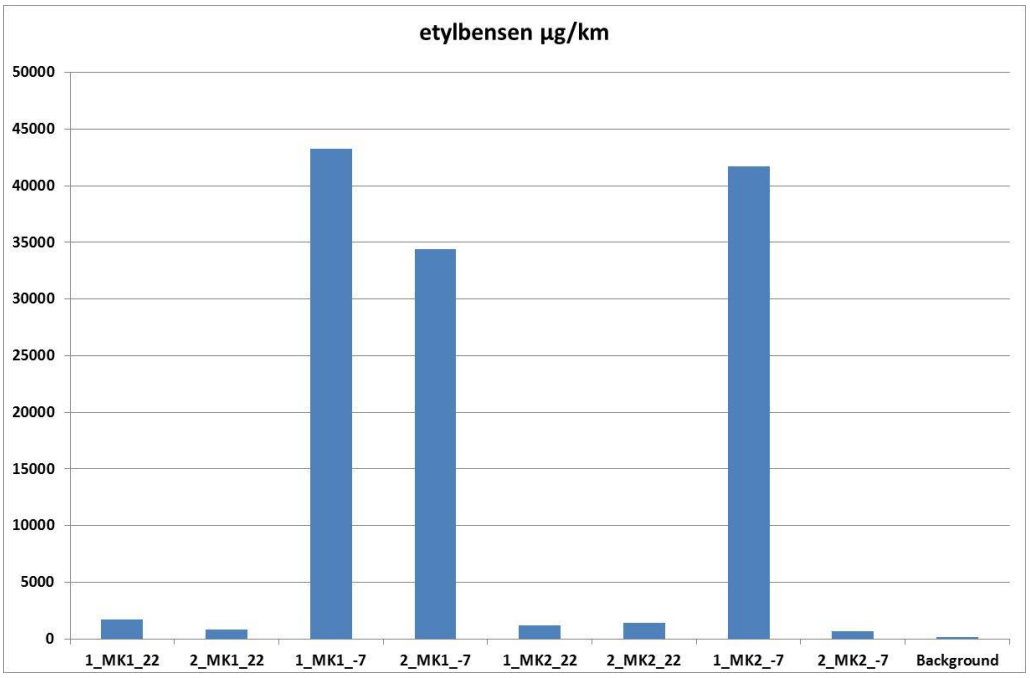

cyklohexan µg/km
8000
7000
6000
5000
4000
3000
2000
1000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

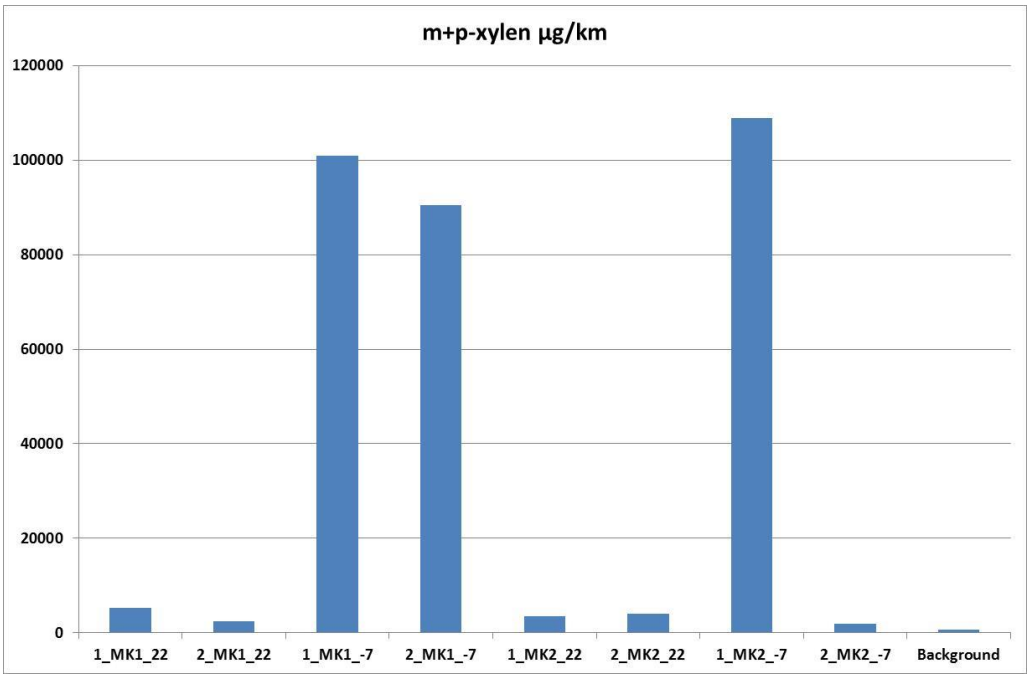

isooktan µg/km
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

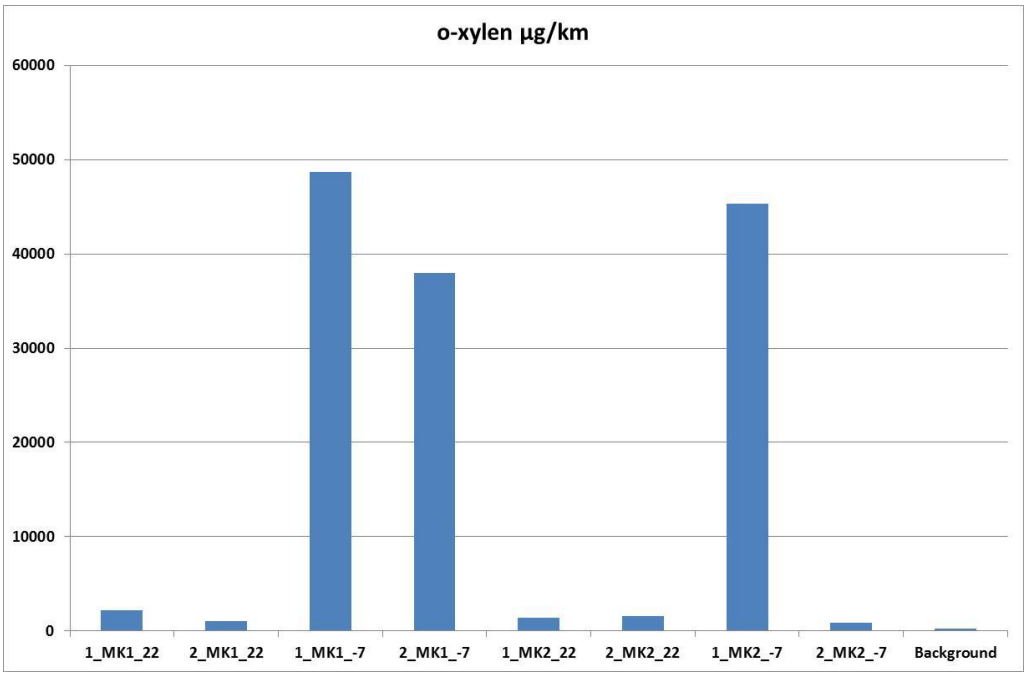

n-heptan µg/km
7000
6000
5000
4000
3000
2000
1000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

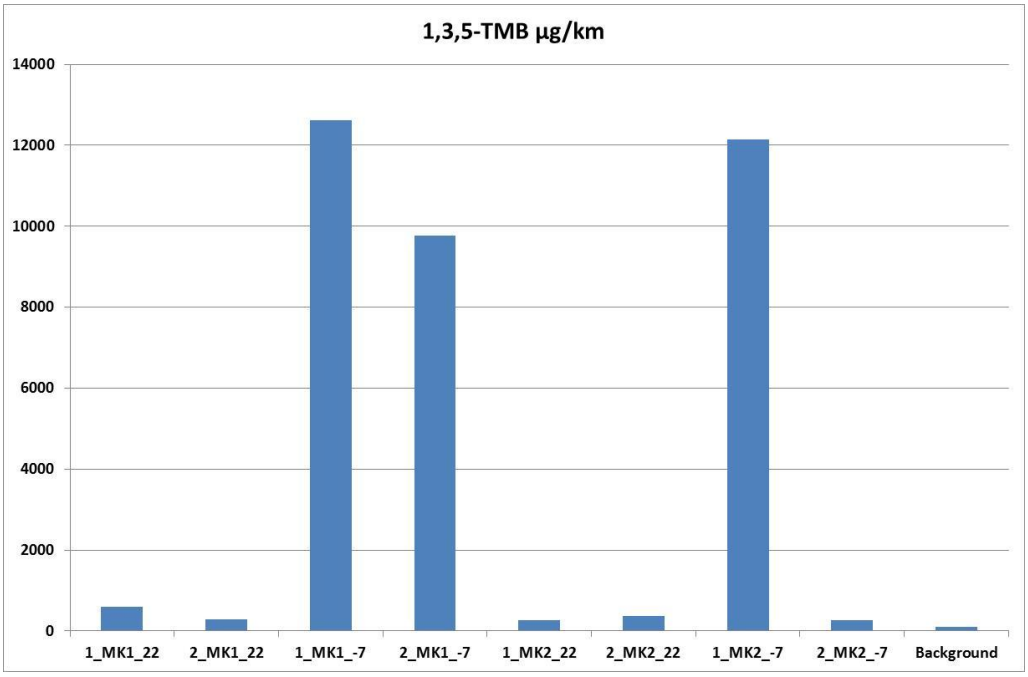

toluen µg/km
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

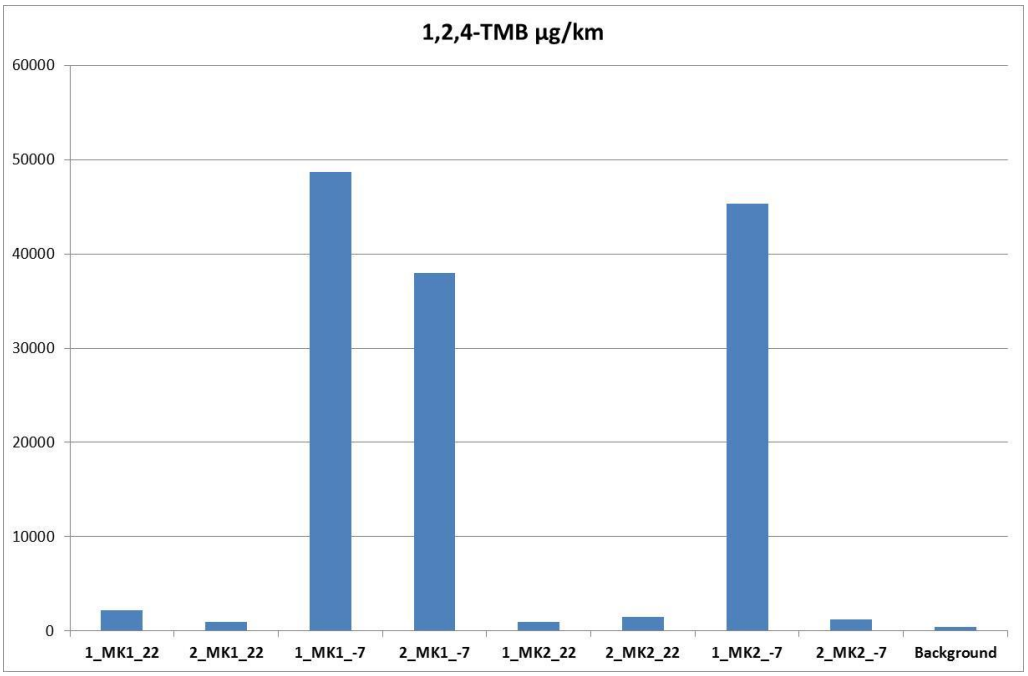

n-oktan µg/km
4000
3500
3000
2500
2000
1500
1000
500
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

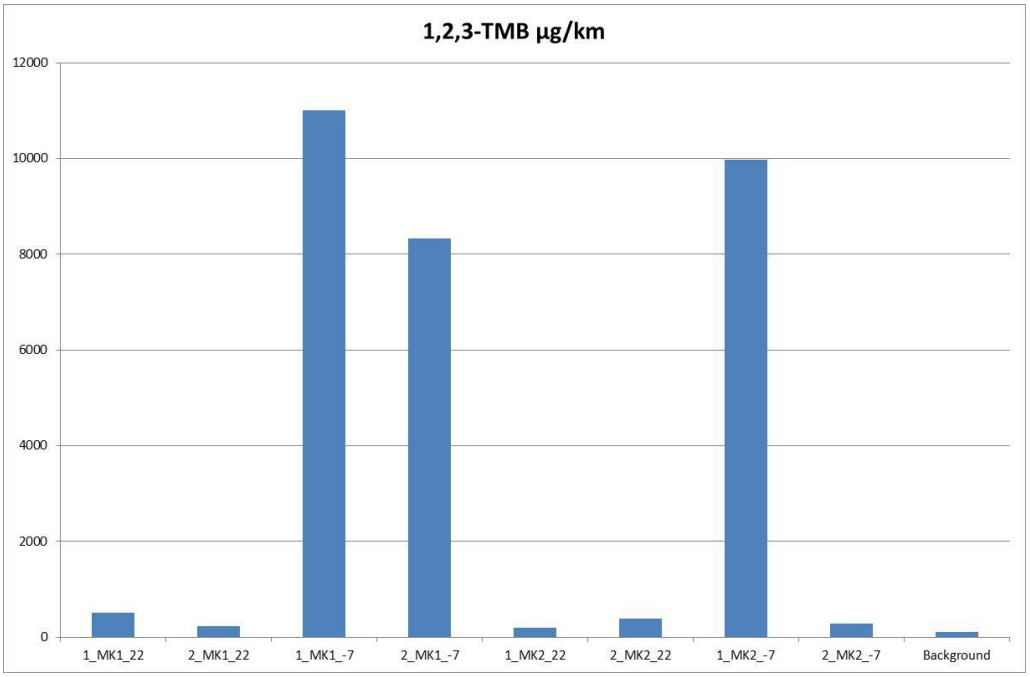

etylbensen µg/km
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background


m+p-xylen µg/km
120000
100000
80000
60000
40000
20000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

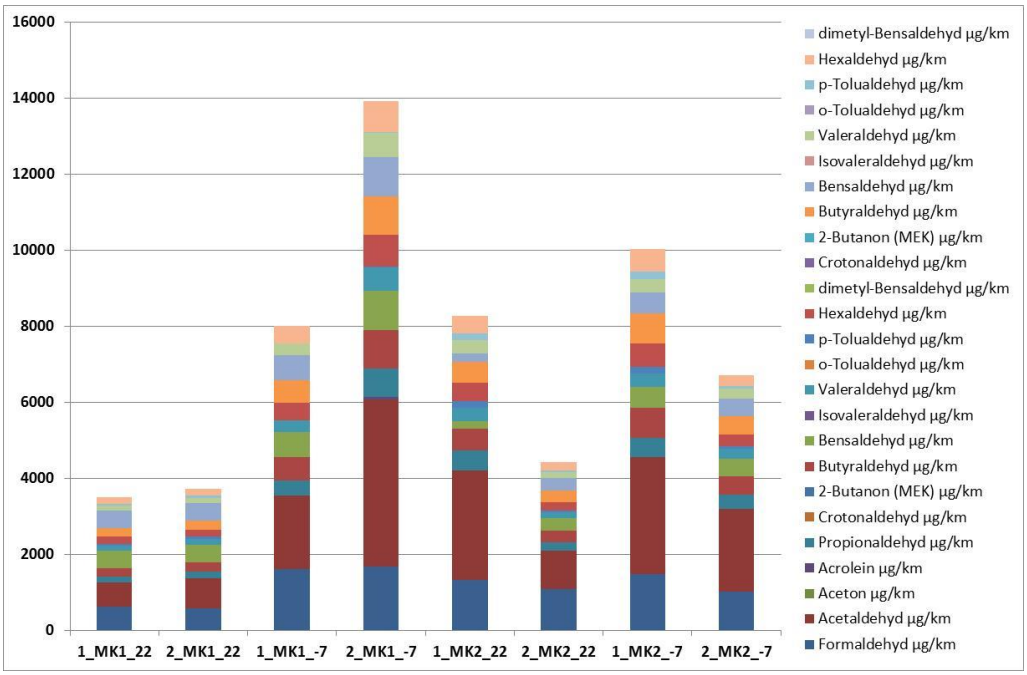

o-xylen µg/km
60000
50000
40000
30000
20000
10000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background


1,3,5-TMB µg/km
14000
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background


1,2,4-TMB µg/km
60000
50000
40000
30000
20000
10000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background


1,2,3-TMB µg/km
12000
10000
8000
6000
4000
2000
0
1_MK1_22
2_MK1_22
1_MK1_-7
2_MK1_-7
1_MK2_22
2_MK2_22
1_MK2_-7
2_MK2_-7
Background

Un-regulated results – Aldehydes



The table above summarizes the emission of aldehydes. The levels were overall low. The conclusion from this analyze is that there are no significant differences between emission of aldehydes from the two fuels used.

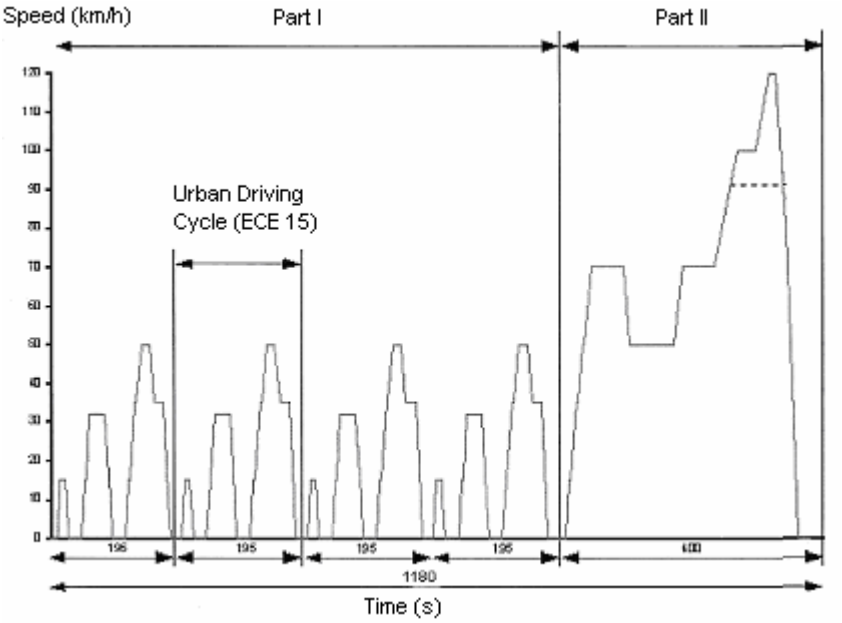
4. Conclusions

By comparing emission from the two types of fuel we can draw these conclusions:

- These tests do not show any significant differences with respect to fuel consumption and exhaust emissions
- This applies to both regulated and unregulated components
- For both fuels, the emissions were higher at the start of the cold ambient temperature compared with start in normal ambient temperatures
- After the catalyst has reached full function were all emission components relatively low. Hydrocarbons and carbon monoxide was in practice very close to zero after the catalyst reach full function. For start at -7 C this time was about 60 second and for start at 22 C about 30 seconds.

5. Driving cycles (graphs)

UDC



Source – GlobalNEST

6. Fuel specifications

Neste Oil
Anna Karvo
Certificate no: TT-14-000943 (11.3.2014)
Sample 1: MK1 Gasoline
Sample 2: EN228 Gasoline

Physical property	Method	Unit	Sample 1.	Sample 2.
Density at 15°C	ENIS012185	kg/m3	747,7	736,4
Sulphur, UV	ENIS020846	mg/kg	7,3	7,9
Vapour pressure, DVPE	EN13016-1	kPa	78,1	84,1
Ethanol 0-FID	EN1601	vol-%	4,68	4,60
Total Oxygen 0-FID	EN1601	wt-%	1,73	1,74
Phosporous, (BE)	ASTMD3231	mgil	<0,2	<0,2
Lead, (AAS)	EN237	mg/l	<2	<2
Distillation IBP	ENIS03405	°C	29,9	28,6
Distillation 5 vol-%	ENIS03405	°C	40,4	37,7
Distillation 10 vol-%	ENIS03405	°C	45,5	41,2
Distillation 20 vol-%	ENIS03405	°C	52,9	46,1
Distillation 30 vol-%	ENIS03405	°C	59,6	50,8
Distillation 40 vol-%	ENIS03405	°C	75,7	57,2
Distillation 50 vol-%	ENIS03405	°C	92,7	77,1
Distillation 60 vol-%	ENIS03405	°C	107,2	102,0
Distillation 70 vol-%	ENIS03405	°C	121,6	119,5
Distillation 80 vol-%	ENIS03405	°C	135,5	133,7
Distillation 90 vol-%	ENIS03405	°C	151,4	149,6
Distillation 95 vol-%	ENIS03405	°C	162,8	160,7
Distillation FBP	ENIS03405	°C	187,0	183,0
Distillation Recovery	ENIS03405	vol-%	96,8	97,5
Distillation Residue	ENIS03405	vol-%	1,1	1,0
Distillation Loss	ENIS03405	vol-%	2,1	1,5
Distillation 70°C (E70)	ENIS03405	vol-%	37,1	47,1
Distillation 100°C (E100)	ENIS03405	vol-%	54,9	59,1
Distillation 150°C (E150)	ENIS03405	vol-%	89,2	91,0
Benzene	ENIS022854	vol-%	0,48	0,52
Olefins	ENIS022854	vol-%	11,7	16,2
Aromatics	ENIS022854	vol-%	33,5	30,3
Research octane number, RON	ENIS05164		96,2	96,5
Motor octane number, MON	ENIS05163		85,4	85,4
Research octane number, RONc	ENIS05164		96,0	96,3
Motor octane number, MONc	ENIS05163		85,2	85,2
Manganese (TECH, ICP)	ASTMD5185	mg/kg	<0,3	<0,3

7. Appendix 1 – result table regulated emission

Test	THC (mg/km)	CH4 (mg/km)	CO (mg/km)	CO2 (g/km)	NOX (mg/km)	NO (mg/km)	FC (l/100 km)	PM (mg/km)	PN (#/km)
1_MK1_UDC_1_22C	68,698	4,147	518,6558	188,48	24,84	25,5967	8,165	0	4,82E+10
1_MK1_UDC_2_22C	0	0,002	2,1813	168,79	14,074	14,1046	7,272	0	2,54E+09
2_MK1_UDC_1_22C	48,016	3,065	411,2231	189,79	36,4951	37,094	8,211	0,242	2,61E+11
2_MK1_UDC_2_22C	0	0,105	2,4025	169,59	12,0664	12,505	7,307	0,293	3,01E+09
1_MK2_UDC_1_22C	60,755	4,876	631,564	183,92	20,627	18,4312	8,097	0,14	1,46E+11
1_MK2_UDC_2_22C	0	0	3,7229	166,17	9,8929	11,5729	7,269	0,183	2,34E+09
2_MK2_UDC_1_22C	51,134	4,587	619,7269	186,41	20,9084	20,1963	8,204	0,1	9,57E+10
2_MK2_UDC_2_22C	0	0	10,6899	167,96	12,2331	12,9356	7,348	0,104	2,06E+09
1_MK1_UDC_1_-7C	1116,14	34,873	3852,159	217,85	22,7775	22,7434	9,769	5,804	5,03E+12
1_MK1_UDC_2_-7C	1,9339	0	4,1805	177,32	15,6222	15,3896	7,64	0,08	4,00E+09
2_MK1_UDC_1_-7C	1045,566	33,868	3950,71	218,79	28,5687	28,4909	9,834	4,016	5,38E+12
2_MK1_UDC_2_-7C	4,703	0	3,3341	180,35	12,2665	11,7151	7,771	0,156	5,09E+09
1_MK2_UDC_1_-7C	1045,42	37,82	5327,858	215,22	13,812	13,8931	9,923	3,398	4,79E+12
1_MK2_UDC_2_-7C	4,301	0	115,9622	181,12	8,0391	7,449	7,932	0,354	7,14E+09
2_MK2_UDC_1_-7C	1082,868	38,23	5084,224	224,13	17,1115	20,357	10,301	4,267	5,84E+12
2_MK2_UDC_2_-7C	5,822	0,013	102,3599	180,47	9,9914	9,3928	7,903	0,117	5,75E+09

8. Appendix 2 – result table un-regulated emission

	Formaldehyd	Acetaldehyd	Aceton	Acrolein	Propionaldehyd	Crotonaldehyd	2-Butanon (MEK)	Butyraldehyd	Bensaldehyd	Isovaleraldehyd	Valeraldehyd	o-Tolualdehyd	p-Tolualdehyd
	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km
1_MK1_22	624	634	0	0	159	0	0	224	467	0	123	0	51
2_MK1_22	585	780	0	0	187	0	0	241	468	0	138	0	64
1_MK1_-7	1612	1946	0	0	393	0	0	606	657	0	312	0	0
2_MK1_-7	1671	4407	0	56	750	0	0	1017	1025	0	628	0	27
1_MK2_22	1323	2890	0	0	520	0	0	568	200	0	354	0	173
2_MK2_22	1098	1007	0	0	204	0	0	310	331	0	163	0	38
1_MK2_-7	1491	3074	0	0	498	0	0	784	557	0	343	0	194
2_MK2_-7	1013	2177	0	0	375	0	0	495	453	0	271	0	60

	Hexaldehyd	dimetyl-Bensaldehyd	Crotonaldehyd	2-Butanon (MEK)	Butyraldehyd	Bensaldehyd	Isovaleraldehyd	Valeraldehyd	o-Tolualdehyd	p-Tolualdehyd	Hexaldehyd	dimetyl-Bensaldehyd	
	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	
1_MK1_22	183	0	0	0	224	467	0	123	0	51	183	0	
2_MK1_22	176	0	0	0	241	468	0	138	0	64	176	0	
1_MK1_-7	459	0	0	0	606	657	0	312	0	0	459	0	
2_MK1_-7	827	0	0	0	1017	1025	0	628	0	27	827	0	
1_MK2_22	481	0	0	0	568	200	0	354	0	173	481	0	
2_MK2_22	216	0	0	0	310	331	0	163	0	38	216	0	
1_MK2_-7	611	0	0	0	784	557	0	343	0	194	611	0	
2_MK2_-7	299	0	0	0	495	453	0	271	0	60	299	0	

In the table above, 0 = under detection limit.

	etan	eten	propan	propen	iso-butan	n-butan	etyn	t-2-buten	1-buten	iso-buten	c-2-buten	iso-pentan	n-pentan	1,3-butadien	propyn	t-2-penten
	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km
1_MK1_22	963	3083	123	1533	166	1814	245	183	305	454	129	2539	743	229	14	370
2_MK1_22	548	1517	179	769	325	1641	112	99	133	282	69	2533	688	107	8	264
1_MK1_-7	10277	43273	923	34258	832	8294	2344	2885	6311	5770	1803	19834	6311	4147	954	4327
2_MK1_-7	9408	34376	1103	28948	769	7961	1755	2895	6513	5795	1990	15741	4885	3980	1078	4161
1_MK2_22	764	2332	209	1566	247	1794	200	263	347	409	182	7891	1756	193	21	960
2_MK2_22	717	2158	91	1496	136	1299	299	186	276	368	128	6470	1446	170	45	714
1_MK2_-7	8342	41709	1111	27202	758	8161	2720	4352	7798	4352	2720	54403	13601	3990	486	11425
2_MK2_-7	46	127	414	125	155	258	9	15	30	144	10	191	146	31	9	28
Background	39	57	33	43	21	84	9	5	4	72	3	191	87	10		47

	1-penten	2-metylpentan	3-metylpentan	n-hexan	bensen	cyklohexan	isooktan	n-heptan	toluen	n-oktan	etylbensen	m+p-xylen	o-xylen	1,3,5-TMB	1,2,4-TMB	1,2,3-TMB
	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km	µg/km
1_MK1_22	67	2177	1285	899	3446	430	645	381	8888	180	1723	5260	2177	590	2177	517
2_MK1_22	39	1400	830	575	1570	284	409	217	4524	95	811	2533	1035	285	989	227
1_MK1_-7	979	25243	15326	11533	30652	7212	7933	6130	113593	3434	43273	100971	48683	12621	48683	10999
2_MK1_-7	797	19902	11037	9046	23520	5609	6332	4704	135695	206	34376	90463	37995	9778	37995	8323
1_MK2_22	121	924	618	564	3228	114	116	320	7533	125	1221	3587	1390	272	928	191
2_MK2_22	105	736	487	478	3058	174	105	212	7014	126	1395	4135	1576	374	1518	388
1_MK2_-7	1995	11425	7254	7254	27202	2720	1494	6348	163210	327	41709	108807	45336	12150	45336	9974
2_MK2_-7	6	89	58	67	296	57	53	74	2358	8	665	1999	866	266	1193	285
Background	6	36	25	32	73	11	12	10	712	7	199	633	280	93	412	101

9. Appendix 3 – test protocols regulated emission

1_MK1 – UDC_1_2 (22 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-22 14:48		**Testzelle: 03**

Testbegleitdaten 2014072203-6

Testdatum:	2014-07-22 14:48	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56131

Fahrzeug *S1296*

Auftraggeber:	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugmo:	Hyundai i10	Hubraum [cm³]:	
Kennzeichen:	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma:	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff **EcoTraffic Neste Oil Sample1**

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850	Dichte[kg/l]:	0,748

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	22,0	22,0			21,990
Luftdruck:	[mbar]	1007	1007			1007
Relative Luftfeuchtigkeit:	[%]	45,0	45,0			45,0
Absolute Luftfeuchtigkeit:	[g/kg]	7,4	7,4			7,4
NOX Korrekturfaktor:	[-]	0,902	0,903			0,902
Verdünnungsfaktor (Beutel):	[-]	21,87	24,19			23,03
CVS Volumen bei 20°C:	[m³]	73,186	73,187			146,374
CVS Volumen bei 0°C:	[m³]	68,193	68,194			136,387
CVS Temperatur	[°C]	34,963	34,953			34,958
PTS-Volumen bei 20°C	[l]	902,4	0,0			902,4
PTS-Volumen bei 0°C	[l]	840,8	0,0			840,8
Wegstrecke	[km]	4,035	4,051			8,086
Wegstrecke	[mi]	2,507	2,517			5,024
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,013	0,000			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	2,66E+04	1,41E+02			1,34E+04
Partikelanzahl	[1]	1,95E+12	1,03E+10			1,96E+12
Partikelanzahl vor Verd.	[1/cm³]	51,881	0,275			26,078
Verd. Faktor (Partikelanzahl)	[1]	512,330	512,330			512,330
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	9,01	2,69	2,58	2,73				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	2,09	1,83	1,75	1,83				
NMHC	[ppm C1] :	6,92	0,86	0,82	0,90				
CO	[ppm] :	25,00	0,47	0,52	0,43				
NOX	[ppm] :	0,89	0,10	0,56	0,11				
NO	[ppm] :	0,77	-0,05	0,47	0,02				
CO2	[%] :	0,609	0,043	0,554	0,045				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	68,698	0,000			34,281
CH4	[mg/km]	4,147	0,002			2,071
NMHC	[mg/km]	65,0331	0,0000			32,4522
NOX	[mg/km]	24,8431	14,0740			19,4479
NO	[mg/km]	25,5967	14,1046			19,8393
HC+NOx	[mg/km]	93,5412	14,0740			53,7290
CO	[mg/km]	518,6558	2,1813			259,9076
CO2	[g/km]	188,48	168,79			178,61
Partikel	[mg/km]					0,258
Partikelanzahl	[1/km]	4,82E+11	2,54E+09			2,42E+11

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	8,165	7,272			7,718
Kraftstoff-Wirtschaftlich	[km/l]	12,248	13,751			12,957
Kraftstoff-Wirtschaftlich	[mi/gal]	28,805	32,341			30,474

Bemerkungen/Sonstiges

Test 1

Behälter FS22

2_MK1 – UDC_1_2 (22 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-23 07:22		**Testzelle: 03**

Testbegleitdaten **2014072303-2**

Testdatum:	2014-07-23 07:22	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56139

Fahrzeug ***S1296***

Auftraggeber	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugmo	Hyundai i10	Hubraum [cm³]:	
Kennzeiche	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff **EcoTraffic Neste Oil Sample1**

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850	Dichte[kg/l]:	0,748

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	22,0	22,0			21,993
Luftdruck:	[mbar]	1008	1008			1008
Relative Luftfeuchtigkeit:	[%]	45,0	45,0			45,0
Absolute Luftfeuchtigkeit:	[g/kg]	7,4	7,4			7,4
NOX Korrekturfaktor:	[-]	0,902	0,902			0,902
Verdünnungsfaktor (Beutel):	[-]	21,60	23,86			22,73
CVS Volumen bei 20°C:	[m³]	73,246	73,242			146,488
CVS Volumen bei 0°C:	[m³]	68,249	68,245			136,494
CVS Temperatur	[°C]	34,951	34,976			34,963
PTS-Volumen bei 20°C	[l]	451,1	451,1			902,2
PTS-Volumen bei 0°C	[l]	420,3	420,3			840,7
Wegstrecke	[km]	4,048	4,066			8,114
Wegstrecke	[mi]	2,515	2,527			5,042
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,006	0,007			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	1,44E+04	1,67E+02			7,31E+03
Partikelanzahl	[1]	1,06E+12	1,22E+10			1,07E+12
Partikelanzahl vor Verd.	[1/cm³]	28,193	0,327			14,260
Verd. Faktor (Partikelanzahl)	[1]	512,330	512,330			512,330
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	7,32	2,94	2,79	2,96				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	2,20	2,04	1,96	2,03				
NMHC	[ppm C1] :	5,11	0,90	0,84	0,93				
CO	[ppm] :	20,00	0,51	0,59	0,50				
NOX	[ppm] :	1,21	0,04	0,44	0,05				
NO	[ppm] :	1,13	-0,06	0,37	-0,04				
CO2	[%] :	0,618	0,047	0,561	0,049				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	48,016	0,000			23,955
CH4	[mg/km]	3,065	0,105			1,582
NMHC	[mg/km]	45,3072	0,0000			22,6033
NOX	[mg/km]	36,4951	12,0664			24,2536
NO	[mg/km]	37,0924	12,5050			24,7714
HC+NOx	[mg/km]	84,5111	12,0664			48,2084
CO	[mg/km]	411,2231	2,4025			206,3593
CO2	[g/km]	189,79	169,59			179,67
Partikel	[mg/km]	0,242	0,293			0,268
Partikelanzahl	[1/km]	2,61E+11	3,01E+09			1,32E+11

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	8,211	7,307			7,758
Kraftstoff-Wirtschaftlich	[km/l]	12,178	13,686			12,890
Kraftstoff-Wirtschaftlich	[mi/gal]	28,642	32,188			30,316

Bemerkungen/Sonstiges

2.Test

Behälter FS26

1_MK2 – UDC_1_2 (22 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-29 09:37		**Testzelle: 03**

Testbegleitdaten 2014072903-5

Testdatum:	2014-07-29 09:37	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56281

Fahrzeug *S1296*

Auftraggeber:	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugmo:	Hyundai i10	Hubraum [cm³]:	
Kennzeichen:	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma:	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff *Eco Traffic Neste Oil Sample 2*

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850	Dichte[kg/l]:	0,736

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	22,0	22,0			21,986
Luftdruck:	[mbar]	1000	1000			1000
Relative Luftfeuchtigkeit:	[%]	46,9	45,5			46,2
Absolute Luftfeuchtigkeit:	[g/kg]	7,8	7,6			7,7
NOX Korrekturfaktor:	[-]	0,912	0,906			0,909
Verdünnungsfaktor (Beutel):	[-]	21,90	23,99			22,95
CVS Volumen bei 20°C:	[m³]	72,637	72,648			145,285
CVS Volumen bei 0°C:	[m³]	67,681	67,692			135,373
CVS Temperatur	[°C]	34,958	34,957			34,957
PTS-Volumen bei 20°C	[l]	451,0	451,1			902,2
PTS-Volumen bei 0°C	[l]	420,3	420,4			840,6
Wegstrecke	[km]	4,050	4,072			8,122
Wegstrecke	[mi]	2,517	2,530			5,047
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,004	0,005			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	8,14E+03	1,31E+02			4,13E+03
Partikelanzahl	[1]	5,91E+11	9,54E+09			6,01E+11
Partikelanzahl vor Verd.	[1/cm³]	15,886	0,257			8,071
Verd. Faktor (Partikelanzahl)	[1]	512,330	512,330			512,330
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	8,91	3,30	3,13	3,31				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	2,68	2,38	2,27	2,37				
NMHC	[ppm C1] :	6,23	0,92	0,86	0,94				
CO	[ppm] :	30,51	0,29	0,43	0,26				
NOX	[ppm] :	0,84	0,19	0,55	0,24				
NO	[ppm] :	0,71	0,13	0,44	0,07				
CO2	[%] :	0,608	0,050	0,558	0,051				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	60,755	0,000			30,295
CH4	[mg/km]	4,876	0,000			2,432
NMHC	[mg/km]	56,4457	0,0000			28,1464
NOX	[mg/km]	20,6270	9,8929			15,2454
NO	[mg/km]	18,4312	11,5729			14,9928
HC+NOx	[mg/km]	81,3823	9,8929			45,5408
CO	[mg/km]	631,5654	3,7229			316,7939
CO2	[g/km]	183,92	166,17			175,02
Partikel	[mg/km]	0,140	0,183			0,162
Partikelanzahl	[1/km]	1,46E+11	2,34E+09			7,40E+10

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	8,097	7,269			7,682
Kraftstoff-Wirtschaftlich	[km/l]	12,350	13,756			13,017
Kraftstoff-Wirtschaftlich	[mi/gal]	29,045	32,354			30,615

Bemerkungen/Sonstiges

FS 11 MK2

Test1 22°C

2_MK2 – UDC_1_2 (22 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-30 07:48		**Testzelle: 03**

Testbegleitdaten 2014073003-3

Testdatum:	2014-07-30 07:48	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56289

Fahrzeug *S1296*

Auftraggeb	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugm	Hyundai i10	Hubraum [cm³]:	
Kennzeiche	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff *Eco Traffic Neste Oil Sample 2*

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850	Dichte[kg/l]:	0,736

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	22,0	22,0			21,988
Luftdruck:	[mbar]	1001	1001			1001
Relative Luftfeuchtigkeit:	[%]	45,0	45,0			45,0
Absolute Luftfeuchtigkeit:	[g/kg]	7,5	7,5			7,5
NOX Korrekturfaktor:	[-]	0,903	0,904			0,904
Verdünnungsfaktor (Beutel):	[-]	21,83	23,94			22,89
CVS Volumen bei 20°C:	[m³]	72,679	72,680			145,360
CVS Volumen bei 0°C:	[m³]	67,721	67,722			135,443
CVS Temperatur	[°C]	35,001	34,969			34,985
PTS-Volumen bei 20°C	[l]	451,1	451,1			902,2
PTS-Volumen bei 0°C	[l]	420,3	420,3			840,7
Wegstrecke	[km]	4,041	4,068			8,109
Wegstrecke	[mi]	2,511	2,528			5,039
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,003	0,003			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	5,32E+03	1,15E+02			2,72E+03
Partikelanzahl	[1]	3,87E+11	8,36E+09			3,95E+11
Partikelanzahl vor Verd.	[1/cm³]	54,966	1,189			28,077
Verd. Faktor (Partikelanzahl)	[1]	96,810	96,810			96,810
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	7,51	2,80	2,67	2,82				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	2,23	1,94	1,87	1,95				
NMHC	[ppm C1] :	5,27	0,86	0,80	0,87				
CO	[ppm] :	29,78	0,21	0,69	0,18				
NOX	[ppm] :	0,92	0,26	0,68	0,29				
NO	[ppm] :	0,72	0,07	0,47	0,06				
CO2	[%] :	0,610	0,046	0,559	0,048				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	51,134	0,000			25,482
CH4	[mg/km]	4,587	0,000			2,286
NMHC	[mg/km]	47,0798	0,0000			23,4615
NOX	[mg/km]	20,9084	12,2331			16,5563
NO	[mg/km]	20,1963	12,9356			16,5539
HC+NOx	[mg/km]	72,0421	12,2331			42,0380
CO	[mg/km]	619,7264	10,6899			314,1942
CO2	[g/km]	186,41	167,96			177,15
Partikel	[mg/km]	0,100	0,104			0,102
Partikelanzahl	[1/km]	9,57E+10	2,06E+09			4,87E+10

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	8,204	7,348			7,775
Kraftstoff-Wirtschaftlich	[km/l]	12,189	13,609			12,862
Kraftstoff-Wirtschaftlich	[mi/gal]	28,668	32,007			30,251

Bemerkungen/Sonstiges

2.Test MK2
Behälter FS14

1_MK1 – UDC_1_2 (-7 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-24 09:41		**Testzelle: 03**

Testbegleitdaten 2014072403-2

Testdatum:	2014-07-24 09:41	Fahrkurve:	NEFZ_MAN|default|hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56147

Fahrzeug *S1296*

Auftraggeber:	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugmo:	Hyundai i10	Hubraum [cm³]:	
Kennzeichen:	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma:	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff *EcoTraffic Neste Oil Sample1*

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850 Dichte[kg/l]: 0,748

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	-6,9	-7,0			-6,982
Luftdruck:	[mbar]	1005	1005			1005
Relative Luftfeuchtigkeit:	[%]	0,0	0,0			0,0
Absolute Luftfeuchtigkeit:	[g/kg]	0,0	0,0			0,0
NOX Korrekturfaktor:	[-]	0,739	0,739			0,739
Verdünnungsfaktor (Beutel):	[-]	18,37	22,96			20,66
CVS Volumen bei 20°C:	[m³]	73,096	73,095			146,191
CVS Volumen bei 0°C:	[m³]	68,109	68,108			136,217
CVS Temperatur	[°C]	35,043	34,926			34,984
PTS-Volumen bei 20°C	[l]	451,0	451,0			902,1
PTS-Volumen bei 0°C	[l]	420,3	420,3			840,5
Wegstrecke	[km]	4,054	4,073			8,127
Wegstrecke	[mi]	2,519	2,531			5,050
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			317,69
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,144	0,002			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,661	0,500			
Partikelanzahl	[1/cm³]	2,79E+05	2,23E+02			2,79E+05
Partikelanzahl	[1]	2,04E+13	1,63E+10			2,04E+13
Partikelanzahl vor Verd.	[1/cm³]	162,381	0,130			162,511
Verd. Faktor (Partikelanzahl)	[1]	1719,180	1719,180			1719,180
Phase.WeightingFactor	[-]	0,661	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	108,00	2,87	2,86	2,80				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	4,69	1,89	1,75	1,84				
NMHC	[ppm C1] :	103,31	0,99	1,11	0,96				
CO	[ppm] :	184,00	0,60	0,68	0,50				
NOX	[ppm] :	0,95	0,06	0,78	0,18				
NO	[ppm] :	0,92	0,03	0,65	0,04				
CO2	[%] :	0,700	0,042	0,583	0,045				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	1116,140	1,939			559,039
CH4	[mg/km]	34,873	0,000			17,437
NMHC	[mg/km]	1085,3210	1,9390			543,630
NOX	[mg/km]	22,7775	15,6222			19,200
NO	[mg/km]	22,7434	15,3896			19,067
HC+NOx	[mg/km]	1138,9180	17,5612			578,240
CO	[mg/km]	3852,1590	4,1805			1928,170
CO2	[g/km]	217,85	177,32			197,585
Partikel	[mg/km]	5,804	0,080			2,942
Partikelanzahl	[1/km]	5,03E+12	4,00E+09			2,52E+12

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	9,796	7,640			9,834
Kraftstoff-Wirtschaftlich	[km/l]	10,208	13,089			10,169
Kraftstoff-Wirtschaftlich	[mi/gal]	24,009	30,783			23,916

Bemerkungen/Sonstiges

Test 1

2_MK1 – UDC_1_2 (-7 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-25 07:31		**Testzelle: 03**

Testbegleitdaten 2014072503-2

Testdatum:	2014-07-25 07:31	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56159

Fahrzeug *S1296*

Auftraggeber:	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugmo:	Hyundai i10	Hubraum [cm³]:	
Kennzeichen:	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten	**eingestellte Rollenlast**		**Straßenlast**	
Schwungma:	1020	F0 [N]:	-3,25	F0 [N]: 62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]: 0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]: 0,02648

Kraftstoff *EcoTraffic Neste Oil Sample1*

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850 Dichte[kg/l]: 0,748

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	-6,8	-7,0			-6,904
Luftdruck:	[mbar]	1005	1005			1005
Relative Luftfeuchtigkeit:	[%]	0,0	0,0			0,0
Absolute Luftfeuchtigkeit:	[g/kg]	0,0	0,0			0,0
NOX Korrekturfaktor:	[-]	0,739	0,739			0,739
Verdünnungsfaktor (Beutel):	[-]	18,35	22,66			20,50
CVS Volumen bei 20°C:	[m³]	73,004	73,040			146,044
CVS Volumen bei 0°C:	[m³]	68,023	68,057			136,080
CVS Temperatur	[°C]	35,081	34,903			34,992
PTS-Volumen bei 20°C	[l]	451,1	451,1			902,2
PTS-Volumen bei 0°C	[l]	420,3	420,3			840,6
Wegstrecke	[km]	4,035	4,060			8,095
Wegstrecke	[mi]	2,507	2,523			5,030
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,100	0,004			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	2,98E+05	2,83E+02			1,49E+05
Partikelanzahl	[1]	2,17E+13	2,07E+10			2,17E+13
Partikelanzahl vor Verd.	[1/cm³]	173,102	0,164			86,633
Verd. Faktor (Partikelanzahl)	[1]	1719,180	1719,180			1719,180
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	101,00	2,87	3,24	2,93				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	4,74	2,04	1,94	2,04				
NMHC	[ppm C1] :	96,26	0,83	1,30	0,89				
CO	[ppm] :	188,00	0,55	0,70	0,56				
NOX	[ppm] :	1,18	0,07	0,53	0,04				
NO	[ppm] :	1,14	0,03	0,50	0,04				
CO2	[%] :	0,702	0,043	0,591	0,045				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	1045,566	4,703			525,134
CH4	[mg/km]	33,868	0,000			16,934
NMHC	[mg/km]	1015,6350	4,7029			510,169
NOX	[mg/km]	28,5687	12,2665			20,418
NO	[mg/km]	28,4909	11,7151			20,103
HC+NOx	[mg/km]	1074,1350	16,9694			545,552
CO	[mg/km]	3950,7100	3,3341			1977,022
CO2	[g/km]	218,79	180,35			199,570
Partikel	[mg/km]	4,016	0,156			2,086
Partikelanzahl	[1/km]	5,38E+12	5,09E+09			2,69E+12

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	9,834	7,771			8,799
Kraftstoff-Wirtschaftlich	[km/l]	10,169	12,868			11,365
Kraftstoff-Wirtschaftlich	[mi/gal]	23,917	30,265			26,728

Bemerkungen/Sonstiges

Test 2

1_MK2 – UDC_1_2 (-7 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-07-31 07:19		**Testzelle: 03**

Testbegleitdaten 2014073103-2

Testdatum:	2014-07-31 07:19	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56297

Fahrzeug *S1296*

Auftraggeber:	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugmo:	Hyundai i10	Hubraum [cm³]:	
Kennzeichen:	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma:	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff *Eco Traffic Neste Oil Sample 2*

Kraftstoffart		Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850 Dichte[kg/l]: 0,736

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	-6,9	-7,0			-6,928
Luftdruck:	[mbar]	1006	1006			1006
Relative Luftfeuchtigkeit:	[%]	0,0	0,0			0,0
Absolute Luftfeuchtigkeit:	[g/kg]	0,0	0,0			0,0
NOX Korrekturfaktor:	[-]	0,739	0,739			0,739
Verdünnungsfaktor (Beutel):	[-]	18,44	22,50			20,47
CVS Volumen bei 20°C:	[m³]	73,082	73,117			146,199
CVS Volumen bei 0°C:	[m³]	68,096	68,129			136,225
CVS Temperatur	[°C]	34,873	35,096			34,984
PTS-Volumen bei 20°C	[l]	451,0	451,1			902,1
PTS-Volumen bei 0°C	[l]	420,3	420,3			840,6
Wegstrecke	[km]	4,030	4,055			8,085
Wegstrecke	[mi]	2,504	2,520			5,024
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,084	0,009			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	2,64E+05	3,96E+02			1,32E+05
Partikelanzahl	[1]	1,93E+13	2,90E+10			1,93E+13
Partikelanzahl vor Verd.	[1/cm³]	153,609	0,230			76,919
Verd. Faktor (Partikelanzahl)	[1]	1719,180	1719,180			1719,180
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	101,00	3,12	3,44	3,18				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	5,12	2,10	2,00	2,10				
NMHC	[ppm C1] :	95,88	1,02	1,44	1,08				
CO	[ppm] :	253,00	0,80	6,27	0,79				
NOX	[ppm] :	0,65	0,12	0,49	0,18				
NO	[ppm] :	0,58	0,04	0,34	0,05				
CO2	[%] :	0,691	0,045	0,595	0,048				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	1045,420	4,301			523,251
CH4	[mg/km]	37,820	0,000			18,852
NMHC	[mg/km]	1011,9960	4,3011			506,5905
NOX	[mg/km]	13,8120	8,0391			10,9166
NO	[mg/km]	13,8931	7,4490			10,6611
HC+NOx	[mg/km]	1059,2320	12,3402			534,1674
CO	[mg/km]	5327,8580	115,9622			2713,8530
CO2	[g/km]	215,22	181,12			198,12
Partikel	[mg/km]	3,398	0,354			1,871
Partikelanzahl	[1/km]	4,79E+12	7,14E+09			2,39E+12

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	9,923	7,932			8,925
Kraftstoff-Wirtschaftlich	[km/l]	10,077	12,607			11,205
Kraftstoff-Wirtschaftlich	[mi/gal]	23,701	29,651			26,353

Bemerkungen/Sonstiges

1. Test MK2
-7°C

2_MK2 – UDC_1_2 (-7 C)

MPAS Kurzprotokoll TÜV - Essen	EU5	2014-08-01 07:47		**Testzelle: 03**

Testbegleitdaten 2014080103-3

Testdatum:	2014-08-01 07:47	Fahrkurve:	2_UDC|Default|Hand|0|||
Bediener:	Jablonski	Schaltpunkttabelle:	
Fahrer:	Jablonski	Gesetzgebung :	EU5
Device Konfiguration :		Berechnungsmethode :	GASOLINE
		Kilometerstand:	56305

Fahrzeug ***S1296***

Auftraggeb	Ecotraffic	Auftragsnummer:	810 883 4525 Pos:200
Hersteller:	Hyundai	Motorcode:	
Fahrzeugm	Hyundai i10	Hubraum [cm³]:	
Kennzeiche	LRM600	Getriebe:	M5
Fahrgestellnummer:	MALAN51BABM906257	Reifengröße:	165/60R14

Rollendaten		**eingestellte Rollenlast**		**Straßenlast**	
Schwungma	1020	F0 [N]:	-3,25	F0 [N]:	62,93
Radstand [r	2378	F1 [N/(km/h)]:	0,0686	F1 [N/(km/h)]:	0,5931
Coastdown [s]:		F2 [N/(km/h)2]:	0,02757	F2 [N/(km/h)2]:	0,02648

Kraftstoff **Eco Traffic Neste Oil Sample 2**

Kraftstoffart	Heizwert [BTU/lb]:	18080,00	C-Gehalt:	0,850	Dichte[kg/l]: 0,736

Umgebungsdaten	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Umgebungstemperatur:	[°C]	-7,3	-7,0			-7,134
Luftdruck:	[mbar]	1001	1001			1001
Relative Luftfeuchtigkeit:	[%]	0,0	0,0			0,0
Absolute Luftfeuchtigkeit:	[g/kg]	0,0	0,0			0,0
NOX Korrekturfaktor:	[-]	0,739	0,739			0,739
Verdünnungsfaktor (Beutel):	[-]	17,86	22,68			20,27
CVS Volumen bei 20°C:	[m³]	72,694	72,754			145,448
CVS Volumen bei 0°C:	[m³]	67,735	67,790			135,525
CVS Temperatur	[°C]	35,039	34,886			34,962
PTS-Volumen bei 20°C	[l]	451,1	451,1			902,3
PTS-Volumen bei 0°C	[l]	420,4	420,4			840,7
Wegstrecke	[km]	4,001	4,030			8,031
Wegstrecke	[mi]	2,486	2,504			4,990
Phasendauer	[s]	780	780			1560
Fahrer Verletzung	[s]	0,00	0,00			0,00
Anzahl Fahrfehler	[-]	0	0			0
Primärfilter Diff	[mg]	0,105	0,003			
Sekundärfilter Diff	[mg]	0,000	0,000			
Filtereffektivität	[%]	100,0%	100,0%			
Phase.WeightingFactor	[-]	0,500	0,500			
Partikelanzahl	[1/cm³]	3,21E+05	3,18E+02			1,61E+05
Partikelanzahl	[1]	2,34E+13	2,32E+10			2,34E+13
Partikelanzahl vor Verd.	[1/cm³]	186,946	0,185			93,566
Verd. Faktor (Partikelanzahl)	[1]	1719,180	1719,180			1719,180
Phase.WeightingFactor	[-]	0,500	0,500			

Konzentrationen		**A 1**	**L 1**	**A 2**	**L 2**	**A 3**	**L 3**	**A 4**	**L 4**
THC	[ppm C1] :	104,00	2,79	3,29	2,87				
THC Tunnel	[ppm C1] :								
CH4	[ppm C1] :	4,91	1,85	1,76	1,84				
NMHC	[ppm C1] :	99,09	0,94	1,53	1,03				
CO	[ppm] :	241,00	0,79	5,51	0,67				
NOX	[ppm] :	1,16	0,52	0,68	0,30				
NO	[ppm] :	0,67	-0,13	0,26	-0,12				
CO2	[%] :	0,716	0,044	0,590	0,046				

Beutelmassen/km	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
HC	[mg/km]	1082,868	5,822			542,400
CH4	[mg/km]	38,230	0,013			19,053
NMHC	[mg/km]	1049,0820	5,8097			525,5624
NOX	[mg/km]	17,1115	9,9914			13,5386
NO	[mg/km]	20,3570	9,3928			14,8551
HC+NOx	[mg/km]	1099,9800	15,8131			555,9389
CO	[mg/km]	5084,2240	102,3599			2584,2970
CO2	[g/km]	224,13	180,47			202,22
Partikel	[mg/km]	4,267	0,117			2,185
Partikelanzahl	[1/km]	5,84E+12	5,75E+09			2,91E+12

Verbrauch-Beutel	**Einheit**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Gesamt**
Kraftstoffverbrauch	[l/100km]	10,301	7,903			9,098
Kraftstoff-Wirtschaftlich	[km/l]	9,707	12,654			10,992
Kraftstoff-Wirtschaftlich	[mi/gal]	22,831	29,761			25,852

Bemerkungen/Sonstiges

2. Test MK2 Behälter FS13
-7°C